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(54) PERSONAL CARE DEVICE SUCH AS ELECTRIC SHAVER

KÖRPERPFLEGEVORRICHTUNG WIE ETWA ELEKTRISCHER RASIERER

DISPOSITIF DE SOINS PERSONNELS TEL QU'UN RASOIR ÉLECTRIQUE

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EP 3 546 155 B1

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Description

FIELD OF THE INVENTION

[0001] The present invention relates to a personal care device, in particular a hair removal device such as an electric shaver, comprising a housing with a working head attached thereto, said housing including an inner housing and an outer housing, and a display including a light source accommodated in the inner housing to emit light through transparent portions of said inner and outer housings, said display further including a display foil having portions of different transparency and/or different colors forming display symbols, said display foil being sandwiched between said transparent portions of the inner and outer housings. The present invention further relates to a method of manufacturing such a personal care device.

BACKGROUND OF THE INVENTION

[0002] Electric shavers and other hair removal devices such as epilators usually have one or more cutter elements driven by an electric drive unit in an oscillating manner where the cutter elements reciprocate under a shear foil, wherein such cutter elements or undercutters may have an elongated shape and may reciprocate along their longitudinal axis. Other types of electric shavers use rotatory cutter elements which may be driven in an oscillating or a continuous manner. Said electric drive unit may include an electric motor or a magnetic-type linear motor, wherein the drive unit may include a drive train having elements such as an elongated drive transmitter for transmitting the driving motion of the motor to the cutter element, wherein said motor may be received within the handle portion of the shaver.

[0003] On the other hand, when the motor is accommodated within the shaver head, no such drive train extending from the housing into the shaver head is necessary. Nevertheless, usually an electric connection from the power source accommodated in the housing extends into the shaver head to supply power from said electric power source to the motor. Such power source may be an electric power storage such as a battery or an accumulator.

[0004] The housing accommodating the electric motor and/or electric power source often includes an elongated base element closed by a cover element to allow for mounting and accommodating the electronic components inside the housing. As the housing should nevertheless form a sealed container for protecting the electric components from liquids and moisture, a seal is provided between the base element and the cover element, wherein such seal may include a sealing ring extending between surfaces of the base element and the cover element facing each other.

[0005] Such sealing of the housing is also necessary so as to protect other electronic components from liquids

and moisture. For example, personal care devices often include a display device for displaying various information to a user. Such display may include symbols indicating a battery's charging status, a cleaning status, wear and tear necessitating, for example, replacement of the tool head, a level of an application liquid reservoir or other types of information such as treatment instructions, speed modes, user modes or styling modes.

[0006] Such display devices may include at least one light source such as an LED to emit light from the interior of the housing through a transparent portion of the housing, wherein such light may be guided through a display foil provided with more and less transparent portions and/or portions of different colors to form the aforementioned symbols which are illuminated by the light guided through said display foil. While the light source and supplying and controlling elements connected thereto such as an electronic circuit board are received inside the housing to protect them against moisture, said display foil is sometimes positioned outside the sealed housing container to provide for a more brilliant illumination of the displaying symbols richer in contrast.

[0007] More particularly, said display foil may be positioned outside an inner housing which is sealed against moisture or liquids, but inside an outer housing encompassing or surrounding said inner housing so that the aforementioned display foil is sandwiched between the inner and outer housings. Such two-shell or multiple-shell structure of the housing is sometimes desired so as to hide the functional structure of the inner housing and to provide for good handling, aesthetic appearance and modular configuration of different types of devices. Each of the inner and outer housings may be individually adapted to different functions. For example, the inner housing may form a functional platform for accommodating electronic components protected against moisture and positioning drivetrain elements and supporting the working head, whereas the outer housing may fulfill other needs such as forming an ergonomic handle with an organic shape and an anti-slippery surface, or an attractive outer appearance.

[0008] Such outer housing, however, is sometimes not sealed against moisture or liquids or foam or gel which therefore may get contact to the display foil arranged between the outer and inner housings. Such moisture getting contact to the display foil may impair visibility of the display symbols or, even worse, may harm the function of the display foil due to, for example, dissolving the borders between transparent and opaque portions.

[0009] Furthermore, when positioning the display foil between inner and outer housing portions, it is sometimes difficult to exactly align the symbols of the display foil with the light source accommodated in the interior of the inner housing, as manufacturing tolerances may cause misalignment of the display foil. Even when there are only small misalignments, illumination of the symbols may be severely impaired due to light diffusion or stray light or shadowing. As there are usually a plurality of sym-

bols positioned rather close to each other, the light sources are also arranged in a sort of rather dense matrix so that even small misalignments may cause light emitted from a light source associated with a first symbol to stray and scatter onto a second symbol.

[0010] A personal care device of the aforementioned type is shown, for example, by US 2009/0025229 A1 which discloses a drive unit for the cutter elements of an electric shaver, wherein the drive unit includes transmitter pins extending from the shaver housing towards the shaver head. A similar device is known from US 7,841,090 B2.

[0011] Further electric shavers are known from, for example, US 3,748,371 B, FR 1391957 A, GB 811,207 B and US 5,704,126 B. A personal care device and in particular an electric shaver according to the features of the preamble portion of claim 1 is known from WO2005051615A1.

SUMMARY OF THE INVENTION

[0012] It is an objective underlying the present invention to provide for an improved personal care device such as a hair removal device as an electric shaver avoiding at least one of the disadvantages of the prior art and/or further developing the existing solutions.

[0013] This objective is solved by the features of each of claim 1. The sub-claims provide advantageous embodiments.

[0014] A more particular objective underlying the invention is to provide for cost-sensitive, easy manufacturing of personal care devices such as a hair removal device as electric shavers having a brilliant display for displaying information and sufficiently sealed against liquids.

[0015] A further objective underlying the invention is to provide for an improved hair removal device such as e.g. a shaver having a sealed container housing for accommodating electric components such as an electric motor and/or an electric power source, and a display rich in contrast and providing for good visibility.

[0016] More particularly, an objective underlying the present invention is to combine an easily visible display with sealing of the personal care device's housing and protection of the display against moisture even when there are tolerances in shape and/or dimensions of the housing elements to be connected and/or variations in the mounting forces pressing the housing elements against each other due to tolerances and/or mistakes in the assembling process.

[0017] To achieve at least one of the aforementioned objectives, it is suggested to provide a personal care device as mentioned above having a sealing of the display foil to both the inner and outer housing elements to protect the display foil against liquids and moisture. More particularly, the display foil may be glued to both the inner and outer housing by means of an adhesive on each of opposite sides of the display foil. Due to such adhesion

of the display foil to the outer side of the inner housing and the inner side of the outer housing, water or other liquids and moisture or foam or gel are prevented from creeping onto the display foil surface, thereby preventing visibility from being impaired or the display foil from becoming defective.

[0018] So as to compensate for tolerances in the distance of the inner surface of the outer housing from the outer surface of the inner housing and/or compensate for movements of the inner and outer housings relative to each other due to deformation due to gripping forces and/or bending of the housing, an adhesive foam such as PE foam or PU foam may be used as adhesive for glueing the display foil to the inner or outer housing.

[0019] The display foil may be provided with the symbols to be illuminated by means of, for example, laser treatment of the display foil, after having attached the display foil to the inner housing. Applying the symbols to the foil after having fixed the foil to the inner housing helps in avoiding misalignment of the symbols relative to the inner housing and components received therein such as the light source.

[0020] According to a still further aspect, the inner housing may be provide with opaque shading fences on the interior side of the inner housing for restricting light emitted by a light source associated with a transparent housing portion aligned with a display symbol to be transmitted only to said display symbol and prevent other symbols from being illuminated by stray light or scattered light originating from such light source.

[0021] These and other advantages become more apparent from the following description giving reference to the drawings and possible examples.

BRIEF DESCRIPTION OF THE DRAWINGS

[0022]

Fig. 1: a perspective view of an electric shaver with a shaver connected to a handle by means of a support structure,

Fig. 2: a schematic explosion view of the housing of the electric shaver showing the shell-like structure of the housing including an outer housing and an inner housing, and a display foil to be arranged therebetween,

Fig. 3: a perspective, explosion view of the inner housing of Fig. 2, wherein an electronic core component including an LED array of a display is to be inserted into an elongated, cup-shaped base element of the inner housing,

Fig. 4: a cross-sectional view of the electric shaver's handle showing the arrangement of the display foil between the inner and outer housings and the arrangement of the light source and the

shading fences inside the inner housing,

Fig. 5: a schematic cross-sectional view of the display foil and the adhesive layers fixing the display foil to the inner and outer housings, wherein according to a first aspect two transparent adhesive layers fully covering the opposite surfaces of the display foil are bonding the display foil to the inner and outer housings,

Fig. 6: a schematic cross-sectional view of the display foil and the adhesive layer similar to Fig. 5, wherein a bottom side of the display foil is bonded to the inner housing by means of a transparent adhesive layer fully covering the display foil and the top side of the display foil is bonded to the outer housing by means of an adhesive layer having a window leaving open the display area of the display foil,

Fig. 7: a schematic cross-sectional view of the display foil and the adhesive layer similar to Fig. 5, wherein a top side of the display foil is bonded to the outer housing by means of a transparent adhesive layer fully covering the display foil and the bottom side of the display foil is bonded to the inner housing by means of an adhesive layer having a window leaving open the display area of the display foil,

Fig. 8: a schematic cross-sectional view of the display foil and the adhesive layer similar to Fig. 5, wherein a bottom side of the display foil is bonded to the inner housing by means of a transparent adhesive layer fully covering the display foil and the top side of the display foil is bonded to the outer housing by means of an adhesive foam layer having a window leaving open the display area of the display foil,

Fig. 9: a schematic cross-sectional view of the display foil and the adhesive layer similar to Fig. 5, wherein a top side of the display foil is bonded to the outer housing by means of a transparent adhesive layer fully covering the display foil and the bottom side of the display foil is bonded to the inner housing by means of an adhesive foam layer having a window leaving open the display area of the display foil,

DETAILED DESCRIPTION OF THE INVENTION

[0023] According to an aspect, to achieve at least one of the aforementioned objectives, it is suggested for a personal care device to seal the display foil, which is arranged between the inner and outer housings, to the inner surface of the outer housing as well to the outer surface of the inner housing. More particularly, the display foil is

glued to both the inner and outer housings by means of an adhesive on each of the opposite major surfaces of the display foil so that the outer housing is glued to the inner housing via said display foil. Due to such gluing of both surfaces of the display foil to the inner and outer housings, water or other liquids and moisture are prevented from creeping onto the displaying surface of the display foil what prevents visibility of the display symbols from being impaired and the display foil from becoming defective.

[0024] More particularly, so as to prevent water or moisture from creeping onto the displaying symbols, said adhesive may form at least a closed sealing loop surrounding the area of the display foil in which the display symbols are arranged, wherein such closed sealing loop may run along the outer edges of the display foil. Basically, such closed sealing loop formed by the adhesive may be provided on each of opposite sides of the display foil so central areas on both sides of the display foil may be left open. However, in the alternative, at least one of the major surfaces of the display foil may be fully covered by adhesive and fully glued to the respective housing element so that the display foil, at least on one side, is in full contact with the housing.

[0025] More particularly, on one side of the display foil, the adhesive may form a transparent adhesive layer covering at least a major portion of the display foil including the display area in which the display symbols are arranged, whereas on the opposite other side of the display foil the adhesive may form an adhesive layer having a window leaving open or leaving uncovered the display symbols. In such window of the adhesive layer, the display foil is not covered by adhesive and may be spaced apart from the transparent housing portion covering the display foil.

[0026] Glueing at least one side of the display foil substantially completely to the housing, i.e. the complete surface area of said at least one side or at least a major portion of the surface area of said side is covered by adhesive and glued to said housing, helps in maintaining the desired shape of the display foil and prevents the display foil from corrugating or undulating or wrinkling or other undesired deformations.

[0027] Both sides of the display foil may be substantially completely glued to the inner and outer housings, wherein in such case a transparent adhesive is used to glue the display foil to the inner and outer housings so that light may shine through the transparent adhesive layers, in particular in the area of the display symbols.

[0028] When one of the adhesive layers is provided with a window so that basically a central portion of the display unit is not glued to the corresponding housing element, such windowed adhesive layer may be provided on a top surface of the display unit to fix the display foil to the outer housing. In the alternative, such windowed adhesive layer may be provided on a bottom side of the display foil to connect the display foil to the inner housing.

[0029] Such adhesive layer having a window portion

leaving open the display foil's area in which the display symbols are arranged, may consist of or include an opaque adhesive material. Use of such opaque adhesive material forming a window frame surrounding the display area of the display foil may prevent scattered light from illuminating other portions than the display area and thus, may improve visibility of the illuminated symbols.

[0030] According to a further aspect, the adhesive for glueing the display foil to the inner and/or outer housing may include an adhesive foam and/or be made from a foamy material. For example, a polyurethane (PU) or a polyethylene (PE) foam may be used to fixedly attach the display unit to the inner housing or to the outer housing. Adhesive foam may be advantageous so as to compensate for tolerances in the distance of the inner surface of the outer housing from the outer surface of the inner housing and/or to compensate for movements of the inner and outer housings relative to each other which may occur, for example, due to bending of the housing and/or gripping the housing with excessive forces and/or for avoiding the generation of bubbles between two glue layers. Advantageously, the adhesive foam may be elastic and/or deformable to allow for such compensation. Moreover, such adhesive foam may easily compensate for uneven portions of the housings' surface and to provide for a smooth surface holding the display foil.

[0031] In particular, the aforementioned adhesive layer having a window leaving open the display foil's area in which the display symbols are provided, may be formed from such adhesive foam.

[0032] In order to avoid excessive forces onto the adhesive bonding of the display foil or even loosening or detaching the display foil from the inner and/or outer housing, it may be advantageous to provide for a multipiece structure of the outer housing. More particularly, the outer housing may be composed of a plurality of housing parts, wherein an outer housing display part to which the display foil is attached, may form a substantially plate-like insert received in a window of another outer housing part which helps in avoiding transmission of forces applied to said other housing part to said outer housing display part. In other words, the outer housing display part may form a window pane to be inserted into the window frame formed by said other housing part. More particularly, said outer housing display part forming the aforementioned insert may be inserted into the window of the other housing part from an inner side of the outer housing so that the outer housing display part may stick to the display foil even when the other housing part having said window is moved away from the display foil. More particularly, the other outer housing part having said window may, with an edge portion of the window, overlay the outer housing display part from an outside thereof.

[0033] So as to allow for easy manufacturing, but nevertheless receive precise alignment of the display symbols with the light sources received in the interior of the inner housing, the display foil may be provided with the display symbols after having been attached to the inner

housing. More particularly, when manufacturing and/or assembling the personal care device, a plain display foil not yet having the display symbols may be glued onto the outer surface of the inner housing. After having attached the display foil onto the inner housing by means of glueing, a marking treatment may be applied to the display foil so as to generate the display symbols desired. More particularly, a laser treatment process may be used so as to provide the display foil attached to the inner housing with the desired symbols.

[0034] The display foil may include a laser-active layer. For example, a transparent foil may be used having a laser-active layer becoming opaque when applying laser light thereon. In the alternative, the laser-active layer may be originally opaque, for example black, wherein the laser-active layer may be configured to become transparent in the portions subject to the laser beam. By activation by laser it is further possible to apply the laser process after the shaver is finally ready manufactured and just before packaging the shaver may be tailored to the specific shaver type by applying the type specific display foil activation process (if e.g. shaver types are merely different by the symbols shown on the laser display). By this process the inventors of finished goods is reduced.

[0035] Other treatment processes may be used to mark the display foil with the desired symbols, for example applying radiation onto the foil via a mask.

[0036] Provision of the display symbols after having attached the display foil to the inner housing is not only advantageous in terms of exact alignment irrespective of tolerances in positioning the foil onto the housing, but also allows for easy logistics avoiding storage of different display foils preconfigured for different models of the personal care device, thus reducing the number of different parts needed, and making delivery of the parts needed for assembling an embodiment just in time easier.

[0037] After having created the symbols on the display foil, the outer housing may be glued to the display foil. Thus, the manufacturing process may include the following three steps executed one after the other with optional other intermediate treatment steps therebetween: glueing a plain display foil onto the inner housing, marking the display foil with the symbols to be displayed and then glueing the outer housing onto the marked display foil. Said optional intermediate steps may include, for example, a heat application step for expediting hardening of the adhesive, or a cooling step after laser marking the display foil.

[0038] In order to help in illuminating a symbol of the display foil brightly and exactly without illumination of neighboring regions of the display foil, the inner housing may be formed to include transparent portions and opaque portions. More particularly, the inner housing may include a transparent portion aligned with and positioned below a display symbol of the display foil, and a non-transparent portion surrounding said transparent portion, said non-transparent portion may have a ring-shape and/or may form a shadowing fence preventing

light going through the transparent portion from spreading into other portions neighboring the display symbol.

[0039] More particularly, the inner housing may be formed as a two-component or multiple component part comprising portions of different materials. For example, the inner housing may be a molded plastic part made from two different plastic components one of which is transparent and another one is opaque.

[0040] When the display foil includes a plurality of display symbols which may be arranged in a regular pattern such as a matrix of symbols, the inner housing may have a plurality of transparent portions aligned with the position of the display symbols, wherein each of said transparent housing portions may be surrounded, at least in part, by non-transparent housing portions. Said non-transparent housing portions separating the transparent housing portions from each other, may form a net-like or grid-like, opaque structure separating the transparent portions of the inner housing aligned with the display symbols from each other. For example, the transparent portions of the inner housing may be formed from a transparent hard-plastic material component, whereas the non-transparent, grid-like structure may be formed from an opaque soft-material plastic component.

[0041] In addition or in the alternative to such wall structure of the inner housing including transparent and non-transparent portions, a shadowing fence structure also may be provided between the inner surface of the inner housing and the light source. More particularly, such shadowing fence structure on the inner side of the inner housing may include at least one non-transparent sleeve surrounding the at least one light source and extending from the light source to the inner surface of the inner housing, wherein a longitudinal axis of such sleeve may extend substantially perpendicular to the inner housing and/or to the display foil and/or substantially parallel to the main axis of emission of the light source.

[0042] When there are a plurality of light sources associated with a plurality of display symbols, a plurality of such sleeve-like shadowing fences may be provided so as to form light pipes directing light from each light source to the display symbol associated therewith and to prevent such light from spreading towards another display symbol. Again, when the display symbols and the light sources associated therewith are arranged in a regular pattern such as a matrix of light sources, the sleeve-like shadowing fences may form a grid-like or net-like structure of opaque material having light channels formed by recesses in the material and going from a light source to the respective display symbol, more particularly the transparent portion of the inner housing associated with such display symbol.

[0043] The light sources may be arranged on a common circuit board for supplying electric energy to the light sources and/or controlling the light sources. The sleeve-like shadow fences forming light pipes may extend between such circuit board and the inner housing, wherein the shadowing fence structure may be attached to the

circuit board and/or to the inner housing in a fixedly manner, for example by means of glueing or by means of press-fitting contact.

[0044] In order to compensate for an uneven surface of the aforementioned circuit board and/or of the inner housing surface, said shadowing fence structure may be formed by a foamy material allowing for full contact of the surface of the circuit board and/or the inner housing irrespective of uneven sections thereof. More particularly, the shadowing fence structure may be formed by a sponge material such as cellular rubber or sponge rubber that may self-adapt its contour to the contact surface.

[0045] The inner housing may form a sealed, in particular water-proof container in which the motor and/or batteries or accumulators or other power sources and/or an electronic control unit for controlling the motor and the light sources of the display may be received and protected against liquids and moisture, wherein said container may have a barrel structure and being formed by an elongated pot or cup having a closed bottom and an open top side, wherein the motor, an electronic control unit and batteries may be completely received within such cup element of the inner housing which, at its open top side, may be closed by means of a cover element which may form the front face of the barrel-like container forming the inner housing.

[0046] Thus, the barrel-like container forming the inner housing may have a two-piece structure comprising only two pieces, i.e. the aforementioned cup element and the cover element. Such two-piece structure of the inner housing considerably reduces sealing efforts necessary to make the container waterproof. In particular, it may be sufficient to use only one ring-shaped seal to seal the interface between the cup element and the cover element, wherein such interface may have a circular configuration although other contours such as oval or elliptical contours would be possible.

[0047] Said cup element may include the transparent portion(s) aligned with the display foil.

[0048] The aforementioned cup-shaped base element may have an elongated configuration extending substantially over the entire length of the inner housing and may have a length corresponding to at least 80% or 90% of the inner housing and/or of the handle, whereas the cover element may have a length of smaller than 20% or smaller than 10% of the inner housing's length and/or the handle's length. Such cover element may have a disklike or plate like configuration, wherein it may have a slightly dome-shaped or convex contour.

[0049] The connector for connection to the shaver head's support structure may be provided on the aforementioned cover element.

[0050] The cover element and the cup element of the inner housing may be rigidly connected to each other, wherein various known types of connection techniques such as form-fitting, screwing, welding, glueing and/or snap-fitting may be used.

[0051] So as to hold the light source arrangement of

the display and/or the motor and/or the electronic control unit and/or the batteries in position within the inner housing, a support frame to which the aforementioned components are attached, may be inserted into the cup element and may be held there in place, wherein for example a slideable guide element such as a guiding groove and/or guiding projections may be provided. Such support frame may be formed by or include a circuit board bearing the light source(s) and/or forming part of the electronic control unit.

[0052] So as to help in sealing the inner housing, the inner housing may have only one opening which may be an opening in the cover element through which the shaft protrudes. Optionally, there may be a second opening in an end portion opposite to the cover element which second opening may be provided for a charging connection. However, such second opening may be avoided by means of integrating the charging connectors into the inner housing, for example by means of molding charging pins to be an integral part of the inner housing.

[0053] So as to allow communication with the control unit inside the inner housing, the inner housing and/or outer housing may include a soft material portion allowing to be deformed so as to activate switches positioned inside the inner housing.

[0054] So as to allow access to the aforementioned soft material portion associated with switching means of the inner housing, the outer housing also may have soft material portions and/or a recess or opening through which the soft material portion of the inner housing can be deformed.

[0055] The outer housing may have a two-piece or three-piece or multiple-piece shell structure comprising a plurality of shell elements that can be connected with each other and cover different portions of the inner housing. In particular, the outer housing may comprise two shell elements extending on opposite sides of the inner housing and connectable to each other. Such shell elements may have a substantially - roughly speaking - flute-like or chute-like contour so that the two shell elements together may surround the inner housing substantially completely.

[0056] In addition to such shell elements, the outer housing may further include a ring element to be connected with at least one of the aforementioned shell elements. Such ring element may help in forming a rigid, strong outer housing structure, wherein such ring element may be positioned at an end portion of the housing facing the shaver head. More particularly, such ring element may surround the shaft and may have an inner diameter which is significantly smaller than the maximum diameter of the inner housing.

[0057] When considering the handle in its entirety, the handle may have an elongated shape the cross-section of which may substantially continuously increase from a bottom face of the handle to a top face of the handle opposite to said bottom face of the handle. In other words, the cross-section of the handle may continuously in-

crease towards the shaver head. The cross-sectional shape may vary, wherein such cross-sectional shape may be substantially rounded and/or circular and/or elliptical and/or oval. "Substantially continuously" does not exclude some portions such as the display portion or an operating key portion where the cross-section does not increase. Nevertheless, when considering the larger proportions, the handle's cross-section may increase from a bottom end portion to a top end portion.

[0058] In addition, a drive transmitter may include a shaft or shaft-like elongated drive element extending from the handle into the interior of the shaver head.

[0059] So as to transform the rotatory oscillation of such shaft as mentioned before into a linear oscillation of at least one cutter element, a crank arm may be attached to the shaft, wherein such crank arm may be positioned within the shaver head and/or may support at least one drive pin for driving the cutter element. For example, such drive pin may extend substantially parallel to the shaft and may be fixedly attached to the crank arm to extend eccentric with regard to the shaft axis. When the crank arm, in its neutral position, extends substantially perpendicular to the desired linear oscillation of the cutter element, such drive pin is moved along a curved path tangential to the desired cutter element oscillation and thus, executes a nearly linear oscillation.

[0060] These and other features become more apparent from the examples shown in the drawings. As can be seen from Fig. 1, shaver 1 may have a shaver housing 300 forming a handle 2 for holding the shaver, which handle may have different shapes such as - roughly speaking - a substantially cylindrical shape or box shape or bone shape allowing for ergonomically grabbing or holding the shaver, wherein such shaver handle 2 has a longitudinal axis 20 due to the elongated shape of the handle, cf. Fig. 1.

[0061] More particularly, the handle 2 may have a cross-sectional shape which is rounded or circular or oval or elliptical, wherein mixtures of those shapes are possible. Irrespective of the cross-sectional shape, the cross-section may continuously increase from one end of the handle to the other one thereof.

[0062] On one end of the handle 2, a electric shaver head 3 is attached to the handle 2, wherein the shaver head 3 may be slewably supported about a swiveling axis 7 and about a tilting axis 11 which swiveling and tilting axes 7 and 11 may extend substantially perpendicular to each other and perpendicular to the aforementioned longitudinal handle axis 20.

[0063] When considering an oblong main axis 40 of the shaver head 3, the swivel axis 7 may extend parallel to such main axis 40, whereas the tilting axis 11 may extend perpendicular to such main axis 40. Such main axis 40 may be considered to extend in parallel to the larger side surfaces of the shaver head 3 and/or in parallel with a longitudinal axis of the elongated cutter elements 4 and/or in parallel with a cutter oscillation axis 8 and/or substantially perpendicular to the longitudinal handle ax-

is 20.

[0064] The shaver head 3 may include a pair of elongated cutter units 100 each comprising an elongated cutter element 4 that can be driven in a reciprocating manner along reciprocating axis 8 which may extend parallel to the aforementioned main axis 40. Said cutter elements 4 may cooperate with and reciprocate under shear foils 5 covering said cutter elements 4.

[0065] As can be seen from Figures 1 to 3, the shaver head 3 is supported onto the handle 2 by means of a support structure 30.

[0066] In addition to said support structure 30, an elongated drive transmitter may extend from the handle 2 into the shaver head 3 so as to connect the cutter element 4 to a motor 93 which may be accommodated in the interior of the handle 2. Such elongated drive transmitter 9 may include a shaft 90 which may be driven to rotate in a reciprocating manner, i.e. to rotate back and forth by a certain degree. A crank element may be rotatorily fixed to said shaft 90 and accommodated inside the shaver head 3. Such crank element may rigidly support a drive pin for each of said cutter elements 4. Said crank element, in a neutral position of the shaft 90 may extend transverse to the longitudinal axis of the elongated cutter element 4 so that the drive pin moves back and forth along the longitudinal axis of the cutter element 4. More particularly, such drive pin executes a movement along a segment of a circle. However, as the rotational oscillation has a limited amplitude and the circular segment is tangential to the longitudinal axis of the cutter element 4, such movement may be considered to approximate a linear movement along the cutter element's longitudinal axis.

[0067] As can be seen from Fig. 3, the housing 300 forming the handle 2 may have a two-shell structure comprising an inner housing 301 and an outer housing 302 (including parts 305, 304, 302d) surrounding said inner housing 301.

[0068] The inner housing 301 accommodates the aforementioned motor 93 and furthermore, an electrical storage such as batteries or an accumulator, and an electronic control unit, cf. Fig. 3, wherein the inner housing 301 may form a water-tight container protecting such components from liquids and moisture.

[0069] More particularly, the inner housing 301 may have an elongated barrel-like structure including a cup-shaped or pot-like base element 306 having a closed bottom and an open top face, wherein such base element may extend substantially over the entire length of the handle 2, cf. Fig. 2 and 3.

[0070] The base element 306 is closed, at its open top side, by a cover element 307 which may have a plate-like or slightly dome-like shape and, when closing the base element 306, forms a front face side of the inner housing 301 facing the shaver head 3.

[0071] The aforementioned cover element 307 includes an opening through which the shaft 90 penetrates the housing, wherein the cover element 307 is sealed, by means of appropriate seals, against said shaft 90 and

against the cover element 307 so that the inner housing 301 forms a waterproof container.

[0072] As can be seen from Fig. 3, charging connections such as charging pins 310 may protrude from the bottom side of the cover element 307 so as to allow charging of the batteries inside the inner housing 301.

[0073] The inner housing 301 may include at least one soft material portion 309 which can be associated with an electronic switching means inside the inner housing 301.

[0074] As can be seen from Fig. 3, the outer housing 302 may have a shell structure including a pair of elongated shell elements 304 and 305 which together may surround the inner housing 301 substantially entirely. The shell elements 304 and 305 may extend substantially over the entire length of the inner housing 301 and/or the handle 2.

[0075] Said shell elements 304 and 305 may be positioned on opposite sides of the inner housing 301 and may be connected to each other so that they together form the gripping surface of the substantially cone-shaped or cylindrical handle 2.

[0076] In addition, the outer housing 302 may include a ring element 303 forming, at least in part, a top side surface of the outer housing 302 facing the shaver head 3, wherein said ring element 303 may have an inner diameter substantially smaller than the maximum outer diameter of the inner housing 301. Said ring element 303 is connected to at least one of the shell elements 304 and 305 and may cover a ring-shaped portion of the cover element 307 of the inner housing 301.

[0077] Furthermore, there is a display 500 for displaying various information useful to a user of the device, wherein such display 500 may be arranged at the housing 300 forming the handle 2. Such display 500 may include a plurality of display symbols 501a-n to indicate such information such as a loading status of the device's battery, a cleaning status, last shaving time or other information as mentioned before.

[0078] Said display 500 includes a display foil 502 which may include transparent and non-transparent portions forming said symbols or portions of different colors forming such symbols 501a-n, wherein a light source 503 such as an LED may emit light to illuminate the symbols of the display foil 502.

[0079] As can be seen from Figures 3 to 9, said display foil 502 may be positioned between the inner housing 301 and the outer housing 302, wherein said inner and outer housings 301, 302 may include transparent portions allowing light emitted from the light source 503, which may be accommodated inside the inner housing 301, to be transmitted through the inner housing 301, the display foil 502 and the outer housing 302.

[0080] More particularly, the outer housing 302 may include a transparent outer housing display part 302d which may be a part of the aforementioned shell structure and one of the shell elements thereof. Said outer housing display part 302d may have a size comparable to the size

of the display foil 502 and/or may cover substantially the entire display foil 502.

[0081] As can be seen from Figure 3, said outer housing display part 302d may form an insert that can be inserted into a window portion of a further outer housing part that can be formed by one of the aforementioned shell elements 304. Advantageously, the shell element 304, with the edge of its window portion forming a sort of window frame, may overlay the outside of said outer housing display part 302 at an edge portion thereof. In other words, the outer housing display part 302d can be inserted into the window portion of shell element 304 from an interior side thereof. Thus, forces urging the outer housing 302 away from display foil 502 are not transmitted to the outer housing display part 302d and/or may not damage the bonding of the display foil 502 to the inner and outer housings as it will be described later.

[0082] The inner housing 301 also may have a transparent inner housing display part 301d which may form an integral part of the aforementioned base element or cup element 306. More particularly, the inner housing 301 may have a plurality of transparent portions in the region facing the display foil 502. Such plurality of transparent portions 301d may be aligned with the display symbols 501a-n so that the respective display symbol is positioned directly on the top surface of a corresponding transparent portion 301d in the center thereof.

[0083] Corresponding to a matrix-like pattern of the display symbols 501a-n, said transparent portions 301d of the inner housing 301 also may be arranged in a matrix-like pattern.

[0084] To avoid light scattering to different display symbols, said transparent portions 301d of the inner housing 301 may be separated from each other by non-transparent, opaque inner housing portions 301o. When the transparent display portions 301d are arranged in a matrix-like pattern, the opaque housing portions 301o may form a grid-like or net-like structure forming a shadowing fence structure.

[0085] The inner housing 301 may be formed as a two-components or multiple-components molded plastic part, wherein, for example, the transparent inner housing display portions 301d may be formed from a transparent hard plastic, whereas the grid-like shadowing fence structure formed by the aforementioned opaque housing portions 301o may be formed from an opaque soft plastic material.

[0086] As can be seen from Figures 4 to 9, the light sources 503, which also may be arranged in a matrix-like pattern corresponding to the pattern of the display symbols 501a-n, can be supported on a circuit board 504 which may include electric lines for supplying electric power to the light sources 503 and electronic circuit components for controlling said light sources 503.

[0087] As can be seen from Figure 3, said circuit board 504 including the light sources 503 may be preassembled with the motor 93 and the battery compartment to form a preassembled mounting structure that can be inserted

into the inner housing 301.

[0088] So as to avoid light scattering and spreading in the area between the circuit board 504 and the inner housing 301, a light shadowing fence structure 505 may be provided between the circuit board 504 and the inner surface of the inner housing 301. Such fence structure 505 may include a sleeve for each light source 503, which sleeve surrounds the associated light source 503 and may extend from the circuit board 504 to the inner surface of the inner housing 301. When there are a plurality of light sources 503, a plurality of sleeve-like shadowing fences may be provided as fence structure 505 which fence structure 505 may have a matrix-like or grid-like or net-like structure providing for a plurality of light pipes or light channels each going from a light source 503 to an associated display symbol 501a-n.

[0089] Such inner shadowing fence structure 505 may be made from an elastic and/or spongy material such as rubber sponge and may be in full contact with the surfaces of the circuit board 504 and the inner housing 301. For example, the fence structure 505 may be fixedly attached by means of, for example, glueing or press-fitting contact, to the circuit board 504 and/or to the inner housing 301.

[0090] As can be seen from Figures 5 to 9, the aforementioned display foil 502 is glued to the outer surface of the inner housing 301 as well as to the inner surface of the outer housing 302 by means of an adhesive layer 506 and 507 on each side of the display foil 502. 520 in Fig. 5 to 9 refers to the black laser active layer and 521 refers to the white PET basis foil.

[0091] Advantageously, at least on one side of the display foil 502, a continuous adhesive layer 506, 507 is provided to fully cover the display foil 502, wherein such continuous adhesive layer may be made from a transparent adhesive to allow light going therethrough. By means of such continuous, full-size transparent adhesive layer, the display foil 502 or at least a major portion thereof is in full contact with the corresponding inner or outer housing surface, thereby preventing the display foil 502 from corrugating or wrinkling or other undesired deformations.

[0092] As can be seen from Figure 5, such full-size adhesive layer 506 and 507 can be provided on both, opposite sides of the display foil 502.

[0093] In the alternative, only one side of the display foil 502 may be provided with such continuous full-size transparent adhesive layer, whereas the opposite side of the display foil 502 may be glued to the corresponding housing part by means of a frame-like adhesive layer having a window leaving open the central portion of the display foil 502. The advantage of such window is per one side to minimize or avoid the generation of bubbles because the glue layer is not properly fixed on the housing, per other side improve the light transmission.

[0094] As can be seen from Figure 6, the bottom side of the display foil 502 may be glued to the inner housing 301 by means of a transparent adhesive layer 506 fully

covering the display foil 502, whereas the top side of the display foil 502 can be glued to the outer housing 302 by means of a frame-like adhesive layer 507 having a central window 507w leaving open the central portion of the display foil 502.

[0095] In the alternative, as shown by Figure 7, the bottom side of the display foil 301 by means of said frame-like adhesive layer 506 having a central window 506w, whereas the top side of the display foil 502 may be glued to the outer housing 302 by means of a continuous full-size adhesive layer 507 fully covering the display foil 502.

[0096] Said frame-like adhesive layer having a central window may be formed from a non-transparent, opaque adhesive.

[0097] As can be seen from Figures 8 and 9, such frame-like adhesive layer having a central window also may be formed from an adhesive foam such as a PU foam or a PE foam so as to compensate for tolerances in the distance of the display foil 502 to the inner housing 301 or the outer housing 302. Such adhesive foam layer may have a multi-layered structure, wherein the foaming material may form a central or inner layer with sticky, adhesive layers provided on opposite sides and forming the surfaces of the adhesive foam layer, cf. Figures 8 and 9.

[0098] As can be seen from Figures 8 and 9, the adhesive foam layer may be provided on the top side of the display foil 502 to glue it to the outer housing 302, or may be provided on the bottom side of the display foil 502 to glue it to the inner housing 301. The other side of the display foil 502 of these two examples of Figures 8 and 9 may be glued to the other housing part by means of a continuous, substantially full-size transparent adhesive layer.

[0099] As illustrated by Figures 5 to 9, the display foil 502 may include a laser-active layer allowing the display symbols 501a-n to be created in a laser treatment step, wherein lase light is applied to the display foil 502.

[0100] Advantageously, such laser treatment can be made, after the display foil 502 has been glued to the inner housing 301. After having applied the laser markings onto the display foil 502 to form the display symbols 501, the outer housing 302, more particularly the outer housing display part 302d may be glued onto the top surface of the display foil 502. As mentioned above alternatively the laser treatment may be applied at the end of the shaver assembly process.

[0101] In a further manufacturing step, the other shell elements 304 and 305 of the outer housing 302 may be assembled to form the outer housing 302.

[0102] As can be seen from Figures 2 and 3, the pre-assembled electronic core of the shaver including the circuit board 504 with the light sources 503 supported thereon and optionally the motor 93 and the battery compartment may be inserted into the inner housing 301 before glueing the display foil 502 onto the outer surface of the inner housing 301, wherein the inner housing 301 may be completely closed and/or sealed before glueing

the display foil 502 onto the inner housing 301. In the alternative, the display foil 502 may be glued onto the inner housing 301 and/or the laser markings thereof may be effected, before said electronic core including the circuit board 504 is inserted into the inner housing 301.

[0103] The dimensions and values disclosed herein are not to be understood as being strictly limited to the exact numerical values recited. Instead, unless otherwise specified, each such dimension is intended to mean both the recited value and a functionally equivalent range surrounding that value. For example, a dimension disclosed as "40 mm" is intended to mean "about 40 mm."

15 **Claims**

1. A personal care device, in particular a hair removal device, more particularly an electric shaver, comprising a housing (300) with a working head (3) attached thereto, said housing (300) including an inner housing (301) and an outer housing (302), and a display (500) including a light source (503) accommodated in the inner housing (301) to emit light through transparent portions (301d, 302d) of said inner and outer housing (301, 302), said display (500) further including a display foil (502) having portions of different transparency and/or different colors forming display symbols (501), said display foil (502) being sandwiched between said transparent portions of the inner and outer housings (301, 302), **characterized in that** said display foil (502) is glued to both the inner and outer housings (301, 302) by means of an adhesive (508) on each of opposite sides of the display foil (502).
2. Personal care device according to the preceding claim, wherein said adhesive (508) forms at least a closed sealing loop surrounding the display symbols (501) on each of said opposite sides to seal the display foil (502) against the inner and outer housings (301, 302) to prevent liquid or moisture from contacting the display foil (502) inside said adhesive sealing loop.
3. Personal care device according to any one of the preceding claims, wherein on one side of said display foil (502), said adhesive (508) forms a transparent adhesive layer (506, 507) covering at least a major portion of the display foil (502) including the display symbols (501) thereof, whereas on the opposite other side of said display foil (502), the adhesive (508) forms an adhesive layer (506, 507) having a window (506w, 507w) leaving open the display symbols (501) and/or a central portion of said display foil (502).
4. Personal care device according to any one of the preceding claims, wherein the adhesive (508) on

- both sides of the display foil (502) is a transparent adhesive.
5. Personal care device according to claim 3, wherein the adhesive layer (506, 507) having said window (506w, 507w) is made from a non-transparent adhesive.
 6. Personal care device according to any one of the preceding claims, wherein at least one side of said display foil (502) is glued to the housing (300) by means of an adhesive foam.
 7. Personal care device according to the preceding claim in combination with claim 3, wherein the adhesive layer (506, 507) having the window (506w, 507w) includes an adhesive foam layer and/or an adhesive polyurethane foam layer and/or adhesive polyethylene foam layer and or having provided the window in the inner housing side.
 8. Personal care device according to any one of the preceding claims, wherein the outer housing (302) is composed of a plurality of housing parts, wherein an outer housing display part (302) to which the display foil (502) is glued, forms a substantially plate-like, transparent insert received in a window frame portion of another housing part (304) of the outer housing (302).
 9. Personal care device according to the preceding claim, wherein said further outer housing part (304), with an edge portion of its window, overlays an outer surface of said outer housing display part (302d) at an edge portion thereof.
 10. Personal care device according to any one of the preceding claims, wherein the inner housing (301) is a multiple component plastic mold part made from a transparent hard plastic material component forming the at least one transparent inner housing display portion (301d) aligned with the display foil (502) and an opaque soft or hard plastic material portion (301o) surrounding said inner housing display portion (301d).
 11. Personal care device according to any one of the preceding claims, wherein the inner housing (301) includes a grid-like shadowing fence structure made of opaque material (301o), said shadowing fence structure separating a plurality of transparent housing portions (301d) aligned with the display symbols (501) of the display foil (502) from each other, said shadowing fence structure preventing light to be transmitted through one of said plurality of transparent housing portions (301d) to one of the display symbols (501) from spreading and scattering towards one of the other display symbols (501).
 12. Personal care device according to any one of the preceding claims, wherein said at least one light source (503) is surrounded by a sleeve-like light pipe (509) extending from said light source (503) to the inner surface of the inner housing (301), said light pipe (509) having a substantially straight longitudinal axis substantially parallel to the main emission direction of the light source (503) and substantially perpendicular to the display foil (502).
 13. Personal care device according to the preceding claim, wherein said light pipe (509) is made from a sponge material or from rubber sponge and is contacting the inner surface of the inner housing (301) as well as a surface of a circuit board (504) supporting said at least one light source (503).
 14. Personal care device according to one of the two preceding claims, wherein a plurality of light sources (503) are arranged in a pattern corresponding to a pattern of the display symbols (501), wherein a plurality of light pipes (509) is provided to restrict light emitted by each of said plurality of light sources (503) to one of said plurality of display symbols (501), wherein said plurality of light pipes (509) is formed by a grid-like fence structure made of opaque material.
 15. Method of manufacturing a personal care device according to any one of the preceding claims, comprising the following steps:
 - fixedly attaching a plain display foil (502) to the inner housing (301),
 - after having attached said plain display foil (502), marking said display foil (502) with display symbols (501) by means of marking treatment.
 16. Method according to claim 15, wherein said marking treatment includes applying a laser beam onto said display foil (502).
 17. Method according to claim 15 or 16, wherein said marking treatment is applied after assembly of the device housing with all display parts mounted thereon and/or a laser beam activation of the display foil is applied through both the outer and the inner housing.

Patentansprüche

1. Körperpflegevorrichtung, insbesondere eine Haarentfernungs Vorrichtung, genauer ein elektrischer Rasierer, umfassend ein Gehäuse (300) mit einem daran befestigten Arbeitskopf (3), wobei das Gehäuse (300) ein Innengehäuse (301) und ein Außengehäuse (302) einschließt, und eine Anzeige (500), die

- eine Lichtquelle (503) einschließt, die in dem Innengehäuse (301) untergebracht ist, um Licht durch transparente Abschnitte (301d, 302d) des Innen- und Außengehäuses (301, 302) zu emittieren, wobei die Anzeige (500) ferner eine Anzeigefolie (502) mit Abschnitten unterschiedlicher Transparenz und/oder unterschiedlicher Farben einschließt, die Anzeigesymbole (501) bilden, wobei die Anzeigefolie (502) zwischen den transparenten Abschnitten des Innen- und Außengehäuses (301, 302) in Sandwichform angeordnet ist, **dadurch gekennzeichnet, dass** die Anzeigefolie (502) sowohl mit dem Innen- als auch mit dem Außengehäuse (301, 302) mittels eines Klebstoffs (508) auf jeder der gegenüberliegenden Seiten der Anzeigefolie (502) verklebt ist.
2. Körperpflegevorrichtung nach dem vorstehenden Anspruch, wobei der Klebstoff (508) mindestens eine geschlossene Dichtungsschleife bildet, die die Anzeigesymbole (501) auf jeder der gegenüberliegenden Seiten umgibt, um die Anzeigefolie (502) gegen das Innen- und Außengehäuse (301, 302) abzudichten, um zu verhindern, dass Flüssigkeit oder Feuchtigkeit mit der Anzeigefolie (502) innerhalb der Klebstoffdichtungsschleife in Kontakt kommt.
 3. Körperpflegevorrichtung nach einem der vorstehenden Ansprüche, wobei auf einer Seite der Anzeigefolie (502) der Klebstoff (508) eine transparente Klebstoffschicht (506, 507) bildet, die mindestens einen größeren Abschnitt der Anzeigefolie (502) einschließlich der Anzeigesymbole (501) darauf bedeckt, während auf der gegenüberliegenden weiteren Seite der Anzeigefolie (502) der Klebstoff (508) eine Klebstoffschicht (506, 507) bildet, die ein Fenster (506w, 507w) aufweist, das die Anzeigesymbole (501) und/oder einen Mittelabschnitt der Anzeigefolie (502) offen lässt.
 4. Körperpflegevorrichtung nach einem der vorstehenden Ansprüche, wobei der Klebstoff (508) auf beiden Seiten der Anzeigefolie (502) ein transparenter Klebstoff ist.
 5. Körperpflegevorrichtung nach Anspruch 3, wobei die Klebstoffschicht (506, 507) mit dem Fenster (506w, 507w) aus einem nichttransparenten Klebstoff hergestellt ist.
 6. Körperpflegevorrichtung nach einem der vorstehenden Ansprüche, wobei mindestens eine Seite der Anzeigefolie (502) mittels eines Klebstoffschaums mit dem Gehäuse (300) verklebt ist.
 7. Körperpflegevorrichtung nach dem vorstehenden Anspruch in Verbindung mit Anspruch 3, wobei die Klebstoffschicht (506, 507) mit dem Fenster (506w, 507w) eine Klebstoffschaumschicht und/oder eine Klebstoff-Polyurethenschaumschicht und/oder Klebstoff-Polyethylenschaumschicht einschließt und oder das Fenster in der Gehäuseinnenseite bereitgestellt aufweist.
 8. Körperpflegevorrichtung nach einem der vorstehenden Ansprüche, wobei das Außengehäuse (302) aus einer Vielzahl von Gehäuseteilen zusammengesetzt ist, wobei ein Außengehäuseanzeigeteil (302), mit der die Anzeigefolie (502) verklebt ist, einen im Wesentlichen plattenähnlichen, transparenten Einsatz bildet, der in einem Fensterrahmenabschnitt eines anderen Gehäuseteils (304) des Außengehäuses (302) aufgenommen ist.
 9. Körperpflegevorrichtung nach dem vorstehenden Anspruch, wobei das weitere Außengehäuseteil (304) mit einem Randabschnitt seines Fensters eine Außenoberfläche des Außengehäuseanzeigeteils (302d) an einem Randabschnitt davon überlagert.
 10. Körperpflegevorrichtung nach einem der vorstehenden Ansprüche, wobei das Innengehäuse (301) ein Mehrkomponenten-Kunststoffformteil ist, das aus einer transparenten Hartkunststoffmaterialkomponente, die den mindestens einen transparenten Innengehäuse-Anzeigeabschnitt (301d), der mit der Anzeigefolie (502) ausgerichtet ist, bildet, und einem undurchsichtigen Weich- oder Hartkunststoffmaterialabschnitt (301o), der den Innengehäuse-Anzeigeabschnitt (301d) umgibt, hergestellt ist.
 11. Körperpflegevorrichtung nach einem der vorstehenden Ansprüche, wobei das Innengehäuse (301) eine gitterähnliche Abschattungsgatterstruktur einschließt, die aus undurchsichtigem Material (301o) hergestellt ist, wobei die Abschattungsgatterstruktur eine Vielzahl von transparenten Gehäuseabschnitten (301d), die mit den Anzeigesymbolen (501) der Anzeigefolie (502) ausgerichtet sind, voneinander trennt, wobei die Abschattungsgatterstruktur verhindert, dass sich Licht, das durch einen der Vielzahl von transparenten Gehäuseabschnitten (301d) zu einem der Anzeigesymbole (501) übertragen werden soll, in Richtung eines der weiteren Anzeigesymbole (501) ausbreitet und streut.
 12. Körperpflegevorrichtung nach einem der vorstehenden Ansprüche, wobei die mindestens eine Lichtquelle (503) von einem hülsenähnlichen Lichtleiter (509) umgeben ist, der sich von der Lichtquelle (503) zu der Innenoberfläche des Innengehäuses (301) erstreckt, wobei der Lichtleiter (509) eine im Wesentlichen gerade Längsachse aufweist, die im Wesentlichen parallel zu der Hauptabstrahlrichtung der Lichtquelle (503) und im Wesentlichen senkrecht zu der Anzeigefolie (502) verläuft.

13. Körperpflegevorrichtung nach dem vorstehenden Anspruch, wobei der Lichtleiter (509) aus einem Schwammmaterial oder aus Gummischwamm hergestellt ist und mit der Innenoberfläche des Innengehäuses (301) sowie einer Oberfläche einer Leiterplatte (504), welche die mindestens eine Lichtquelle (503) trägt, in Kontakt kommt.

14. Körperpflegevorrichtung nach einem der zwei vorstehenden Ansprüche, wobei eine Vielzahl von Lichtquellen (503) in einem Muster angeordnet ist, das einem Muster der Anzeigesymbole (501) entspricht, wobei eine Vielzahl von Lichtleitern (509) bereitgestellt ist, um Licht, das von jeder der Vielzahl von Lichtquellen (503) emittiert wird, auf eines der Vielzahl von Anzeigesymbolen (501) zu beschränken, wobei die Vielzahl von Lichtleitern (509) durch eine gitterähnliche Gatterstruktur, die aus undurchsichtigem Material hergestellt ist, gebildet ist.

15. Verfahren zum Fertigen einer Körperpflegevorrichtung nach einem der vorstehenden Ansprüche, umfassend die folgenden Schritte:

- festes Anbringen einer unbedruckten Anzeigefolie (502) an dem Innengehäuse (301),
- nach dem Anbringen der unbedruckten Anzeigefolie (502), Markieren der Anzeigefolie (502) mit Anzeigesymbolen (501) mittels einer Markierungsbehandlung.

16. Verfahren nach Anspruch 15, wobei die Markierungsbehandlung das Anwenden eines Laserstrahls auf die Anzeigefolie (502) einschließt.

17. Verfahren nach Anspruch 15 oder 16, wobei die Markierungsbehandlung nach dem Zusammenbau des Vorrichtungsgehäuses mit allen darauf montierten Anzeigeteilen angewendet wird und/oder eine Laserstrahlaktivierung der Anzeigefolie sowohl durch das Außen- als auch das Innengehäuse hindurch angewendet wird.

Revendications

1. Dispositif de soins personnels, en particulier dispositif d'épilation, plus particulièrement rasoir électrique, comprenant un logement (300) avec une tête fonctionnelle (3) attachée à celui-ci, ledit logement (300) incluant un logement interne (301) et un logement externe (302), et un affichage (500) incluant une source de lumière (503) logée dans le logement interne (301) pour émettre de la lumière à travers des portions transparentes (301d, 302d) dudit logement interne et externe (301, 302), ledit affichage (500) incluant en outre une feuille métallique d'affichage (502) ayant des portions de transparence dif-

férente et/ou de couleurs différentes formant des symboles d'affichage (501), ladite feuille métallique d'affichage (502) étant intercalée entre lesdites portions transparentes des logements interne et externe (301, 302), **caractérisé en ce que** ladite feuille métallique d'affichage (502) est collée à la fois aux logements interne et externe (301, 302) au moyen d'un adhésif (508) sur chacun des côtés opposés de la feuille métallique d'affichage (502).

2. Dispositif de soins personnels selon la revendication précédente, dans lequel ledit adhésif (508) forme au moins une boucle d'étanchéification fermée entourant les symboles d'affichage (501) sur chacun desdits côtés opposés pour étanchéifier la feuille métallique d'affichage (502) contre les logements interne et externe (301, 302) pour empêcher du liquide ou de l'humidité d'être mis en contact avec la feuille métallique d'affichage (502) à l'intérieur de ladite boucle d'étanchéification adhésive.

3. Dispositif de soins personnels selon l'une quelconque des revendications précédentes, dans lequel sur un côté de ladite feuille métallique d'affichage (502), ledit adhésif (508) forme une couche adhésive transparente (506, 507) couvrant au moins une portion majeure de la feuille métallique d'affichage (502) incluant les symboles d'affichage (501) de celle-ci, tandis que sur l'autre côté opposé de ladite feuille métallique d'affichage (502), l'adhésif (508) forme une couche adhésive (506, 507) ayant une fenêtre (506w, 507w) laissant ouverts les symboles d'affichage (501) et/ou une portion centrale de ladite feuille métallique d'affichage (502).

4. Dispositif de soins personnels selon l'une quelconque des revendications précédentes, dans lequel l'adhésif (508) de part et d'autre de la feuille métallique d'affichage (502) est un adhésif transparent.

5. Dispositif de soins personnels selon la revendication 3, dans lequel la couche adhésive (506, 507) ayant ladite fenêtre (506w, 507w) est faite à partir d'un adhésif non transparent.

6. Dispositif de soins personnels selon l'une quelconque des revendications précédentes, dans lequel au moins un côté de ladite feuille métallique d'affichage (502) est collé au logement (300) au moyen d'une mousse adhésive.

7. Dispositif de soins personnels selon la revendication précédente en combinaison avec la revendication 3, dans lequel la couche adhésive (506, 507) ayant la fenêtre (506w, 507w) inclut une couche de mousse adhésive et/ou une couche de mousse de polyuréthane adhésive et/ou une couche de mousse de polyéthylène adhésive et ou ayant fourni la fenêtre

dans le côté de logement interne.

8. Dispositif de soins personnels selon l'une quelconque des revendications précédentes, dans lequel le logement externe (302) est composé d'une pluralité de parties de logement, dans lequel une partie d'affichage de logement externe (302) à laquelle la feuille métallique d'affichage (502) est collée, forme un insert transparent essentiellement de type plaque reçu dans une portion de cadre de fenêtre d'une autre partie de logement (304) du logement externe (302).
9. Dispositif de soins personnels selon la revendication précédente, dans lequel ladite autre partie de logement externe (304), avec une portion de bord de sa fenêtre, se chevauche avec une surface externe de ladite partie d'affichage de logement externe (302d) au niveau d'une portion de bord de celui-ci.
10. Dispositif de soins personnels selon l'une quelconque des revendications précédentes, dans lequel le logement interne (301) est une partie de moule en plastique à plusieurs composants faite à partir d'un composant de matériau de plastique dur transparent formant l'au moins une partie d'affichage de logement interne transparent (301d) alignée avec la feuille métallique d'affichage (502) et une partie de matériau de plastique souple ou dur opaque (301o) entourant ladite partie d'affichage de logement interne (301d).
11. Dispositif de soins personnels selon l'une quelconque des revendications précédentes, dans lequel le logement interne (301) inclut une structure de barrière d'ombrage de type grille constituée de matériau opaque (301o), ladite structure de barrière d'ombrage séparant une pluralité de portions de logement transparentes (301d) alignées avec les symboles d'affichage (501) de la feuille métallique d'affichage (502) les unes des autres, ladite structure de barrière d'ombrage empêchant de la lumière à être transmise à travers l'une de ladite pluralité de portions de logement transparentes (301d) vers l'un des symboles d'affichage (501) de s'étaler et se disperser vers l'un des autres symboles d'affichage (501).
12. Dispositif de soins personnels selon l'une quelconque des revendications précédentes, dans lequel ladite au moins une source de lumière (503) est entourée par un tuyau de lumière de type manchon (509) s'étendant à partir de ladite source de lumière (503) vers la surface interne du logement interne (301), ledit tuyau de lumière (509) ayant un axe longitudinal essentiellement linéaire essentiellement parallèle à la direction d'émission principale de la source de lumière (503) et essentiellement perpendiculaire à la feuille métallique d'affichage (502).
13. Dispositif de soins personnels selon la revendication précédente, dans lequel ledit tuyau de lumière (509) est fait à partir d'un matériau spongieux ou d'une éponge en caoutchouc et est mis en contact avec la surface interne du logement interne (301) ainsi qu'une surface d'une carte de circuit (504) supportant ladite au moins une source de lumière (503).
14. Dispositif de soins personnels selon l'une des deux revendications précédentes, dans lequel une pluralité de sources de lumière (503) sont agencées dans un motif correspondant à un motif des symboles d'affichage (501), dans lequel une pluralité de tuyaux de lumière (509) est fournie pour restreindre la lumière émise par chacune de ladite pluralité de sources de lumière (503) vers l'un de ladite pluralité de symboles d'affichage (501), dans lequel ladite pluralité de tuyaux de lumière (509) est formée par une structure de barrière de type grille faite d'un matériau opaque.
15. Procédé de fabrication d'un dispositif de soins personnels selon l'une quelconque des revendications précédentes, comprenant les étapes suivantes :
- attacher de manière fixe une feuille métallique d'affichage (502) lisse au logement interne (301),
 - après avoir attaché ladite feuille métallique d'affichage (502) lisse, marquer ladite feuille métallique d'affichage (502) avec des symboles d'affichage (501) au moyen d'un traitement de marquage.
16. Procédé selon la revendication 15, dans lequel ledit traitement de marquage inclut l'application d'un faisceau laser sur ladite feuille métallique d'affichage (502).
17. Procédé selon la revendication 15 ou 16, dans lequel ledit traitement de marquage est appliqué après assemblage du logement de dispositif avec toutes les parties d'affichage montées sur celui-ci et/ou une activation de faisceau laser de la feuille métallique d'affichage est appliquée à travers à la fois le logement externe et interne.

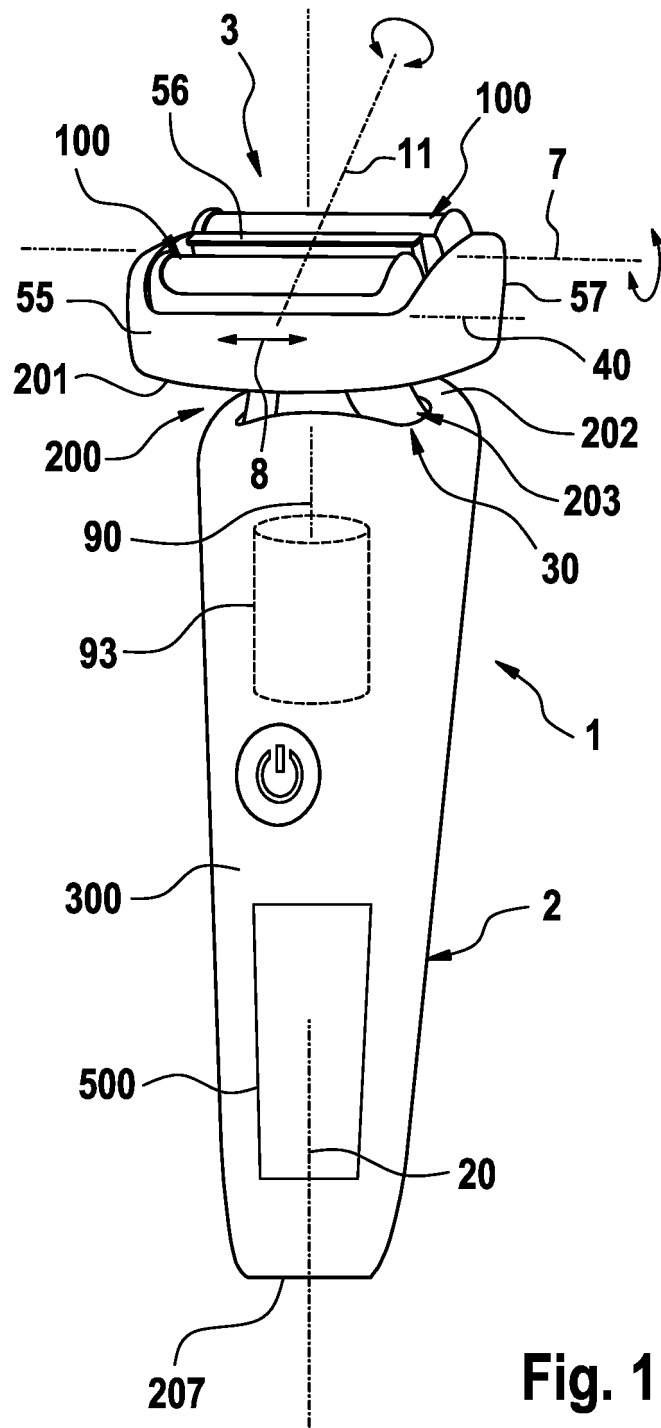


Fig. 1

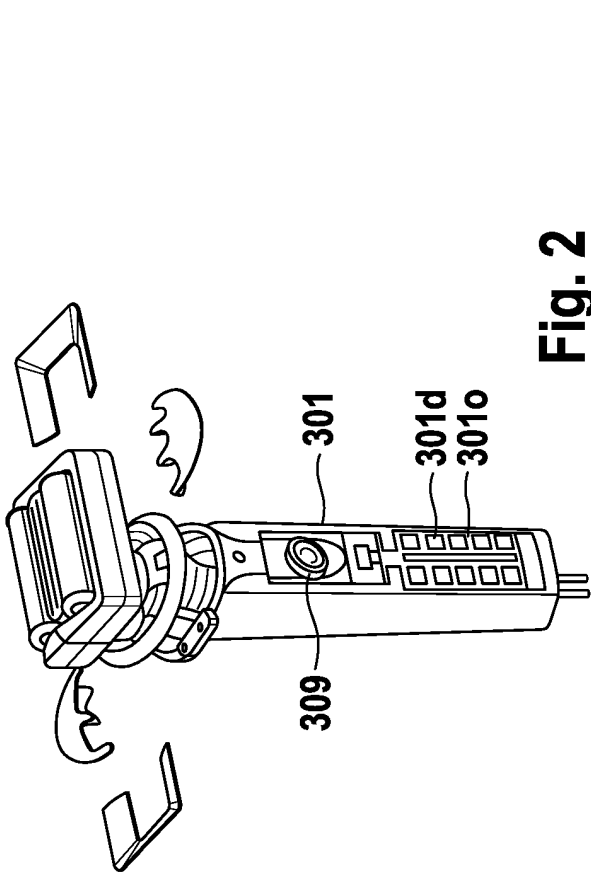


Fig. 2

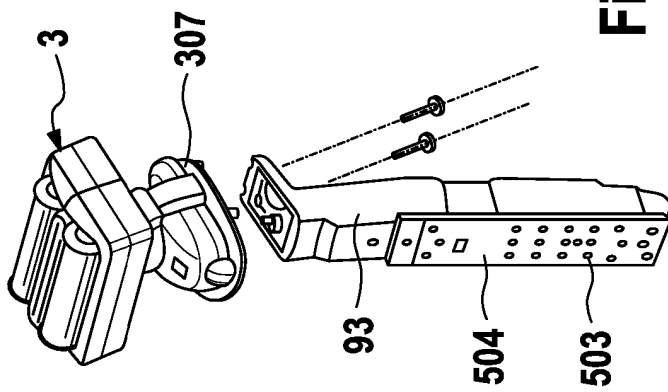
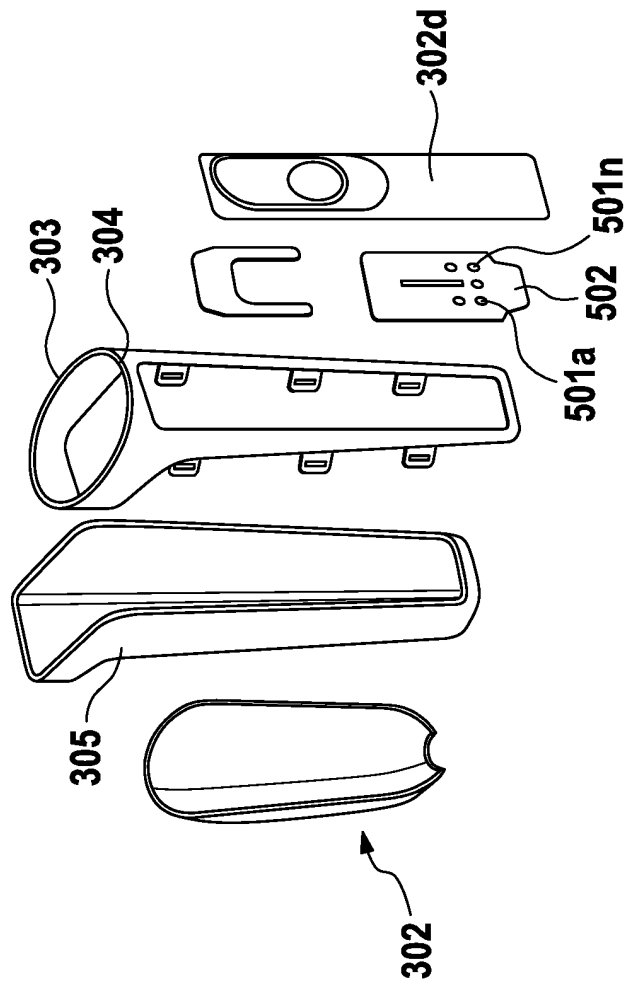
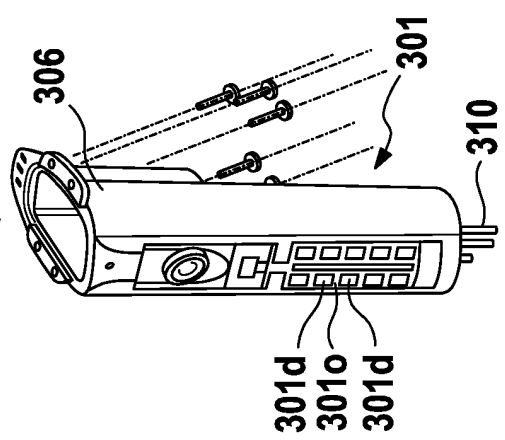


Fig. 3



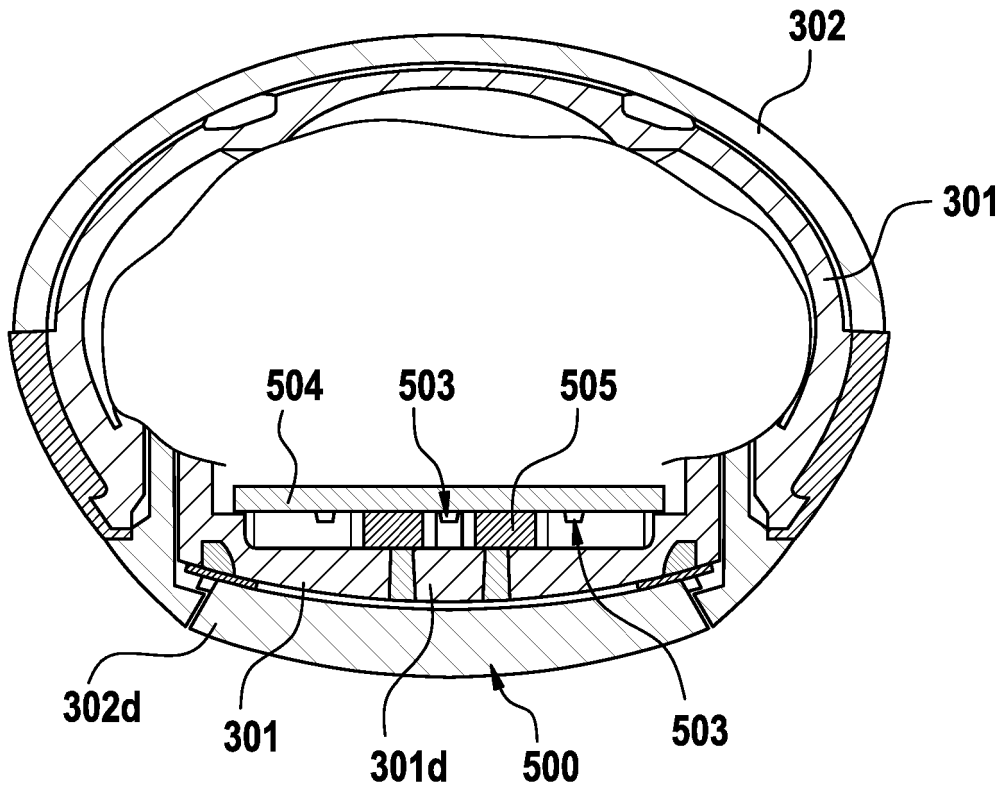


Fig. 4

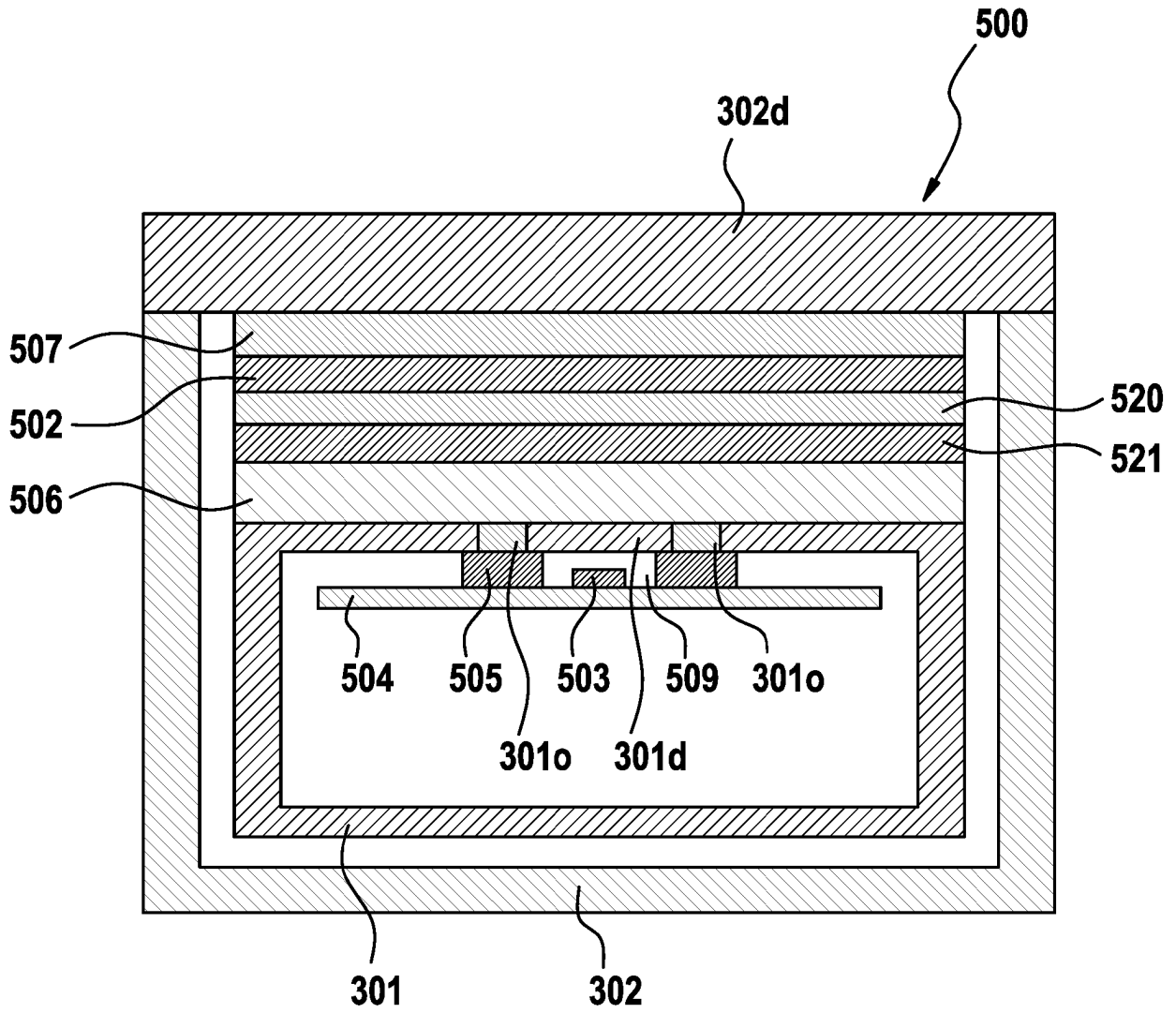


Fig. 5

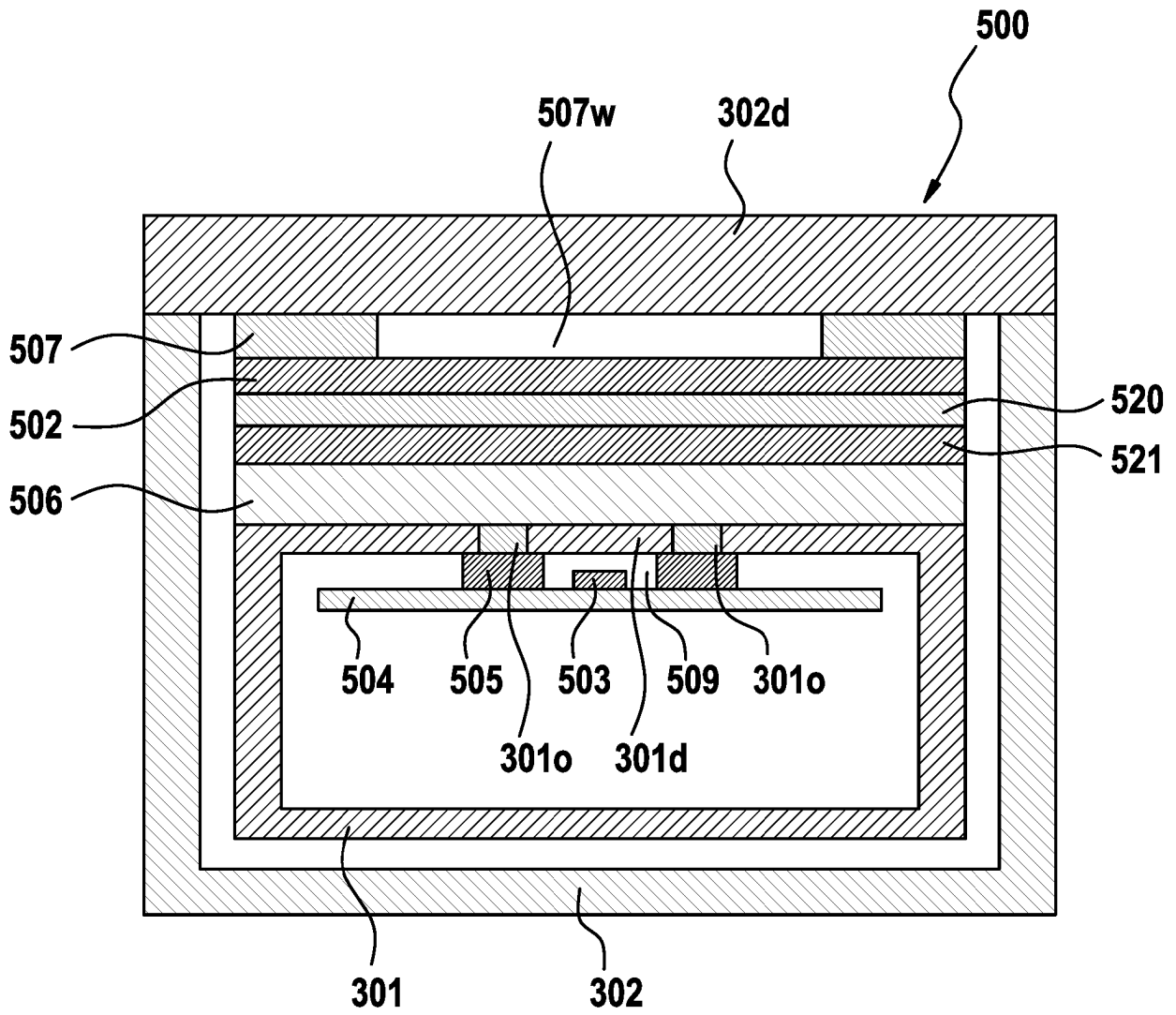


Fig. 6

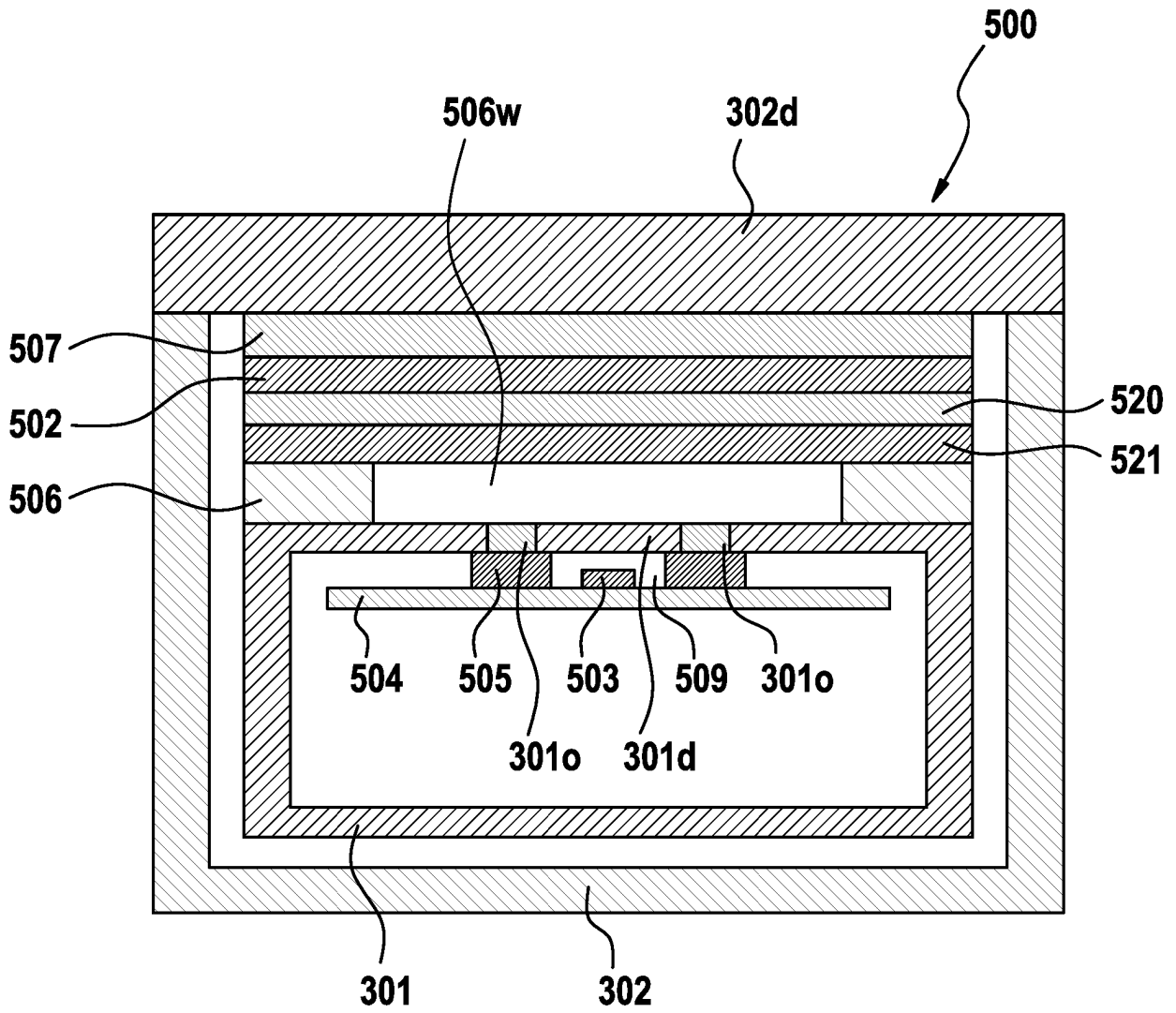


Fig. 7

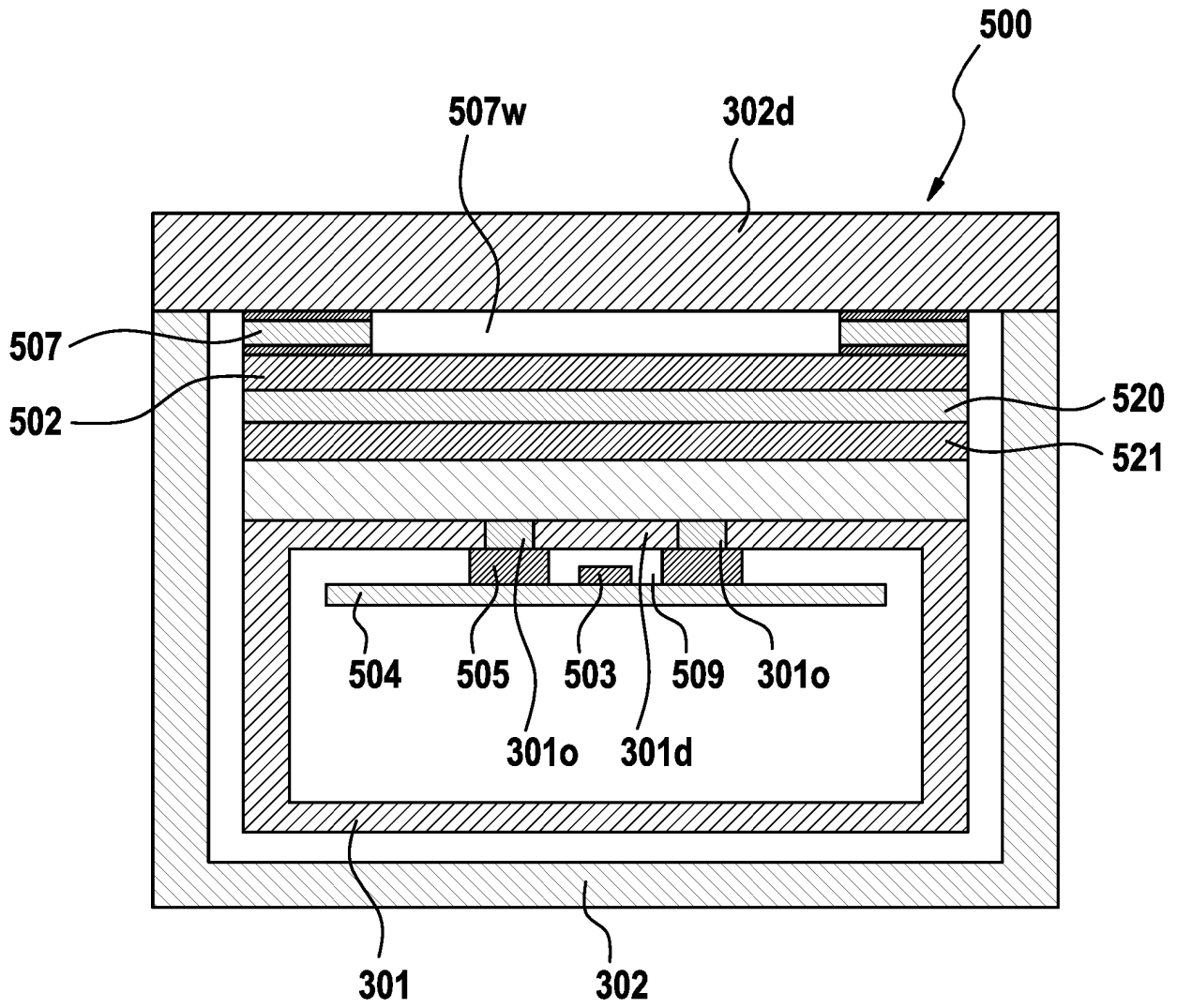


Fig. 8

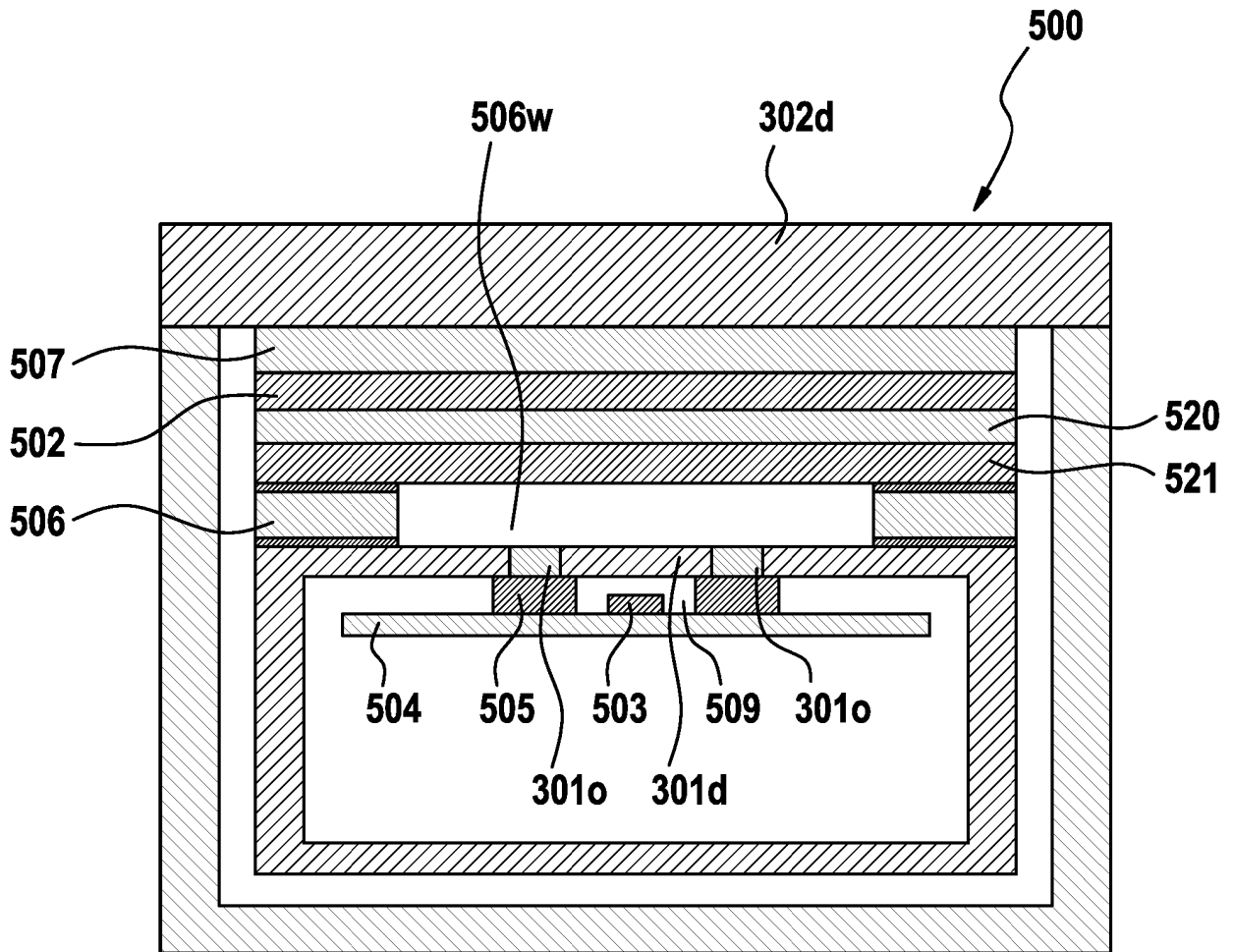


Fig. 9

REFERENCES CITED IN THE DESCRIPTION

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