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(54) Title: DEVICE FOR TREATING THE HAIR

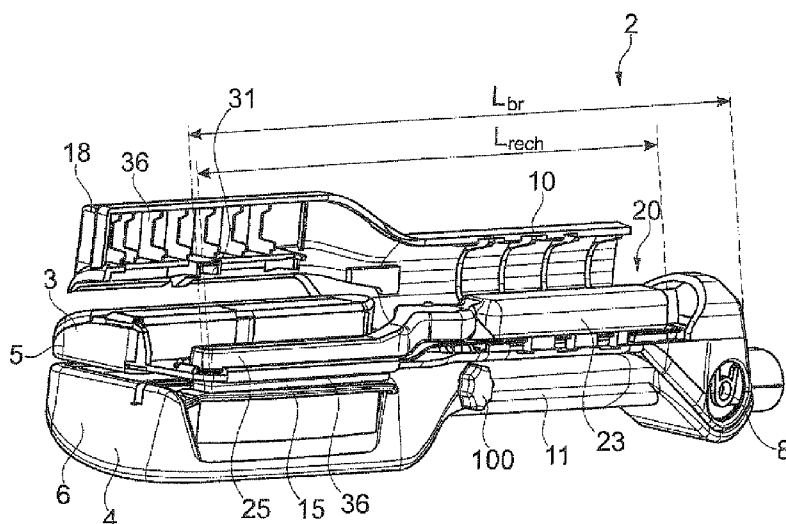


Fig. 3

(57) Abstract: The present invention relates to a device for treating the hair, comprising: -two arms (5, 6) that are able to move relative to one another between a moved-together configuration for treating the hair and a spaced-apart configuration for inserting hair to be treated between said arms, one of the arms (5) comprising a base having a housing and an external flap (18) that pivots on the base between an open position for access to the housing and a closed position preventing access to the housing, -a refill comprising a reservoir (23) containing a product to be applied, said refill being disposed in a removable manner in the housing.



DEVICE FOR TREATING THE HAIR

The present invention relates to devices for treating the hair, and more particularly, but not exclusively, those intended for shaping the hair, in particular those intended for straightening, curling or crimping the hair.

The invention relates more particularly to devices comprising two arms that are able to move with respect to one another, being able to take up a spaced-apart configuration for introducing a lock between said arms and a moved-together configuration for treating the lock, the arms being movable along the lock in this moved-together configuration. In such devices, the arms frequently carry two heating elements with which the hair is brought into contact during the use of the device.

Background

Numerous devices of this type, sometimes also known as straightening irons, have already been proposed, implementing the application of a haircare product to the hair.

Usually, hair straighteners consist of two arms that are connected together with the aid of a hinge which makes it possible to open and close said arms, and of at least one heating element disposed on the arms. During operations of styling a lock of hair, said lock is introduced between the two arms in the open position and then the two arms are closed manually over the lock of hair. The lock of hair is then subjected, until the two arms are opened and the lock of hair is removed, to the heat output by the heating element.

The patent US 6 325 072 discloses an applicator for applying a haircare product, comprising two arms that are able to move with respect to one another, a steam generator and a device for applying a haircare product. The steam activates and fluidizes the haircare product.

The patent application EP 1 458 259 discloses a device for applying a fluid haircare product, comprising a flexible reservoir containing the product to be applied and an applicator body that has orifices for applying the product to the hair. The flexible reservoir has a passage to allow the outlet of the haircare product to the application orifices, the outlet of the haircare product being controlled by pressure on the flexible reservoir.

The application WO 2009/078046 describes a hairstyling appliance comprising two arms that are connected together so as to allow the appliance to be opened and closed,

at least one heating member and at least one seat for accommodating a hair treatment device, the hair treatment device allowing a haircare product to be dispensed during operation. The hair treatment device is composed of a support material impregnated with a haircare product and suitable for a single use.

5 WO 2009/015027 and US 2009/0025247 disclose a hair straightening device that makes it possible to apply a haircare product by contact with the hair. The haircare product to be applied is contained in a removable refill for the application thereof. The removable refill comprises a reservoir containing the haircare product in a gelled form, and orifices for dispensing and applying the product, said orifices being made directly through
10 a wall of the reservoir. The refill is introduced into a housing disposed on one of the two arms of the hair straightener, by sliding.

There is a need to further improve devices for applying a haircare product such that for example the user can easily refill the device with haircare product and/or change the haircare product to be applied.

15 There is also an advantage in having a sufficient quantity of haircare product to apply without changing the refill so as to make it possible not only to style thicker hair but also to reuse a single refill a number of times.

Summary

20 According to a first of its aspects, a subject of the invention is a device for treating the hair, comprising:

- two arms that are able to move relative to one another between a moved-together configuration for treating the hair and a spaced-apart configuration for inserting hair to be treated between said arms, one of the arms comprising a base having a housing and an external flap that pivots on the base between an open position for access to the
25 housing and a closed position preventing access to the housing,
- a refill comprising a reservoir containing a product to be applied, said refill being disposed in a removable manner in the housing.

The housing present on one of the two arms allows the refill to be at least partially integrated into this arm when it is mounted thereon.

30 The pivoting flap allows easy access to the housing and to the base or to the internal face of the housing in order to remove or fit the refill. The fact that the flap is a pivoting flap renders it captive.

The reservoir in the refill makes it possible to have a quantity of haircare product that is sufficient for dispensing a plurality of doses of product.

The use of a refill allows the user to be able to apply different haircare products easily by simply changing the refill.

5 The housing for receiving the refill preferably extends along more than half the total length of the arm. This can make it possible to distribute the mass of the refill along the arm and to reduce the inertia and the effort to be exerted in order to handle the device.

10 The two arms extend along respective longitudinal axes and are preferably connected by a hinge present at their proximal end, this hinge defining a rotation axis that is oriented preferably perpendicularly to a plane defined by the longitudinal axes of the arms.

The two arms may define half-handles that are extended towards their distal end by jaws, the flap preferably defining the top of one of the jaws, when it is viewed along its longitudinal axis with the other jaw below.

15 The maximum thickness of the arms, measured at the jaws, is preferably greater than that measured at the half-handles; the maximum thickness of each arm is preferably between 10 and 40 mm, better still between 17 mm and 32 mm.

20 The refill may be fixed to the flap and be fitted in the housing in the arm by the flap being closed. The flap may comprise at least one relief for fastening the refill thereto, in particular by snap-fastening. Said relief may be one or more tabs for snap-fastening that are moulded together with the rest of the flap. This can make it easier to remove the refill, it being possible to do this by moving the flap into the open position and then detaching the refill from the flap.

25 In a variant, the refill may be fastened directly in the housing in the arm, preferably by snap-fastening, while the flap is in the open position. In this case, the flap, once closed, can help to keep the refill in the housing.

30 The flap or the base of the arm may have a relief designed to engage with the reservoir of the refill in order to cause the internal volume thereof to decrease in particular when the refill is fitted on the device. This can accelerate the dispensing of the product and in particular avoid the need, when the dispensing of a dose of product is brought about by moving the arms together, to actuate the arms a large number of times before the product starts to be dispensed.

The decrease in the internal volume upon installation of the refill can take place by way of a pressure exerted on the reservoir by the flap and/or the arm, in particular when said reservoir is flexible. In a variant, the reservoir comprises a follower piston and said relief may be designed to act on the piston so as to move the latter forward in the reservoir, in particular when the refill is mounted on the arm.

The flap is preferably articulated longitudinally on the arm, in particular with its hinge closer to the side on which the hair to be treated is introduced between the arms than to the opposite side. The flap may open towards the rear when the device is viewed with the side on which the hair is introduced between the jaws facing the viewer. The arm on which the flap is articulated may define a half-handle, the flap being articulated on the half-handle. The flap may also be articulated on the distal part of the arm, extending between its free end and the half-handle.

In a variant, the flap is articulated about a transverse axis with respect to the direction of elongation of the arm which carries it, the two arms then preferably being articulated about the same axis as the flap. The flap may be designed to be snap-fastened to the base of the arm in the closed position, preferably carrying at least one member, which is in particular elastically deformable, for retaining it in the closed position, for example at least one elastically deformable tongue suitable for snap-fastening to a relief corresponding to the base of the arm in the closed position of the flap.

The flap may be articulated by way of a hinge, which may comprise a spring that makes it possible to keep the flap in the open position when it is not locked in the closed position.

The flap may be designed to act on an electrical contact in the closed position, preferably by way of the refill, in particular of the reservoir of the refill, the electrical contact making it possible to detect in particular whether a refill is present in the housing. The device is for example designed to signal the absence of a refill as a result of this detection and/or to pass into a specific operating mode, without application of product. If appropriate, the detection of the absence of a refill may prevent the device from operating.

The refill may have at least one extension that leads to the outside of the arm, preferably a lateral extension that juts out from or is flush with the side of the arm, in particular on the side opposite the articulation of the flap on the arm, allowing a user to see that the refill is present on the arm.

The housing preferably opens to the outside and/or onto a window, making it possible for the user to see that the refill is present on the arm when the flap is in the closed position.

5 The flap may carry a member for closing off a member for applying the product contained in the refill when the device is not in use. This closing-off member may cover the applicator member when the device is not in use, thereby making it possible for example to delay the drying of the product still present on the applicator member and/or avoid the degradation thereof. This can also reduce the risk of the applicator member being damaged or soiled between two uses of the device.

10 The housing may have an opening that extends preferably along the longitudinal axis of the arm, giving onto the other arm, this opening allowing the application of the haircare product, in particular through the applicator member carried by the refill.

15 The refill preferably comprises the reservoir and an end piece for dispensing the product to be applied. The refill is preferably made so as to be able to be handled in one piece in order to be fitted in the housing and removed from the latter.

20 Preferably, the dispensing end piece and the reservoir extend along longitudinal axes parallel to the longitudinal axis of the arm which carries the refill. The longitudinal axis of the dispensing end piece and the longitudinal axis of the reservoir may be offset by a distance of between 10 mm and 40 mm, better still between 24 mm and 32 mm. This can make it easier to produce the refill and the arm intended to receive it.

The length of the reservoir is preferably less than or equal to half the total length of the arm. This makes it easier to handle the refill.

The maximum capacity of the reservoir is preferably between 5 ml and 20 ml.

25 The haircare product is preferably in the fluid state, that is to say liquid, at room temperature or a higher temperature, between 25 and 95°C for example. In this case, the product can initially be in the solid or pasty state at room temperature in the reservoir and be heated up within the reservoir in order to make it sufficiently fluid to be dispensed by a dispensing mechanism provided to supply the applicator member. The product is thus
30 fluid in the reservoir at the time of application. Preferably, the product is liquid at room temperature.

When the product is initially solid in the refill and heated in order to be fluidized, the region around the applicator member is preferably non-heating so as to more easily control the temperature of the product.

5 The reservoir may comprise a rigid or semi-rigid body in contact with the product. In a variant, the reservoir may comprise a flexible body in contact with the product. The reservoir may consist of a flexible body, in particular a flexible sachet, or of a rigid body, in particular with a tubular shape, or partially of a rigid body and partially of a flexible body.

10 The dispensing end piece may comprise at least one dispensing orifice, better still a plurality of dispensing orifices, preferably formed by one or more slots, better still by a plurality of slots having edges that are joined at rest. The dispensing end piece may thus comprise orifices made through an elastically deformable wall, preferably a wall defined by a portion of a flexible duct.

15 The dispensing end piece may be connected to the reservoir by a flexible duct, an extension of this flexible duct preferably at least partially defining the dispensing end piece.

20 The dispensing end piece may be pre-filled with the haircare product to be applied. The pre-filling of the dispensing end piece may be carried out before the refill is introduced into the device. The refill may in particular be supplied to the user, who fits it on the arm of the device with the dispensing end piece pre-filled. This can avoid the need to actuate a dispensing mechanism a number of times before the device is used for the first time.

25 In a variant, the dispensing end piece can be filled at least partially, and better still entirely, with product while the refill is being introduced into the device, in particular when the internal volume of the reservoir decreases when the refill is fitted, it being possible for this to be the case for example when a pressure is exerted on the reservoir during the closure of the flap or when the reservoir comprises a follower piston which is pushed inside the reservoir when the refill is fitted.

30 The device may comprise an applicator member that is independent of the refill but supplied with product thereby. In a variant, the refill comprises an applicator member that is supplied with product by the dispensing end piece. The applicator member

preferably at least partially covers the dispensing end piece, the dispensing orifices of the dispensing end piece preferably being oriented towards the applicator member.

The dispensing end piece is preferably made so as to be filled with product when a dispensing mechanism is actuated, by increasing in volume by elastic deformation under the pressure of the product. Thus, product can collect in the dispensing end piece in order to be dispensed once the filling action has stopped. This makes it possible to supply the applicator member in a delayed manner, to avoid the need to collect a large amount of product within the applicator member itself, and thus to reduce losses of product during the changing thereof. If desired, the applicator member may be produced with a relatively small thickness, for example less than or equal to 10 mm. The applicator member preferably comprises a porous and/or fibrous material and/or a material that is able to release or diffuse the product, in particular an open-cell foam.

The applicator member may be mounted in a fixed or removable manner on a support, at least partially covering the dispensing end piece, the support having at least one opening that is superposed at least partially on the dispensing end piece and allows the product to pass from the dispensing end piece to the applicator member. Preferably, the applicator member comes into contact with the dispensing end piece.

The applicator member is disposed so as to come into contact with the hair when the arms are closed. The arm opposite the one carrying the refill may define a counter-bearing surface such that the hair is pressed against the applicator member with a certain pressure by the counter-bearing surface.

The counter-bearing surface can be part of a removable counter-bearing member that is received in a cavity of the arm opposite the one carrying the refill. The counter-bearing member can be inserted in the cavity or removed from the cavity by sliding, especially by sliding through a front opening of the cavity along an axis that is parallel to the axis of the said arm. The counter-bearing member can comprise at least a relief, as a rib or a slot, that cooperates with a complementary relief, as a slot or a rib, of a wall of the cavity which it faces.

The device can comprise a locking element to lock the counter-bearing member in the cavity. The locking element can cooperate with a corresponding relief of the counter-bearing member. Such a locking element prevents the counter-bearing member to exit the cavity unexpectedly.

The counter-bearing surface can be flat or not.

The counter-bearing member can be a rod, for example a substantially parallelepipedic rod, or a roll.

The counter-bearing member is preferably in only one-piece.

5 The counter-bearing member can be in a plastic material, or in a metal material.

In a variant, the counter-bearing member can be in a porous material, especially in a material formed of fibers that are substantially oriented in the same direction and gathered to form a felt or a foam. In this case, the counter-bearing member
10 can contribute to the product application on the hair, and/or absorb the left over product, and/or homogenize the product application.

The counter-bearing member can be heated. This can fluidify the product to apply.

The arm that bears the refill can comprise an external flap that pivots on the
15 base between an open position for access to the housing and a closed position preventing access to the housing,

The refill preferably comprises one or more components of a pump for supplying the applicator member with product coming from the reservoir of the refill, in particular at least one peristaltic pump tube and/or a flap-valve pump. This pump is
20 preferably actuated while the arms are moved together.

The peristaltic pump tube is preferably formed by the abovementioned flexible duct.

The reservoir may be provided with a dip tube. This dip tube may be formed by a portion of the abovementioned flexible duct.

25 When the reservoir comprises a follower piston, it is preferable for the flexible duct not to extend too far into the reservoir so as not to hamper the forward movement of the follower piston and the emptying of the reservoir.

Preferably, the flexible duct extends along the refill and comprises an end portion that defines the dispensing end piece, an intermediate portion that defines the
30 peristaltic pump tube and an end portion that defines the dip tube in the reservoir.

Preferably, the device is produced such that the applicator member is supplied automatically with product while the device is being used. Thus, the user does not have to

worry about exerting a particular action on the device in order to apply the product. The closure of the arms can actuate the peristaltic or flap-valve pump, which makes it possible to supply the applicator member with product, in particular with a dose of product and to apply the product to the hair disposed between the arms. A dose of product is preferably
5 between 0.01 ml and 0.5 ml.

The applicator member is preferably supplied with product with, as mentioned above, provisional collection of product under pressure by the dispensing end piece. The presence of product under pressure within the dispensing end piece, once the jaws have been moved together, makes it possible to continue supplying the applicator member with
10 product while the device is moved along a lock of hair with the jaws moved together.

The arm opposite the one on which the flap is articulated may have a steam outlet, and preferably also a comb. It may prove advantageous to use two combs, located respectively downstream and upstream of the region for applying the cosmetic product, so as to promote the homogeneous distribution of the product on the hair.

15 These combs are advantageously parallel to one another and may have the same number of teeth.

If appropriate, the device is produced so as to allow at least one of the combs, better still each comb, to be fastened in a removable manner.

20 Preferably, in particular when the hair is intended to be straightened, the device comprises a heating element intended to come into contact with the hair, and better still two heating elements, each disposed on an arm. This or these heating element(s) may each comprise a plate, made of a material that is a good conductor of heat, that defines a hot surface for bringing into contact with the hair, the temperature of said surface being for example greater than or equal to 95°C, better still between 90 and 230°C.

25 Preferably, product is applied to the lock of hair introduced into the device prior to the application of steam and/or combing and/or straightening by the heating element(s). Thus, the hair introduced between the arms can come into contact with the applicator member before being exposed to the steam and to the heating elements while the lock is being moved between the arms of the device.

30 Preferably, the device for treating the hair according to the invention is a straightener having flat heating elements, in particular which come into contact in the closed position.

According to a second of its aspects, the invention provides a device for treating the hair, comprising:

- two arms that are able to move relative to one another between a moved-together configuration for treating the hair and a spaced-apart configuration for inserting hair to be treated between said arms, one of the arms comprising a base having a housing and the other arm comprising a cavity,

- a refill disposed in a removable manner in the housing and comprising
 - a reservoir containing a product to be applied, and
 - an applicator member to apply the product from the reservoir,

and

- a counter-bearing member disposed in a removable manner in the cavity and defining a counter-bearing surface, the counter-bearing surface being configured to apply the hair against the applicator member in the moved-together configuration of the arms.

The counter-bearing member allows pressing the hair on the application member for an efficient application of the product on the latter.

With a removable counter-bearing member, it is possible to clean the counter-bearing member, especially after a long use or when the user wants to change the product to apply. It is also possible to change the counter-bearing member, especially to replace it by a counter-bearing member having a different shape or size, to modify for example the quantity of product applied and/or the final effect on the hair. It is also possible to access the cavity for cleaning it for example.

Preferably, the counter-bearing member has a counter-bearing surface that has a shape that is substantially identical to the shape of the surface of the application member that comes into contact with the hair.

The counter-bearing member can be inserted in the cavity or extract from the cavity by sliding. The counter-bearing member can be inserted in the cavity or extracted from the cavity through a front opening of the cavity along an axis that is parallel to the axis of said arm..

The counter-bearing member can comprise at least a relief, as a rib or a slot, that cooperates with a complementary relief, as a slot or a rib, of a wall of the cavity which it faces.

The device can comprise a locking element to lock the counter-bearing member in the cavity. The locking element can cooperate with a corresponding relief of the counter-bearing member. Such a locking element prevents the counter-bearing member to exit the cavity unexpectedly.

5 The counter-bearing surface can be flat or not.

The counter-bearing member can be a rod, for example a substantially parallelepipedic rod, or a roll.

The counter-bearing member is preferably in only one-piece.

10 The counter-bearing member can be in a plastic material, or in a metal material.

In a variant, the counter-bearing member can be in a porous material, especially in a material formed of fibers that are substantially oriented in the same direction and gathered to form a felt or a foam. In this case, the counter-bearing member can contribute to the product application on the hair, and/or absorb the left over product, and/or homogenize the product application.

15 The counter-bearing member can be heated. This can fluidify the product to apply.

20 The arm that bears the refill can comprise an external flap that pivots on the base between an open position for access to the housing and a closed position preventing access to the housing,

All the features that were described in relation with the first aspect of the invention can be applied to the second aspect of the invention. The present invention may be better understood from reading the following detailed description of non-limiting implementation examples thereof and from examining the appended drawing, in which:

25 - Figure 1 schematically shows a perspective view of an example of a device for treating the hair produced in accordance with the first aspect of the invention, with the pivoting flap in the open position and the refill above the arm,

- Figure 2 is a front view of the device from Figure 1,

- Figure 3 is a view similar to Figure 2, the refill being in position on the arm,

30 - Figure 4 is a view similar to Figure 2, after the flap has been closed over the refill in position on the arm,

- Figure 5 is a top view of an example of a refill that can be used within a device according to the invention,
- Figure 6 is an exploded view of the refill from Figure 5,
- Figure 7 shows the thermoformed shell and the associated covers, on their own,
- Figure 8A shows a top view of the dispensing end piece, on its own,
- Figure 8B is a view similar to Figure 8A of a variant end piece,
- Figure 9 is a schematic view of a sheet carrying a plurality of refills according to the invention,
- Figures 10A to 10C are cross-sectional views of examples of refills,
- Figure 11 is a view similar to Figure 1 of a variant embodiment of the device,
- Figure 12 is a view similar to Figure 11, the refill being in position on the flap,
- Figure 13 is a side view of the device from Figure 12,
- Figure 14 is a front view of the device from Figure 12 after the flap has been closed,
- Figure 15 shows an example of a refill that can be used with the device from Figure 11, on its own,
- Figure 16 shows a side view of the refill from Figure 15,
- Figure 17 is an exploded view of the refill from Figure 15,
- Figure 18 shows a variant device according to the invention in longitudinal section,
- Figure 19 shows a side view of a variant device according to the invention,
- Figure 20 is a view similar to Figure 1 of a variant embodiment of the device,
- Figure 21 shows the device from Figure 20, the refill being in position on the flap,
- Figure 22 is a front view of the device from Figure 21 after the flap has been closed,
- Figure 23 shows an example of a refill that can be used with the device from Figure 20,

- Figure 24 shows a side view of the refill from Figure 23,
- Figure 25 is an exploded view of the refill from Figure 23,
- Figure 26 schematically shows a perspective view of a variant device according to the invention,

5 - Figure 27 shows the device from Figure 26 before the refill is fitted on the corresponding arm,

- Figure 28 is a view similar to Figure 26 of a variant device according to the invention,

- Figure 29 shows the device from Figure 28 before the refill is fitted,

10 - Figure 30 is a schematic cross-sectional view of a device according to the invention, illustrating the arrangement of various components thereof,

- Figures 31 and 32 show variant dispensing end pieces on their own,

- Figure 33 is a schematic front view of a variant of device for treating the hair in accordance with the invention, and

15 - Figure 34 is a schematic cross-sectional view of a device according to the invention.

Figure 1 shows the handpiece 2 of an example of a device for treating the hair according to the invention.

20 This handpiece 2 has two jaws 3 and 4 that are able to move with respect to one another between a spaced-apart configuration (not shown) for the introduction between said jaws of a lock of hair, and a moved-together configuration for treatment, illustrated in Figure 1.

25 The jaws 3 and 4 are carried by an upper arm 5 and a lower arm 6, respectively, which, in the example in question, are connected together at one end by an articulation 8, the handpiece 2 thus forming tongs.

The upper arm 5 and lower arm 6 each preferably have a total length of between 22 cm and 31 cm and define, between the articulation 8 and the jaws 3 and 4, respective half-handles 10 and 11 on which the user can press in order to move the jaws 3 and 4 together.

30 The upper arm 5 and lower arm 6 extend along respective longitudinal axes X_1 and X_2 which are preferably parallel to one another when the jaws 3 and 4 are closed.

An elastic return member (not visible) is preferably provided to return the jaws 3 and 4 to a spaced-apart configuration, this elastic return member being for example a spring disposed around an articulation pin 8.

5 The invention is not limited to a particular manner of connecting the upper arm 5 and lower arm 6 together and the jaws 3 and 4 may be rendered able to move in some other way without departing from the scope of the present invention. However, the presence of an articulation is largely preferred for the ergonomics it provides.

10 The jaws 3 and 4 define between one another a region for treating the hair, said region being intended to receive a lock of hair to be treated, the handpiece 2 being moved along said lock during the treatment, for example in the direction from the root to the end of the hair.

In the example in question, the handpiece 2 is configured to apply a cosmetic product, to treat the hair by way of steam and to carry out a heat treatment of the hair by contact with one or more hot surfaces.

15 The direction D of movement of the handpiece 2 over the hair, illustrated in Figure 2, is preferably substantially perpendicular to the longitudinal axes X_1 and X_2 of the upper arm 5 and lower arm 6.

The handpiece 2 is connected by a line, in the example in question, to a base station (not shown) that is fixed during the treatment and is connected to the mains.

20 This base station ensures the electric power supply to the handpiece 2 and also its supply with water in order to generate steam, and may also carry out additional functions of processing electrical signals received from the handpiece 2. The line 13 which connects the handpiece 2 to the base station can thus comprise various electrical conductors and a water supply pipe.

25 A user interface (not shown in the figures) can be present on the handpiece 2 so as to allow the user for example to start up certain components thereof, or not.

The application of the cosmetic product is ensured by an applicator member 15 disposed so as to come into contact with the hair extending through the treatment region.

30 The applicator member is supplied with product with the aid of a dispensing mechanism which is actuated automatically during the use of the handpiece 2, for example in order to apply a quantity of product to the hair, such that a mass of one gram of hair made up of hair with a length of 20 cm receives between 0.01 and 0.4 g, better still

between 0.01 and 0.2 g of product in the case of a care product, or even more in the case of thermal straightening, dyeing or chemical straightening products, the quantity received then being for example between 0.5 and 10 g.

5 The upper arm 5 comprises, as illustrated in Figures 1 to 4, a pivoting flap 18 which can take up the open configuration illustrated in Figures 1, 2 and 3, allowing a refill 20 to be fitted and to be removed once the product has been used up, and a closed configuration, shown in Figure 4, for using the device to treat the hair.

The refill 20 comprises a reservoir 23 containing the product to be applied and a head 25 comprising the applicator member 15.

10 In the example illustrated, the pivoting flap 18 is articulated about a rotation axis Y which is oriented substantially parallel to the longitudinal axis X_1 of the upper arm 5.

The flap 18 is for example articulated by way of a hinge 28, as illustrated in Figure 1, to the proximal part of the arm 5 which acts as a half-handle 10 while the handpiece 2 is being used.

In the example illustrated, the proximal part 18a of the flap 18 also defines a gripping surface of the half-handle 10.

20 The flap 18 can be articulated so as to open towards the rear when the device is viewed as in Figure 1. This can make it easier to produce the hinge 28 and construct the device so as to provide access that is as open as possible to the user to allow him to fit or replace the refill 20.

The angular travel α of the flap 18 is advantageously at least 90° , as illustrated in Figure 2, so as to make it easier to introduce the refill 20 into the handpiece 2 during the fitting or replacement thereof.

25 The closing or opening movement of the flap 18 may, if appropriate, be assisted by an elastic return member, for example a helical spring or leaf spring disposed in the region of the hinge 28. This return member can urge the flap 18 towards its open position, collecting elastic potential energy when the flap 18 is closed. The use of such a return member, the opening of which is assisted, is particularly advantageous when the device is also equipped with a member for locking the flap 18 in the closed position. In this case, when the user acts on this locking member in order to unlock this flap 18, the flap 18

can be opened automatically, advantageously as far as its completely open position or, in a variant, over only a part of the opening travel.

It is possible to provide the flap 18 with a movement retarder when the hinge 28 is equipped with an elastic return member which tends to urge the flap 18 towards the open or closed position.

The flap 18 can be held in the closed position on the upper arm 5 in various ways, and preferably with snap-fastening of at least one relief carried by the flap 18 onto a corresponding form (not illustrated) carried by the base of the arm 5. For example, as illustrated, the flap 18 carries at least one elastically deformable tab 31 which can be snap-fastened onto a corresponding coupling relief provided on the base of the arm 5. If appropriate, a means for locking/unlocking by the user is provided to keep the flap 18 in the closed position. In this case, the user has to exert an action on this unlocking means before opening the flap 18. This can reduce the risk of the flap 18 opening accidentally if the handpiece 2 is dropped, for example.

The flap 18 may have any suitable form for at least partially covering the refill 20 once the latter is fitted in the device, in particular when the head 25 and the reservoir 23 are not aligned.

The flap 18 may have a configuration in which the distal part 18b of the flap 18, said distal part 18b being located in the region of the jaw 3, is offset upwards with respect to the proximal part 18a of the flap 18 which serves to articulate it on the base of the upper arm 5, when the flap 18 is viewed in a position which is open more or less at 90°, as can be seen in Figure 1, to the articulation pin of the horizontal arms. The flap 18 can thus comprise an intermediate portion 18c which extends generally obliquely upwards and towards the front.

In a variant, the flap 18 may be coupled in some other way to the base of the arm 5 and for example be articulated by way of its distal part 18b in the region of the jaw 3.

In the example in Figures 1 to 4, the refill 20 is housed on the upper arm 5 in a housing 33 in the latter, while the flap 18 is in the open position, as illustrated in Figure 3.

The upper arm 5 comprises reliefs (not visible in the figures) which make it possible to retain the refill 20 in its housing 33, in particular reliefs which allow the refill 20 to be snap-fastened to the upper arm 5. For example, the upper arm 5 comprises

elastically deformable tabs to which the refill 20 can be snap-fastened when it is inserted into its housing 33.

The flap 18 may comprise reliefs 36 which help to immobilize the refill 20 in its housing 33 when the flap 18 is in the closed position.

5 The flap 18 comprises for example a set of ribs that are oriented substantially transversely to the longitudinal axis of the flap 18 and cover the head 25 of the refill 20 when the flap 18 is closed.

The flap 18 may also comprise ribs that are positioned, in a similar manner, above the reservoir 23 when the flap 18 is closed.

10 The flap 18 may be made of an opaque material with at least one transparent window (not illustrated) that allows the user to see that the refill 20 is present and/or to see the level of product in the reservoir 23 if the refill 20 is provided for this purpose.

As illustrated in Figure 4, the housing 33 may comprise at least one opening 36 facing the lower arm 6 so as to allow the haircare product contained in the reservoir 23 to be applied to a lock of hair. This opening 36 receives the applicator member 15 during the introduction of the refill 20 into the housing 33, and has a corresponding elongate shape.

The refill 20 may have various configurations and for example, as illustrated, the reservoir 23 may be located on the proximal side of the handpiece 2, in particular in the region of the half-handle 10, and the head 24 may be positioned in the region of the jaw 3.

20 It is advantageous for the reservoir 23 to be housed in the half-handle 10, as illustrated in Figures 1 to 4, so as in particular to make it possible to reduce the inertia of the handpiece 2 as the articulation pin 8 of the upper arm 5 and lower arm 6 approaches the centre of mass of the mass of product contained in the reservoir 23. Less inertia makes the handpiece easier to handle and less tiring for the user to carry.

25 The handpiece 2 may be designed to automatically detect the presence of the refill 20 in its housing 33.

This detection may be carried out for example electronically, by virtue of a contactor actuated by the refill 20 when the latter is fitted on the handpiece 2. This contactor is for example carried by the base of the upper arm 5 and actuated by the reservoir 23. In a variant, the presence of the refill 20 on the base of the upper arm 5 may be detected by virtue of the flap 18, for example on account of the presence on the flap 18

of a contactor, the state of which changes depending on whether the refill 20 is present or not.

The closure of the flap 18 may itself be detected automatically such that, for example, the operation of the handpiece 2 is only allowed once it has been verified that the flap 18 is in the closed position.

When the flap 18 is in the closed position, communication may remain between the inside of the housing 33 that receives the refill 20 and the outside, allowing the user to see that the refill 20 is present on the device.

The refill 20 may optionally be produced so as to have an extension which remains visible from the outside of the device once the flap 18 has been closed, the user being able to know, by seeing this extension, that the refill is present in the device without opening the flap 18.

In a variant that is not illustrated, the flap 18 carries a member for closing off the applicator member 15 when the handpiece 2 is not in use.

An example of a refill 20 that can be used in particular with a handpiece 2 as illustrated in Figures 1 to 4 will now be described with reference more particularly to Figures 5 to 7.

The refill 20 shown in Figures 5 to 7 comprises a thermoformed support shell 39 which receives the reservoir 23 and components of the head 25.

The support shell 39 may have a peripheral rim 39a, as illustrated.

In the example in question and as can be seen in particular in Figure 5, the reservoir 23 and the head 25 extend along respective longitudinal axes X_{res} and X_{em} which are parallel to one another and offset with respect to one another by a distance c of for example between 24 and 32 mm.

The longitudinal axes X_{res} and X_{em} can extend in a plane M which is parallel to the plane of the upper face of the thermoformed support shell 39, defined by the peripheral rim 39a, but preferably, as illustrated in Figure 6, the longitudinal axes X_{res} and X_{em} are located at different distances from this plane.

The reservoir 23 may be received in a part 39b of the support shell 39 having an elongate shape along the longitudinal axis X_{res} , this part 39b being closed at the top by a first cover 42 which may also be manufactured by thermoforming. This first cover 42 comprises, for example, as illustrated in Figure 7, two parallel ribs 45 for positioning the

first cover 42 on the support shell 39, these ribs 45 projecting into a housing 47 in the support shell 39 which receives the reservoir 23.

One of the thermoformed support shell 39 and the first cover 42 may have a vent 50 leading into the housing 47 that receives the reservoir 23.

5 The thermoformed support shell 39 also comprises a part 39c which receives a dispensing end piece 53 and which is closed at the top by a second cover 55 which may carry the applicator member 15.

The applicator member 15 can be fastened to the second cover 55 in various ways. The applicator member 15 may for example be retained on the second cover 55 by friction or in a variant be retained by adhesive bonding or welding or with the aid of an additional holding element (not illustrated). In particular, the applicator member 15 may be wedged in an opening 60 of elongate shape that is made in the second cover 55.

The applicator member 15 may be held in a removable or non-removable manner on the second cover 55. It is advantageous to be able to change the applicator member 15 from one use to another without having to replace the refill 20 as a whole, in particular for reasons of hygiene or in order for it to be possible to place the applicator member 15 in a closed container between two uses so as to avoid drying out thereof.

In a variant, the refill 20 may be provided with a removable closure member (not illustrated) to be fitted on the applicator member 15 when not in use. This closure member may be designed to be fitted on the applicator member 15 before or after the introduction of the refill 20 into the handpiece 2, consisting for example of a cap designed to be fastened hermetically to the handpiece 2 or the refill 20.

In a variant, the closure member is a membrane seal to be removed when the handpiece 2 is used for the first time or when the refill 20 is fitted into the handpiece 2.

25 The second cover 55 may have a portion 60 which covers an intermediate part 62 of the support shell 39, located between the reservoir 23 and the head 25.

A duct 65 connects the reservoir 23 to the dispensing end piece 53 and extends through the intermediate part 62.

In the example illustrated, a portion 39d of the thermoformed support shell 39 is not covered by the covers 42 and 55, leaving at least partial access to a corresponding portion 65a of the duct 65, this portion 65a constituting a peristaltic pump tube which is actuated by the handpiece 2 in order to convey the product from the reservoir 23 to the

dispensing end piece 53. As illustrated, the latter preferably consists at least partially of an extension of the duct 65.

The dispensing end piece 53 is preferably designed to deliver the product in one direction through at least one dispensing orifice 68 that is visible in Figures 8A and 8B, is closed at rest and can open under the pressure of the upstream product.

As illustrated in Figures 8A and 8B, the dispensing end piece 53 may comprise a number of dispensing orifices 68 disposed in line with one another so as to deliver the product along the applicator member 15.

This or these dispensing orifice(s) 68 may be slots that are elongate along an axis perpendicular, as illustrated in Figure 8A, to the longitudinal axis X_{em} of the dispensing end piece 53. In a variant, the orifices 68 are oriented along an axis parallel to the longitudinal axis of the dispensing end piece 53. The dispensing orifice(s) 68 is/are preferably aligned along a diametric median plane of the dispensing end piece 53. The length p of each dispensing orifice 68 may range from 1 to 5 mm. The dispensing orifices 68 may have identical lengths and be distributed evenly along the dispensing end piece 53. The interval w between two consecutive dispensing orifices 68 is for example from 1 to 5 mm.

Preferably, the dispensing end piece 53 is elastically deformable such that the internal volume can be increased in order to collect product coming from the reservoir 23 before it is dispensed, and the dispensing orifice(s) 68 is/are designed to only open following such an increase in volume. Thus, it is possible to spread out the dispensing of product over a period of time greater than that for which the action of filling the dispensing end piece 53 lasts.

Prolonged dispensing of the product is useful in order to ensure application that is as homogeneous as possible right along the treated lock and to reduce the risk of product being present in a quantity that is not suitable.

Preferably, the system for supplying the applicator member is designed such that the dispensing of the product after the jaws 3 and 4 have been moved together lasts more than 10 s, in particular between 10 and 30 s, for example around 20 s, i.e. more or less the average duration of treatment of a lock for most users.

A particularly simple and effective way of obtaining prolonged dispensing of the product is to use an elastomeric material to produce the dispensing end piece 53, with a

tubular shape closed at one end, and for example having a hardness of Shore 55, and to provide it, as illustrated in Figures 8A and 8B, with a number of dispensing orifices 68 in the form of slots that are closed at rest and are capable of opening by elastic deformation under the pressure of the upstream product. The slots are preferably produced by cutting,
5 so as to close with proper sealing at rest.

The dispensing end piece 53 comprises for example a tubular body with a wall thickness of between 0.3 and 2 mm, for example with an inside diameter of 3.2 mm and an outside diameter of 5 mm, and made of silicone or some other material such as EPDM (rubber).

10 Preferably, the applicator member 15 comes into contact with the dispensing end piece 53 next to the orifices 68 so as to absorb the product delivered thereby as soon as it exits.

The dispensing end piece 53 can extend along the longitudinal axis Z of the head 25.

15 The duct 65 and the reservoir 23 can be connected by an end piece 71, illustrated in Figure 6.

As illustrated in Figure 6, the duct 65 can pass through the end piece 71 into the reservoir 23 and extend inside the latter.

20 The reservoir 23 may be formed by an independent element which is inserted into the corresponding housing 47 provided on the support shell 39, as illustrated in Figure 6.

The covers 42 and 55 can be fastened to the thermoformed support shell 39 by welding or, in a variant, by adhesive bonding.

25 The reservoir 23 disposed in the housing 47 of the support shell 39 may be at least partially rigid or flexible. When the reservoir 23 has a flexible wall 73, as illustrated in Figure 10A, it is for example formed by the assembly of two sheets of polypropylene or of a complex forming a flexible sachet.

30 In order to assemble the refill 20, it is thus possible to dispose, in the support shell 39, the reservoir 23 with the, preferably flexible, duct 65 fastened above, and then to attach the covers 42 and 55 to the support shell 39. The second cover 55 can carry the applicator member 15 at the time it is attached to the support shell 39. The applicator member 15 may also be fastened subsequently to the second cover 55.

In a variant, the reservoir 23 is defined at least partially by the thermoformed shell 39. For example, as illustrated in Figure 10B, the reservoir 23 is defined by the support shell 39 and a flexible wall 73 which is fastened to the support shell 39 and which, during the emptying of the reservoir, can progressively mould itself to the shape of the bottom of the housing 47. The vent 50 is then preferably made in the first cover 42.

In a further variant, the reservoir 23 is carried by the cover 42, being for example defined between the cover 42 and a flexible wall 73 which may fold up against the cover 42 during the emptying of the reservoir 23, as illustrated in Figure 10C. The vent 50 is then preferably made in the support shell 39.

The flexible wall 73 may be an elastically deformable diaphragm. If appropriate, stiffening reliefs (not illustrated) are provided to make it easier for the reservoir 23 to be emptied completely, such that the flexible wall 73 does not deform in a manner which would prevent the product from flowing towards the duct 65 as it is sucked out of the reservoir 23.

The reservoir 23 may be single-use. In a variant, the refill 20 may comprise a valve (not illustrated) for filling the reservoir 23, making it possible to fill the reservoir 23 when the latter is empty or partially empty.

In a variant that is not illustrated, the first cover 42 and the second cover 55 are moulded in one piece and form a single cover that has an opening in the intermediate part 62 so as to allow access to the duct 65.

Preferably, as illustrated in Figure 9, a number of copies of the thermoformed support shell 39 are made in one piece by thermoforming a sheet 75 of thermoplastic material, such as polycarbonate, for example. The covers 42 and 55 may be made from the same material or from a different material.

The thermoformed support shell 39 may also be produced by thermoforming a sheet 75, the remaining part of which is used as a support for displaying the refill 20 to the user. When, as illustrated in Figure 9, a number of support shells 39 are produced from the same sheet 75 by thermoforming, these support shells 39 are preferably disposed in a regularly spaced manner. The components of the refills 20 can be assembled directly on each support shell 39 without separating the latter from the sheet 75. Weakening lines or pre-cut lines can be realized around each support shell 39 so as to allow the refill 20 to be

removed while leaving the other refills 20 secured to the sheet 75. The sheet 75 may have an opening 78 for fastening to a display stand.

The support shell 39 may be made of an opaque or non-opaque thermoplastic material. The same may go for the covers 42 and 55. In particular, it may be advantageous to make at least one of the covers 42 and 55 of the support shell 39 from a non-opaque material so as to allow the user to see the level of product contained in the reservoir 23. If appropriate, the support shell 39 or the cover 42 is made in a colour that makes it possible to more easily see the level of product, for example a coloured base, the colour of which differs from that of the product.

In the example in Figures 1 to 4, the refill 20 is fastened to the base of the upper arm 5 and then the flap 18 closes the housing 33 in which the refill 20 is received. In a variant, as illustrated in Figures 11 to 14, it is possible to fasten the refill 20 to the flap 18 and then to fold the flap 18 down into its closed position in order to bring the refill 20 into its use configuration on the handpiece 2.

For example, as illustrated in these figures, the flap 18 comprises reliefs 80 which allow the refill 20 to be fastened thereto while the flap 18 is in the open position.

In the example in Figures 11 to 14, the flap 18 is articulated by way of its proximal part 18a, as in the example in Figures 1 to 4, but may also be articulated in some other way.

The refill 20 may be inserted between reliefs 36 on the flap 18 which position it.

A refill 20 that can be used on the handpiece 2 in Figures 11 to 14 is shown more particularly in Figures 15 to 17.

This refill 20 comprises a support 83 which defines a housing that receives the dispensing end piece 53, and which serves to hold the applicator member 15 on the dispensing end piece 53.

The reservoir 23 preferably comprises a rigid body 86.

The support 83 may comprise an extension 88, illustrated in Figure 16, which serves to keep the reservoir 23 in a predefined position relative to the dispensing end piece

30 53.

At its end, the extension 88 has an end piece which is produced by moulding in one piece with the rest of the support 83, into which the body 86 of the reservoir 23 is inserted.

5 The support 83 is preferably designed to be fastened to the flap 18 by cooperation of shapes, in particular by snap-fastening. For example, in the region of its distal part 18b, which is located on the jaw 3, said flap 18 comprises tabs 80 which are snap-fastened to the support 83. The proximal part 18a of the flap 18 may also comprise reliefs 36 which hold the reservoir 23 by friction and/or snap-fastening.

10 In the example illustrated in Figure 17, the support 83 extends along a distance l which is less than the total length L_{rech} of the refill 20.

The reservoir 23 preferably comprises a rigid body 86 in which a follower piston 90, illustrated in Figure 16, can move.

The body of the reservoir 86 is formed by an end piece 92 for connecting to the flexible duct 65.

15 The follower piston 90 may be produced with a non-return washer 94 which can slide over the internal surface of the body 86 when the internal volume of the reservoir 23 decreases and can become braced in order to prevent any reverse movement of the piston 90.

20 The end piece 92 for connecting to the duct 65 may be produced in one piece by being moulded with the body 86 of the reservoir 23.

Filling of the dispensing end piece 53 under pressure can be carried out in various ways.

In the variant in Figures 11 to 14, the product is moved from the reservoir 23 to the dispensing end piece 53 by the actuation of a peristaltic pump.

25 A particularly simple and effective way of producing this pump is to use a system as illustrated in Figure 18, comprising a pressing element 95 such as a roller or a cam which is able to move on the upper arm 5 so as to be able to bear, during its movement, against the flexible duct 65 connecting the reservoir 23 to the head 25 and to pinch it, and then to progressively squeeze it in the direction of the head 25 in order to flush the product contained inside towards the head 25. The duct 65 remains pinched as long as the jaws 3 and 4 are closed over the hair, this making it possible to keep the

dispensing end piece 53 under pressure and to force the product to leave it through the orifices 68.

As illustrated in Figures 18 and 19, the pressing element 95 can be actuated by a relief carried by the lower arm 6, this relief coming into contact with the pressing element 95 when the jaws 3 and 4 are moved together.

On its opposing faces, the pressing element 95 may comprise two pairs of lugs 97 that are inserted into guide slots (not illustrated) provided on uprights 98 that are illustrated in Figures 1 and 13. These slots are oriented substantially perpendicularly to the axis of the flexible duct 65 extending between the uprights 98. The pressing element 95 can move first of all substantially in translation, in the slots, in order to pinch the flexible duct 65, under the pushing pressure of the relief. The slots each have a notch which allows the pressing element 95 then to tilt, progressively squeezing the flexible duct 65, the lugs 97 engaging in the notches as the pressure by the relief on the pressing element 95 continues.

Preferably, the relief is carried by an adjusting member 100, such as a slider or a knob, the rotation or movement of which acts on the degree of protrusion and/or the position of the relief which acts on the pressing element 95. In a variant, the flow rate is adjusted at the arm which carries the reservoir, by virtue for example of an adjusting member which restricts the flow of the product to a greater or lesser extent or which pushes back, to a greater or lesser extent, a counter-bearing surface against which the flexible duct 65 is compressed by the pressing element 95 during the operation of the peristaltic pump.

The adjusting member 100 can make it possible to adjust the pressing element 95 into an end position for operation of the device without cosmetic product being dispensed. By virtue of the adjusting member 100, the user benefits from the possibility of acting on the flow rate of cosmetic product delivered on each closure of the jaws 3 and 4. The adjustment can be carried out continuously or incrementally, depending on the manner in which the adjusting member 100 is able to move on the lower arm 6.

In the variant in Figures 20 to 25, the refill 20 comprises a flap-valve pump 103 and the handpiece 2 is produced so as to actuate this flap-valve pump 103 for example when the two arms 5 and 6 have been moved together or, in a variant, with the aid of an actuating member which can be actuated by the user independently of the moving together

of the arms. The refill 20 can be fastened to the flap 18 as in the example in Figures 11 to 14.

The flap-valve pump 103 may comprise a diaphragm 105 which, when the flap 18 is closed, is positioned opposite an actuating member which is, for example, height-adjustable so as to be able to control the quantity of product delivered by the pump 103 on each actuation.

The refill 20 is shown more particularly in Figures 23 to 25. The flap-valve pump 103 comprises a body which is made in one piece with end pieces 109 and 111 which serve to connect to the reservoir 23 and to the dispensing end piece 53, respectively.

The flap-valve pump 103 comprises a pumping chamber 114, illustrated in Figures 24 and 25, which is partially delimited by the diaphragm 105.

The end piece 109 for connecting to the reservoir 23 may house an inlet valve (not shown) which opens when the volume of the pumping chamber 114 increases and which closes again when this volume decreases during the actuation of the diaphragm 105. The pump 103 may also comprise an outlet valve which can be integrated into the pump 103, being for example located in the region of the end piece 93 for connecting to the duct 65.

The pumping chamber 114 may have (a) bellows, if appropriate. In the case of such a pumping mechanism, an anti-backflow valve is present between the reservoir 23 and the pumping chamber 114, opening in the direction of flow from the reservoir 23 to the pumping chamber 114.

In a variant, the outlet valve is formed by the dispensing orifice(s) 68 of the dispensing end piece 53, which open under the effect of the pressure of product upstream and close again when the pressure has decreased, by virtue of the inherent elasticity of the material of which the duct 65 is made.

The refill 20 may comprise a support 83 which receives the dispensing end piece 53, this support 83 making it possible to ensure the position of the dispensing end piece 53 relative to the reservoir 23.

The reservoir 23 can be produced either with a rigid body and a follower piston or with a flexible pouch.

If appropriate, as illustrated, the reservoir 23 can be fastened with the interposition of an O-ring seal 116 on the inlet end piece 109 of the pump 103.

When the diaphragm 105 is deformed by bearing on the actuating relief 95 on the lower arm 6, the internal volume of the pumping chamber 114 decreases. The inlet valve is closed and the product is flushed towards the dispensing end piece 53. The outlet orifice(s) 68 may open under the effect of the pressure of the product and then close again when the pressure decreases following the discharging of the product.

When the actuating relief 95 moves away from the diaphragm 105, the latter returns to its initial shape by inherent elasticity, resulting in the increase in volume of the pumping chamber 114, which returns to its initial volume. The corresponding reduction in pressure causes the inlet valve to open and product coming from the reservoir 23 to be admitted.

In a further variant, the system for dispensing product may be realized without a pump with the aid of a follower piston that moves unidirectionally in the reservoir, this movement being brought about by the moving together of the jaws 3 and 4. For example, the piston is pushed by a rod which is driven incrementally and unidirectionally in movement each time the jaws are moved together.

The supply system may be realized so as to cause a dose of product to be dispensed only after the jaws have been moved together a predefined number of times.

In the examples which have just been described, the refill 20 extends along the major part of the length of the upper arm 5, and in particular inside the corresponding half-handle 10, thereby making it possible to reduce the inertia of the device.

However, the invention is not limited to a refill 20 which extends along more than half the length of the arm 5, and it is possible in particular, as illustrated in Figures 26 and 27, to produce the refill 20 in such a way that it is housed essentially in the upper jaw 3.

The possibility of producing the refill 20 with a lateral extension 116 which remains visible once the flap 18 has been closed in order to form an indicator of the presence of the refill 20 on the handpiece 2 has also been illustrated in these figures.

When the refill 20 is designed to be housed essentially in the jaw 3, the reservoir 23 may or may not be superposed on the dispensing end piece 53, it being possible for the refill 20 to comprise one or more components of a pump which may be of the peristaltic or flap-valve type.

The flap 18 may be articulated about a longitudinal axis Y which is generally parallel to the longitudinal axis X_1 of the upper arm 5 or, in a variant, as illustrated in Figures 28 and 29, about an axis Y which is transverse to the longitudinal axis X_1 of the upper arm 5 and for example an axis which is parallel to, better still coincident with, the pin for articulating the lower arm 6 and upper arm 5 together. It may be advantageous for the articulation of the pivoting flap to be the same as that of the arms, since this can make it easier to manufacture the handpiece 2.

However, it is preferable to produce the flap 18 such that it is articulated about an axis substantially parallel to the longitudinal axis X_1 of the arm 5, since this can reduce the span length and thus reduce the need to stiffen the flap 18.

The flap 18 may be articulated about a fixed rotation axis or, in a variant, the movement of the articulation may be more complex and in particular may take place by virtue of a hinge 28 that allows not only a purely rotational movement but also a movement in translation so as to ensure for example the parallelism of the surfaces which come into contact with the flap 18 and with the base of the arm 5 which carries the latter. In that case, the hinge 28 has for example bearings with somewhat oblong holes, in which the articulation pin can move, optionally with the presence of an elastic return member which tends to urge this pin into abutment against one end of the oblong housings.

A window may be provided, if appropriate, so as to allow the user to see the degree of emptying of the reservoir 23. In a variant, each action of moving the jaws 3 and 4 together increments a counter which is initialized on the installation of a new refill 20, this counter being able to be used to warn the user that complete emptying of the reservoir 23 is imminent. The counter may also be used to signal to the user that the product is ready to be dispensed, when a particular number of actuations of the jaws 3 and 4 is necessary before the product impregnates the applicator member 15, given the dead volume which it is necessary to start filling before the product is dispensed. When the moving together of the jaws 3 and 4 is detected electrically, counting can be effected electronically by the base station.

In a further variant, the system for supplying the applicator member 15 with product is driven in a motorized manner by virtue of an electric motor housed in the arm 5, or possibly in the assembly that forms a refill 20.

Figures 28 and 29 illustrate the possibility for the refill 20 to extend along virtually the entire length of an arm 5.

If appropriate, the refill 20 may comprise an identifier recognized by the device, this allowing at least one of the following additional functions:

- 5 - automated adjustment of one or more operating parameters of the device depending on the knowledge of the nature of the product by the base station, which follows from the recognition of the identifier,
- display of information that guides the user in operations to be carried out depending on the nature of the product contained in the refill 20,
- 10 - knowledge of the capacity of the reservoir 23 fitted and the output of a signal warning the user when the product has been used up, assuming that the device knows the number of doses dispensed, for example by counting the number of times that the jaws 3 and 4 have been moved together,
- passage into a predefined state of the device if the presence of the reservoir
- 15 23 is not detected, for example output of a warning signal,
- preventing operation in the event of non-recognition of an identifier having an authentication function.

The refill 20 can be identified mechanically and/or electronically. In the latter case, the refill 20 may carry an electronic chip in which the useful information is contained and one of the arms 5 or 6 may carry corresponding reading means.

In the examples illustrated, the heat treatment is ensured by two heating elements 120 and 122, visible in Figure 30, that are carried by the upper arm 5 and lower arm 6, respectively, each having a plate that defines a hot surface 125 for bringing into contact with the hair.

25 The plates of the heating elements 120 and 122 are made of any material suitable for the treatment to be carried out, for example a metal, ceramic or glass.

The surface state of the plates of the heating elements 120 and 122, in the region of contact with the hair, depends on the desired treatment, and preferably the plates are smooth when the device is intended to straighten the hair.

30 The length of the plates defines the extent of the treatment region perpendicularly to the direction D of movement of the handpiece 2 relative to the hair. The hot surfaces 125 defined by the plates are for example flat and have a rectangular contour.

One of the plates is for example mounted in a fixed manner on the corresponding arm while the other is mounted in an articulated manner, for example with the aid of a ball joint, so as to allow the plates to extend parallel to one another and to a median treatment plane in the closed configuration of the jaws. If appropriate, at least one
5 of the plates is disposed on one of the arms 5 and 6, being supported by a structure that forms a spring.

The heating elements 120 and 122 may each comprise an electrical resistor electrically powered by the base station, preferably with temperature regulation by virtue of one or more sensors disposed in the vicinity of the heating resistors or in contact with
10 the plates.

Treatment with steam is ensured by virtue of a vaporization member consisting of a resistive element provided in an evaporation chamber supplied with water by the base station. The latter may comprise an electrically driven pump, preferably a peristaltic pump, that draws up water to be sent to the handpiece 2 from a reservoir of water. The pump is
15 for example as disclosed in the publication FR 2 967 018.

The evaporation chamber may be produced in accordance with the teaching in the application EP 2449909A1 or otherwise, and communicate with at least one steam outlet.

The evaporation chamber is disposed on one of the arms, namely the lower arm
20 6 in the example in question, and the steam outlet is provided on the same arm 6.

In the example illustrated, the steam outlet is in the form of a ramp 128 with a shape that is elongate in a direction parallel to the longitudinal axis X_2 of the lower arm 6.

The ramp 128 may have a number of orifices for spraying steam, for example between 6 and 10 orifices, which are preferably distributed evenly along the ramp 128 and
25 each have an axis oriented substantially perpendicularly to the median treatment plane.

The vaporization member is electrically powered by the base station and a temperature sensor is advantageously disposed in the evaporation chamber. The base station may be produced so as to control the electric power supply of the vaporization member in order to keep the temperature of the steam leaving the evaporation chamber at a
30 value of between 110°C and 130°C.

Preferably, as illustrated in Figure 30, the applicator member 15 is disposed opposite a counter-bearing surface 130 defined by a block carried by the lower arm 6. This

counter-bearing surface 130 is preferably substantially in the form of a half cylinder of revolution, with a generatrix parallel to the longitudinal axis X_2 of the lower arm 6. In a variant, the counter-bearing surface 130 may be a roller.

5 The counter-bearing surface 130 may help to channel the steam exiting the ramp 128 towards the hair.

When the jaws 3 and 4 are closed, the counter-bearing surface 130 comes into abutment against the applicator member 15 and preferably, the counter-bearing surface 130 slightly compresses the applicator member 15, for example over a distance k of between 1 and 5 mm.

10 The radius of curvature r of the counter-bearing surface 130, measured about an axis parallel to the longitudinal axis of the arm, is for example between 2 and 10 mm.

The counter-bearing surface 130 may be able to move relative to the jaw 4 which carries it, and its movement may be controlled by a regulating member, for example the one that regulates the quantity of product dispensed while the arms 5 and 6 are moved together. Preferably, this regulating member acts on the height of the counter-bearing surface 130. When the regulating member is in a position not actuating the pump, the counter-bearing surface can reach its maximum height and thus be in a position of maximum compression of the applicator member 15. This configuration can make it possible to wipe the applicator member after use.

20 The counter-bearing surface 130 may also be defined by a member designed to define a protective cap for the applicator member 15 when not in use. This member can thus cover the applicator member 15 partially, and preferably entirely, in order to promote the preservation of the product still impregnating the applicator member 15.

25 The handpiece 2 may comprise a comb (not shown) which is preferably fastened removably to the lower arm 6. This comb is produced for example from a rigid thermoplastic material and has a shape that is elongate along the longitudinal axis X_2 of the lower arm 6.

30 The presence of the comb is advantageous in that it divides the lock into bundles, this tending to increase the contact surface of the hair with the hot surfaces 125 and to improve the straightening action. In addition, by dividing the lock, the surface area for exchange with the steam and the cosmetic product is also increased, to the benefit of the effectiveness of the treatment. The comb can also help to increase the traction exerted

on the hair, and this can improve the shaping thereof, in particular in the case of straightening. The comb can also help to homogenize the product deposited upstream on the hair by the applicator member 15.

Preferably, the device is produced such that a portion of hair introduced
5 between the jaws 3 and 4, and moving relative thereto when the handpiece 2 is drawn from the root of the hair to the end thereof in the direction D, is successively subjected to exposure to the cosmetic product, by passing between the applicator member 15 and the counter-bearing surface 130, to the steam by passing in line with the ramp 128 for spraying steam, and to a heat treatment by passing between the hot surfaces 125.

10 The handpiece 2 may advantageously have on its top a marker, visible to the user, such as an arrow, informing said user of the correct direction of movement of the device.

The steam treatment can improve the penetration of the product deposited upstream on the hair. The heat treatment makes it possible to dry the hair and to fix its
15 shape.

Numerous modifications can be made to the device that has just been described, without departing from the scope of the present invention.

In a variant that is not illustrated, the heating elements 120 and 122 and the associated hot surfaces 125 are absent, the device being designed to only effect the
20 application of the cosmetic product and the exposure to the steam, for example in the context of haircare or a dyeing treatment.

There may be multiple heating elements 120 and 122 on each of the arms 5 and 6, this being able to allow the handpiece 2 to be used in any direction of movement on the hair, if appropriate. The device may also retain a preferred direction of movement D during
25 the treatment, even when there are multiple heating elements 120 and 122 on each of the arms 5 or 6.

The heating elements 120 and 122 carried by one and the same arm 5 or 6 may comprise plates with an identical width and operate simultaneously.

In order to obtain a symmetrical treatment regardless of the direction of
30 movement, the device may comprise two steam outlets on either side of the member 15 for applying cosmetic product and between the hot surfaces 120 and 122.

If there are multiple heating elements 120 and 122 on each of the arms 5 and 6, the member 15 for applying cosmetic product may be disposed away from the heating elements 120 and 122, only one steam outlet being present between the plates.

5 The movement over the hair is preferably carried out so as to ensure that the cosmetic product is deposited first.

In a variant that is not illustrated, at least one of the heating elements 120 and 122 is produced so as to be able to rotate in contact with the hair when the handpiece 2 is moved along the lock to be treated, and is in the form for example of a rotary cylinder. The other heating element 120 and 122 may have a concave curved shape, suitable for
10 accommodating the roller when the jaws 3 and 4 are moved together.

The steam spraying direction may be non-perpendicular to the median treatment plane, in order to increase the area impacted by the jet of steam, with an inclination of 0 to 20° with respect to the normal, for example. The jet exiting each outlet orifice of the ramp (also known as a nozzle) may be sufficiently divergent to result in
15 substantially uniform exposure of the lock in the direction of its width.

The device according to the invention is preferably used with a base station; in a variant, the handpiece 2 is autonomous, comprising the reserve of water necessary for producing steam.

The cosmetic product applied by the device according to the invention may be
20 any type of haircare product. The expression cosmetic haircare product denotes a composition comprising one or more active ingredients for haircare use, and in particular a product as defined in directive 93/35/EEC dated 14 June 1993. Water in liquid or gaseous form which does not contain any additives for haircare use does not constitute a cosmetic product within the meaning of the present invention. The cosmetic product may be
25 intended to make it easier to shape the hair. Examples of active ingredients are given for example in the publication US 2010/0307528 A1, in paragraphs [0031] and [0032]. The product may have an aqueous or non-aqueous base.

In the examples which have just been described, the cosmetic product is not heated other than by heat losses due to the presence of the heating elements 120 and 122
30 and the spraying of steam between the jaws 3 and 4. In one variant, the cosmetic product is heated by a specific heating means so as to raise the temperature thereof prior to application, for example a heating resistor printed onto a sleeve through which the product

passes or which is disposed on the reservoir or in contact therewith. This increase in temperature may have the effect of decreasing its viscosity and making it easier to apply.

The applicator member 15 may be produced in some other way than with a foam, for example with a felt, a frit or a brush.

5 The refill 20 may comprise at least one closure member that can be positioned in a removable manner on the applicator head 25, in particular on the applicator member 15, in order to protect the latter from the outside environment when not in use for applying the product. The closure member may be able to be applied to the refill 20 when the latter is or is not on the handpiece 2. When the refill 20 is positioned in the housing 33 of the
10 handpiece 2, the closure member may cover the applicator member 15. The closure member may be separable from the device or, in a variant, be an element that is permanently present on the device. The member defining the counter-bearing surface 130 may be removable and serve, in particular when turned round, as a member for closing the refill 20.

15 On account of the longitudinal configuration of the refill 20, the dispensing of product through the evenly distributed dispensing orifices 68 of constant size is not uniform. The dispensing orifices in the vicinity of the reservoir are subjected to a greater pressure than those located at the end and, as a result, open more and dispense more product towards the applicator member 15.

20 The following variants make it possible to make the dispensing of the product towards the applicator member 15 along the dispensing end piece 53 more uniform.

 The dispensing orifices 68 of the dispensing end piece 53 are, in a variant as illustrated in Figure 31, spaced apart at a variable distance w , the density of dispensing orifices 68 then varying with their position on the dispensing end piece 53. Preferably, the
25 density of dispensing orifices 68 increases with increasing distance from the reservoir 23 so as to allow product to be dispensed uniformly in the direction of the applicator member 15.

 The dispensing orifices 68 of the dispensing end piece 53 have, in a variant as illustrated in Figure 32, a variable width p depending on their position on the dispensing
30 end piece 53. Preferably, the width p of the dispensing orifices increases with increasing distance from the reservoir 23 so as to allow product to be dispensed uniformly in the direction of the applicator member 15.

The counter-bearing surface 130 is, in a variant, inclined obliquely with respect to the applicator member 15 so as to exert a variable pressure on the applicator member 15. Preferably, the pressure exerted on the applicator member 15 by the counter-bearing surface 130 increases with increasing distance from the reservoir 23 so as to allow product
5 to be applied uniformly to the lock of hair introduced between the upper arm 5 and lower arm 6.

As illustrated on figures 33 and 34, the device can comprise a cavity 131 on the arm 6 and opposite to the applicator member 15 of the refill 20 that receives a removable counter-bearing member 129. The counter-bearing member 129 defines a counter-bearing
10 surface 130 that, when the arms 5 and 6 are in the moved-together configuration, apply the hair on the applicator member 15.

The counter-bearing member 129 can comprise at least one slot 132, better two ribs 132 as illustrated on figure 34, that receives a rib 133 of the cavity 131. The thickness of the slot 132 can be substantially identical to the thickness of the rib 133 and/or the back
15 side of the counter-bearing member 129 can come into contact with the bottom of the cavity 131 such that the counter-bearing member 129 is maintained in position in the cavity 131.

The cavity 131 can be opened to the outside by an opening opposite to the applicator member 15 such that the counter-bearing surface 130 can face the applicator
20 member 15, and a front opening for inserting and removing the counter-bearing member 129.

The device 2 can comprise a locking element, not represented, to cooperate with a corresponding relief of the counter-bearing member 129 to lock the counter-bearing member 129 in the cavity 131. For example, the locking element can be a recessed relief
25 formed on the rib 133 of the cavity that cooperates with a corresponding protrusion formed in the slot 132 of the counter-bearing member 129.

Preferably the counter-bearing member 129 is inserted and removed through the front opening of the cavity by sliding it through an axis that is substantially parallel to the axis X_2 of the arm 6.

30 The counter-bearing surface 130 can be flat, as illustrated on figures 33 and 34.

In a variant illustrated on figure 34, the refill 20 can comprise a porous element, especially a felt element whose upper portion forms the reservoir 23 and whose lower portion, that come into contact with the hair, forms the application member 15.

The device can be used by moving the jaws 3 and 4 along a lock in order to
5 straighten the hair. The device can also be used by winding the lock around a jaw 3 or 4 and unwinding it by sliding it over this jaw 3 or 4 in order to curl the hair.

The device can be used in the hot state without steam production or without the heating elements 120 or 122 being activated.

In one variant, the steam outlet and the applicator member 15 occupy
10 substantially the same position relative to the direction of movement D of the device over the lock of hair. In this case, the steam outlet orifice(s) is/are formed for example through a counter-bearing surface against which the applicator member 15 bears when the jaws 3 and 4 are closed.

In the examples illustrated, the generation of steam takes place on the lower
15 arm 6 and the application of product on the upper arm 5. This arrangement can be reversed.

It is possible for the dispensing end piece 53 not to be elastically deformable and the product may be dispensed only during the moving-together movement of the jaws 3 and 4. An elastically deformable chamber for collecting the product may also be interposed in the path of the product between the duct 65 against which the pressing
20 element 95 and the dispensing end piece 53 bear, this chamber being formed for example by a portion of elastically deformable tube or by a diaphragm that is elastically deformable or able to move without inherent elasticity but comes into abutment against an elastic return member which deforms in order to accompany the increase in volume and which generates the pressure necessary to continue dispensing the product once the jaws 3 and 4
25 have been moved together.

The housing in the device that receives the refill may comprise at least one light source.

This source may allow the user to see that the refill is present while the device is in operation.

When the refill is made at least partially of a material that makes it possible to
30 see the cosmetic product contained in the interior thereof, the light source can make it easier for the user to determine the level of cosmetic product remaining in the refill.

Thus, it may prove to be advantageous to produce the refill with at least a portion of the reservoir made of a transparent or translucent material, and to dispose the light source so as to light the reservoir.

5 Preferably, the flap has a window which makes it possible to see at least a lit part of the reservoir, such that the user can know the level of product remaining while the flap is in the closed position. If appropriate, the colour of the light source can change depending on certain parameters, for example in order to signal that the treatment temperature has been reached or that the level of product or of water is low.

10 The expression “comprising a” should be understood as being synonymous with “comprising at least one”, and the limits are included in all the ranges of values indicated.

CLAIMS

1. Device for treating the hair, comprising:

- two arms (5, 6) that are able to move relative to one another between a
5 moved-together configuration for treating the hair and a spaced-apart configuration for
inserting hair to be treated between said arms, one of the arms (5) comprising a base
having a housing (33) and an external flap (18) that pivots on the base between an open
position for access to the housing (33) and a closed position preventing access to the
housing (33),
10 - a refill (20) comprising a reservoir (23) containing a product to be applied,
said refill (20) being disposed in a removable manner in the housing (33).

2. Device according to Claim 1, wherein the flap (18) is designed to act on an
electrical contact in the closed position, preferably by way of the refill (20), in particular of
the reservoir (23) of the refill (20).

15 3. Device according to Claim 1 or 2, wherein the flap (18) comprises at least
one relief (80) for fastening the refill (20) to the flap (18).

4. Device according to Claim 3, wherein the reservoir (23) comprises a rigid or
semi-rigid body in contact with the product.

20 5. Device according to any one of the preceding claims, wherein the refill (20)
is designed to be positioned in the housing (33) when the flap (18) is in the open position.

6. Device according to any one of the preceding claims, wherein the housing
(33) for receiving the refill (20) extends along more than half the length (L_{br}) of the arm (5).

25 7. Device according to any one of the preceding claims, wherein the flap (18)
is articulated longitudinally on the arm (5), in particular on the side on which the hair to be
treated is introduced between the arms (5).

8. Device according to Claim 7, wherein the arm (5) on which the flap (18) is
articulated defines a half-handle (10), the flap (18) being articulated on the half-handle (10).

30 9. Device according to Claim 7, wherein the arm (5) on which the flap (18) is
articulated defines a half-handle (10), the flap (18) being articulated on the distal part of the
arm (5), extending between its free end and the half-handle (10).

10. Device according to any one of Claims 1 to 6, wherein the flap (18) is
articulated about a transverse axis (Y) with respect to the direction of elongation of the arm

(5) which carries it, the two arms (5, 6) preferably being articulated about the same axis as the flap (18).

11. Device according to any one of the preceding claims, wherein the arm (6), that is opposite to the one on which the flap (18), is articulated has a steam outlet (128).

5 12. Device according to any one of the preceding claims, wherein the flap (18) is designed to be snap-fastened to the base of the arm (5) in the closed position, preferably carrying at least one elastically deformable member (31) for retaining it in the closed position, in particular at least one elastically deformable tongue suitable for snap-fastening to the base of the arm (5) in the closed position of the flap (18).

10 13. Device according to any one of the preceding claims, wherein the housing (33) opens to the outside and/or onto a window, making it possible to see that the refill (20) is present on the arm (5) when the flap (18) is in the closed position.

14. Device according to Claim 13, wherein the refill (20) has at least one extension (116) that leads to the outside of the arm (5), preferably a lateral extension that
15 juts out from or is flush with the side of the arm (5), in particular on the side opposite the articulation (28) of the flap (18) on the arm (5).

15. Device according to any one of the preceding claims, wherein the arms (5, 6) define half-handles (10, 11) that are extended towards their distal ends by jaws (3, 4), the flap (18) defining the top of one of the jaws (3).

20 16. Device according to Claim 15, wherein the maximum thickness (E) of the arms (5, 6), measured at the jaws (3, 4), is greater than that measured at the half-handles (10, 11).

17. Device according to any one of the preceding claims, wherein the flap (18) carries a member for closing off a member for applying the product contained in the refill
25 (20) when the device is not in use.

18. Device according to any one of the preceding claims, wherein the flap (18) or the base of the arm (5) has a relief designed to engage with the reservoir of the refill in order to cause the internal volume thereof to decrease when the refill (20) is fitted on the device.

30 19. Device according to Claim 18, wherein the reservoir (23) comprises a follower piston (88) and said relief is designed to act on the piston (88) so as to move the

latter forward in the reservoir (23), in particular when the refill (20) is mounted on the arm (5).

20. Device according to any one of the preceding claims, which is a straightener, each of the two arms (5, 6) comprising a heating element (120, 122), the
5 heating elements (120, 122) preferably comprising a plate that defines a hot surface (125) for bringing into contact with the hair.

21. Device for treating the hair, comprising:

- two arms (5, 6) that are able to move relative to one another between a moved-together configuration for treating the hair and a spaced-apart configuration for
10 inserting hair to be treated between said arms (5, 6), one of the arms (5) comprising a base having a housing (33) and the other arm (6) comprising a cavity (131),
 - a refill (20) disposed in a removable manner in the housing (33) and comprising
 - a reservoir (23) containing a product to be applied, and
 - 15 ▪ an applicator member (15) to apply the product from the reservoir (22),

and

- a counter-bearing member (129) disposed in a removable manner in the cavity (131) and defining a counter-bearing surface (130), the counter-bearing surface
20 (130) being configured to apply the hair against the applicator member (15) in the moved-together configuration of the arms (5, 6).

22. Device according to claim 21, the counter-bearing member (129) being inserted in the cavity (131) or extracted from the cavity (131) through a front opening of the cavity (131) by sliding along an axis that is parallel to the axis (X_2) of said arm (6).

23. Device according to claim 21 or 22, the counter-bearing member (129) comprising at least a relief (132), as a rib or a slot, that cooperates with a complementary relief (133), as a slot or a rib, of a wall of the cavity (131) which it faces.

24. Device according to any one of claims 21 to 23, the counter-bearing member (129) being one-piece.

25. Device according to any of claims 21 to 24, the arm (5) that bears the refill (20) can comprise an external flap (18) that pivots on the base between an open position for access to the housing (33) and a closed position preventing access to the housing (33),

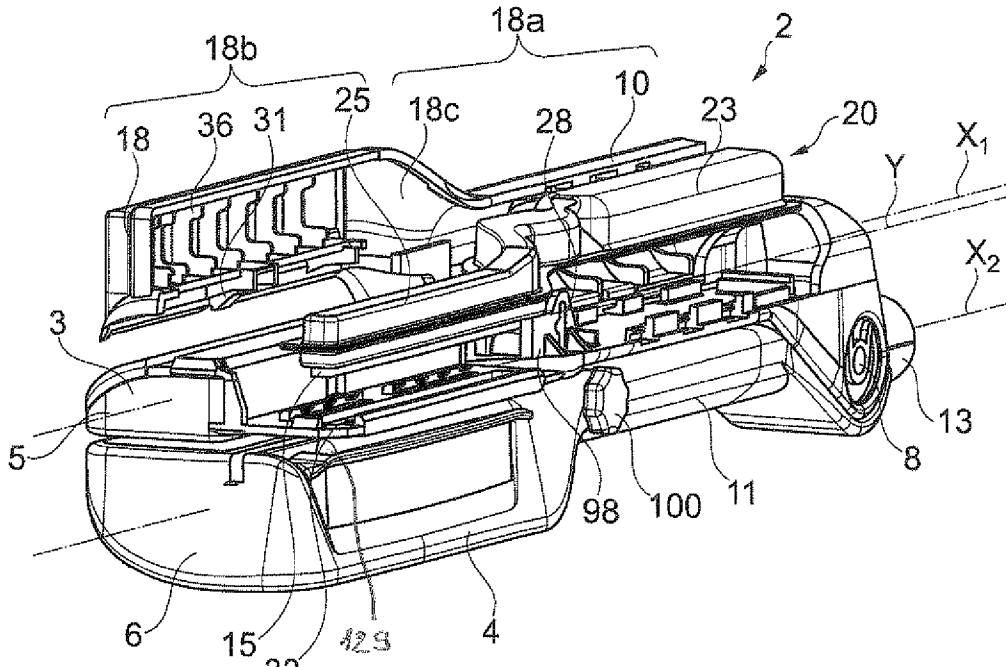


Fig. 1

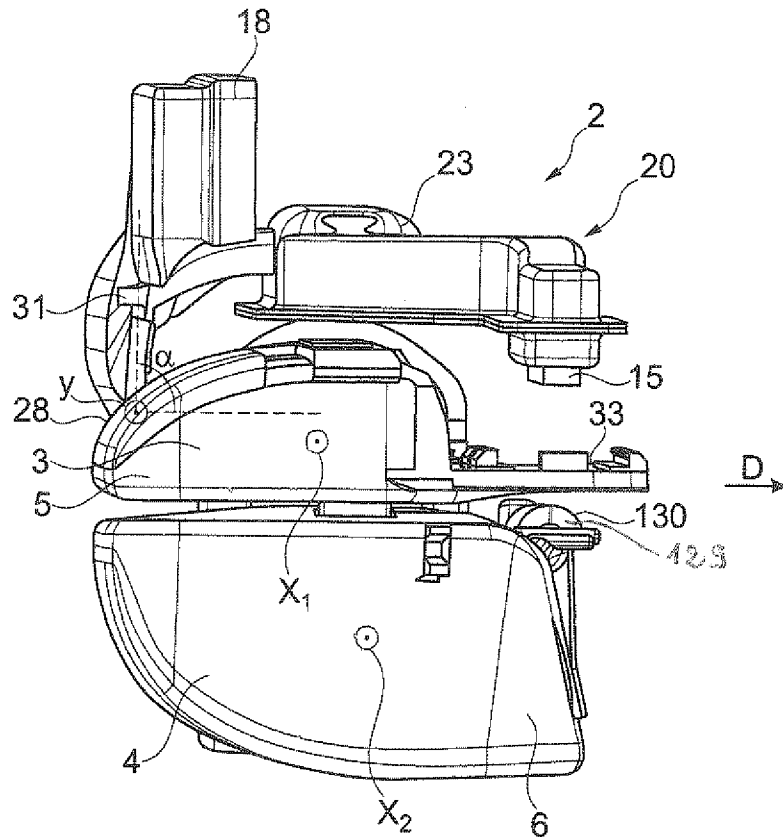


Fig. 2

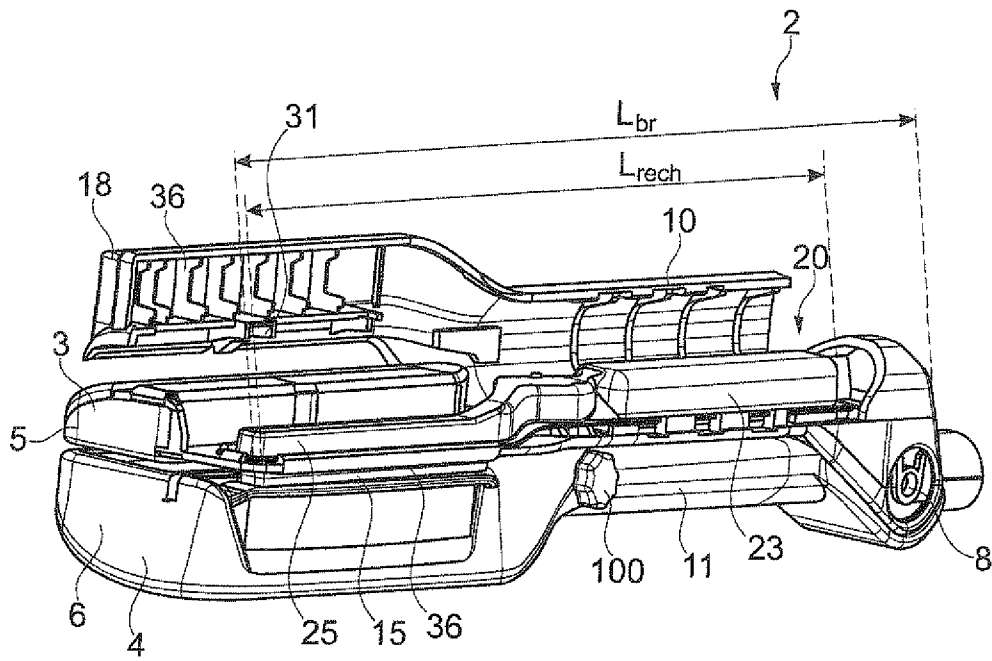


Fig. 3

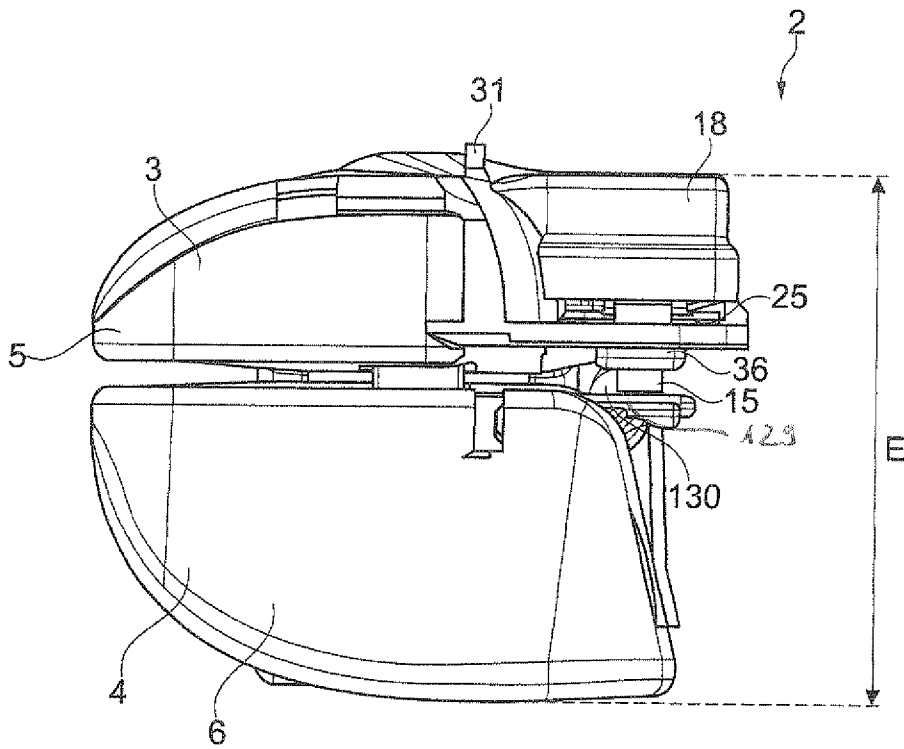


Fig. 4

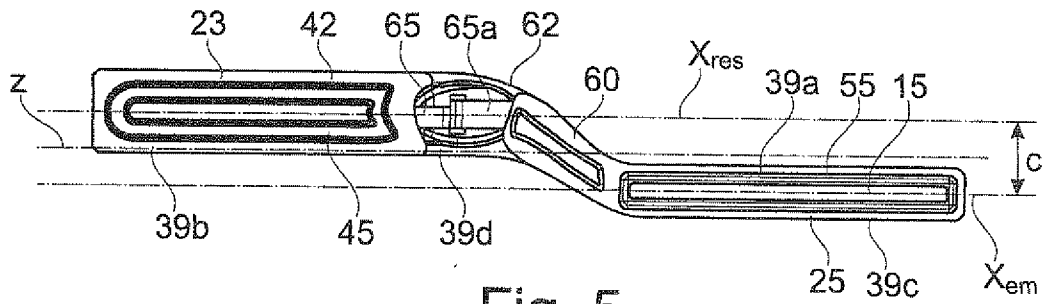


Fig. 5

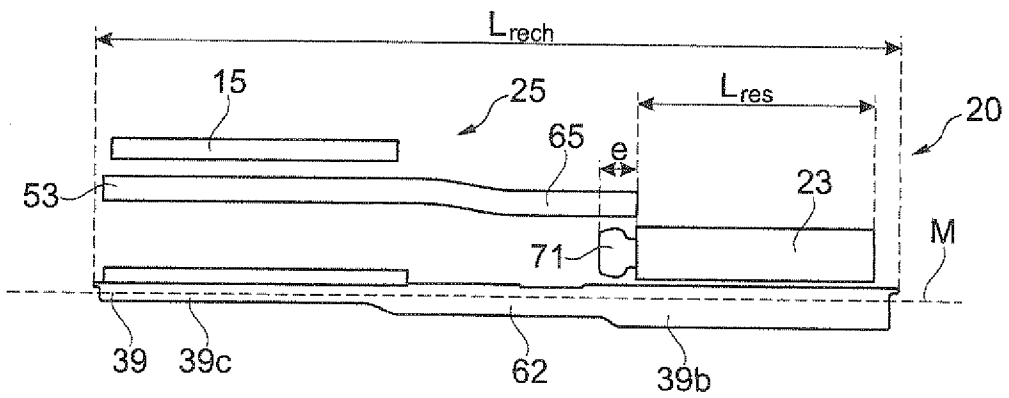


Fig. 6

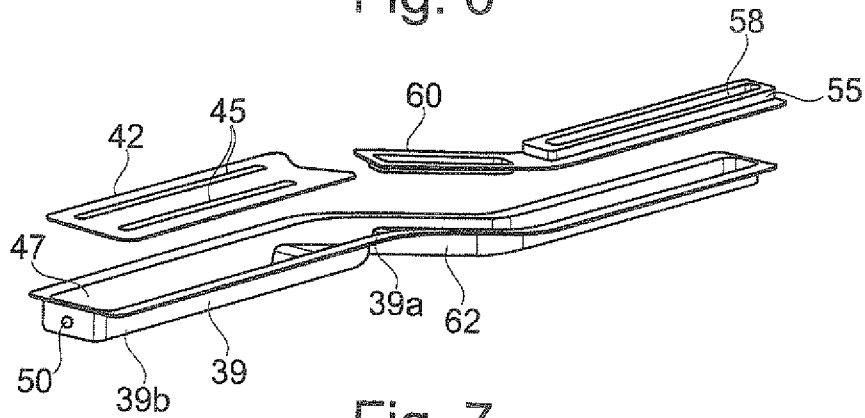


Fig. 7

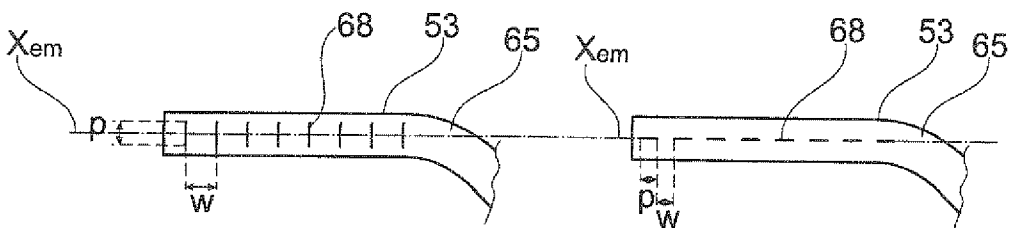


Fig. 8A

Fig. 8B

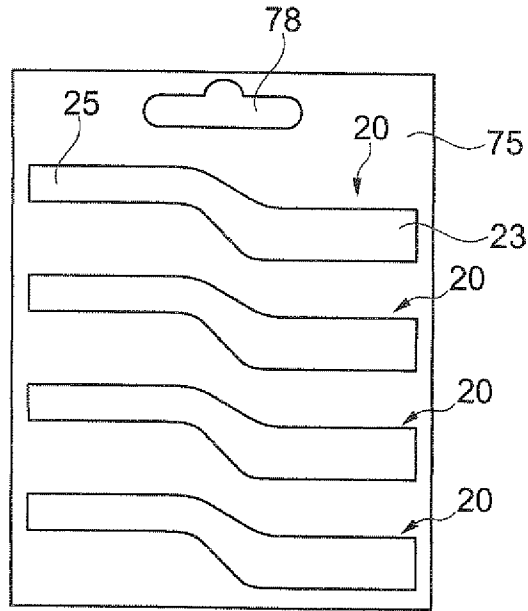


Fig. 9

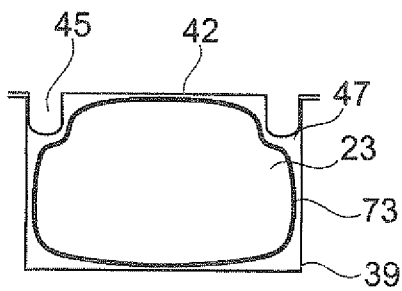


Fig. 10A

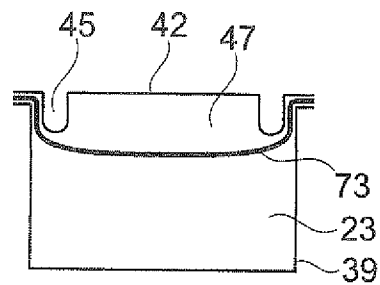


Fig. 10B

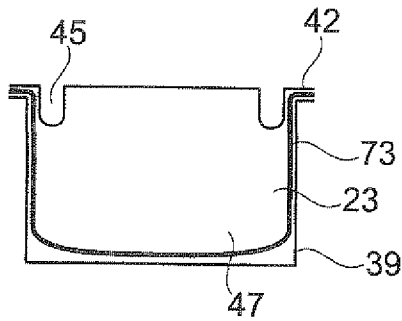


Fig. 10C

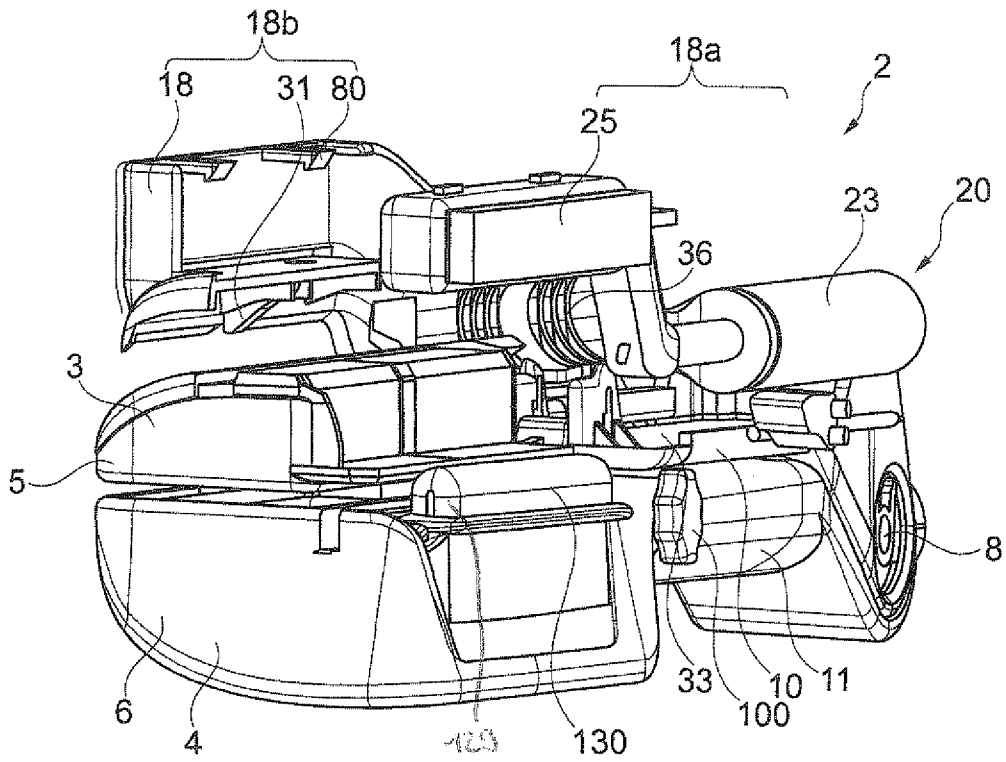


Fig. 11

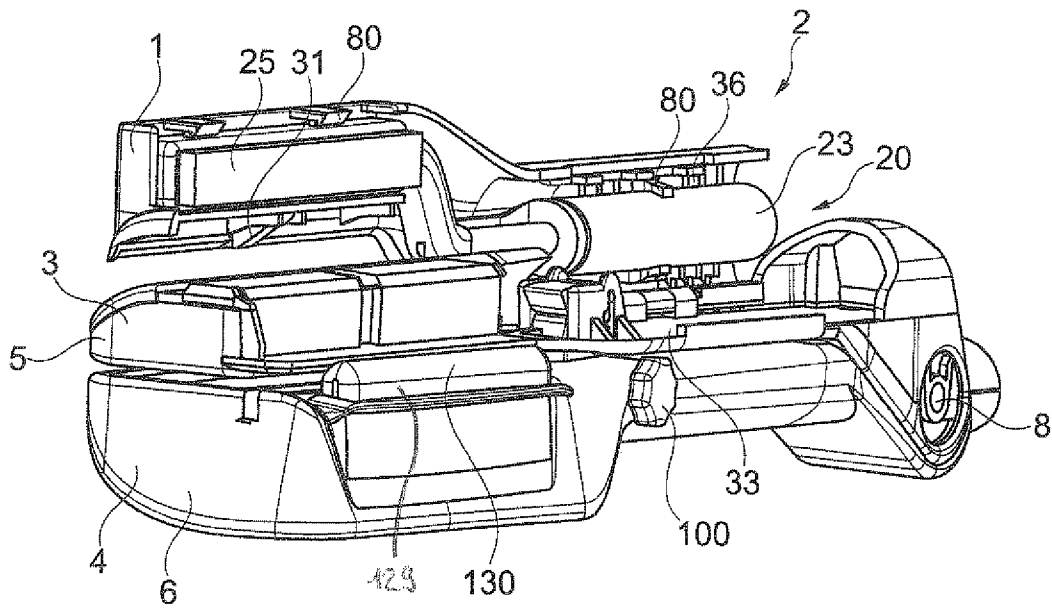


Fig. 12

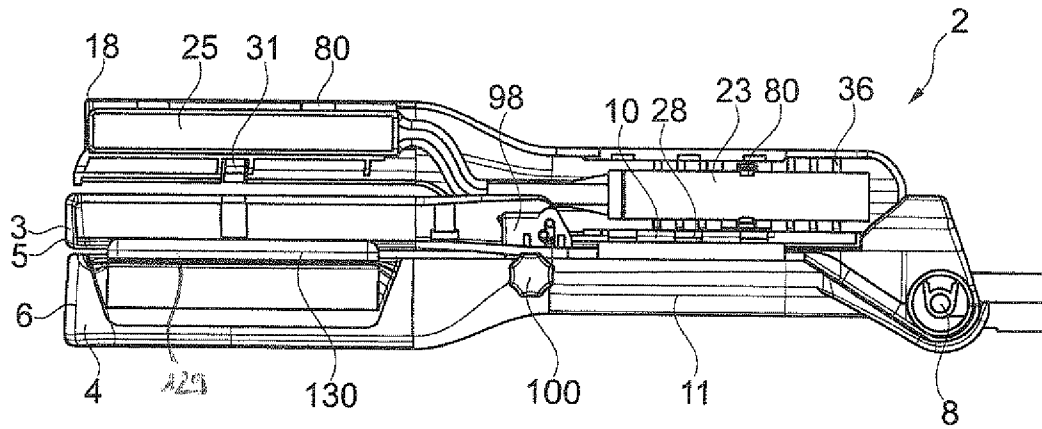


Fig. 13

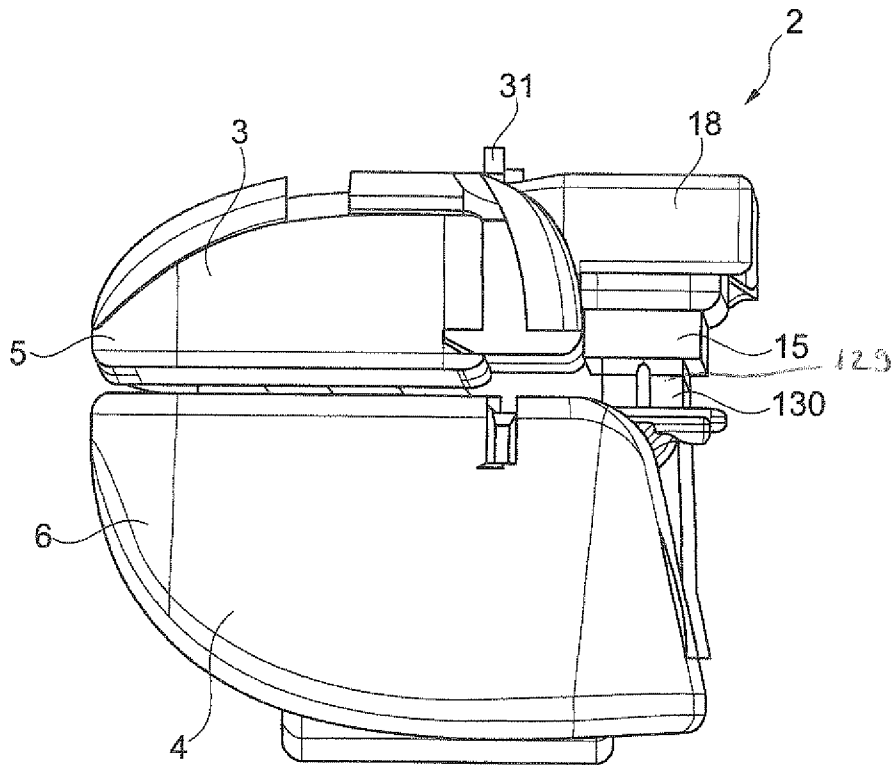


Fig. 14

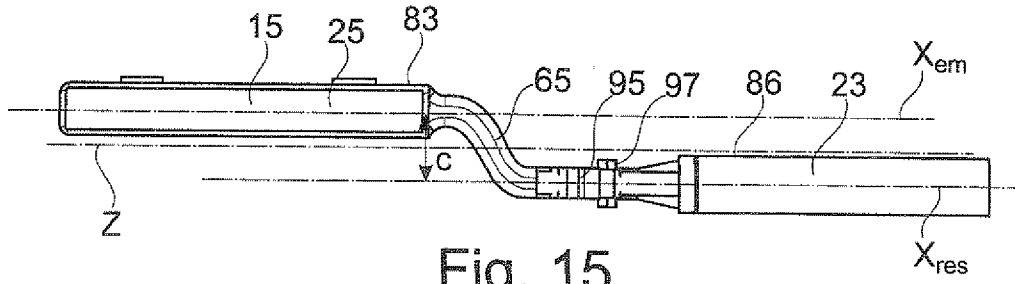


Fig. 15

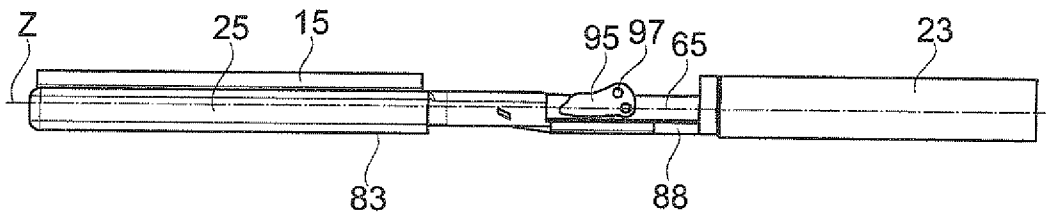


Fig. 16

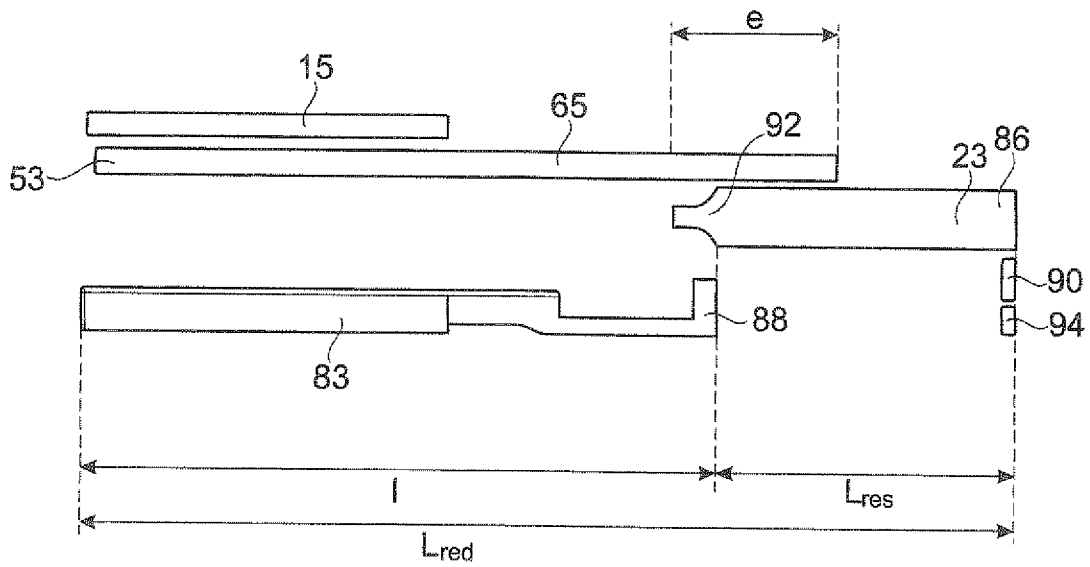


Fig. 17

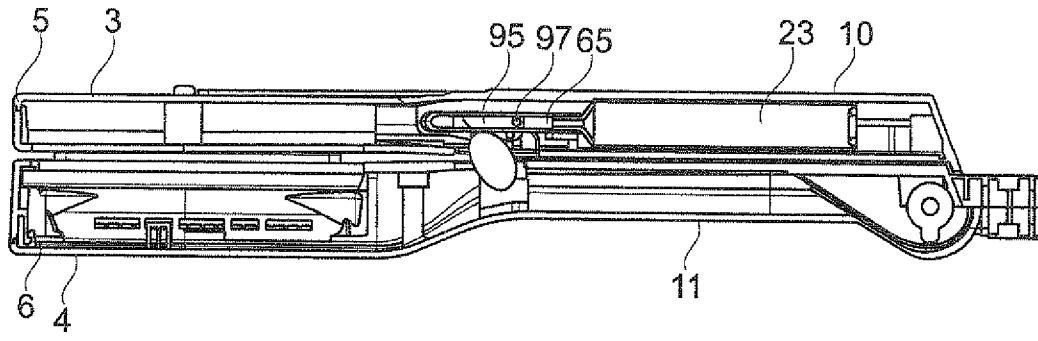


Fig. 18

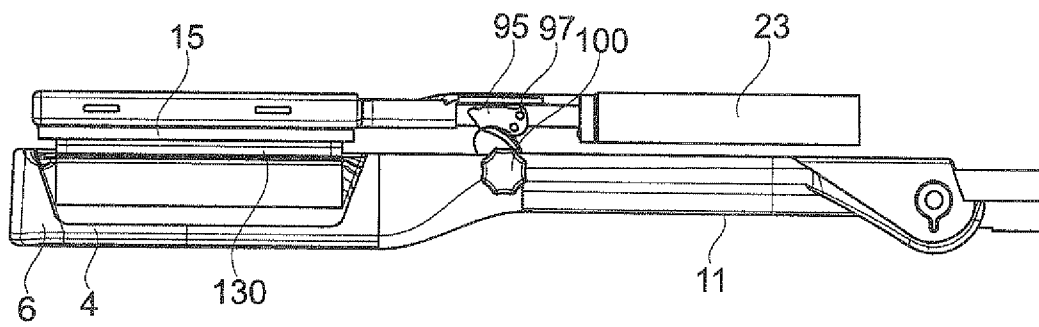


Fig. 19

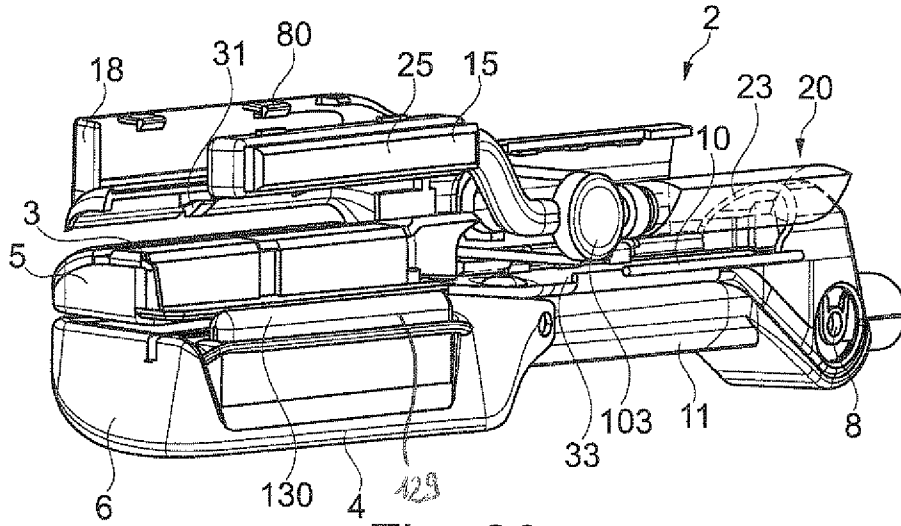


Fig. 20

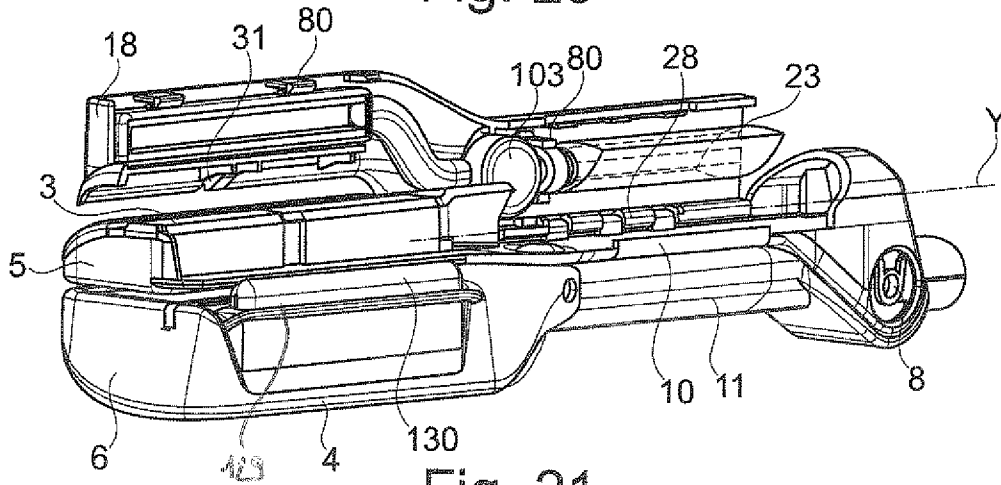


Fig. 21

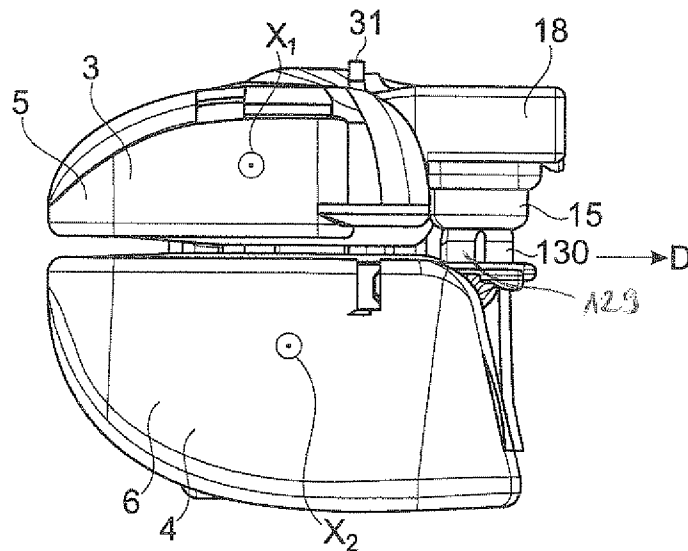


Fig. 22

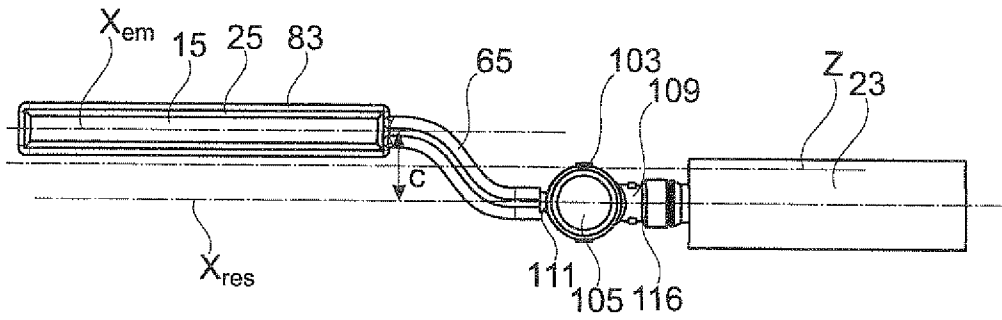


Fig. 23

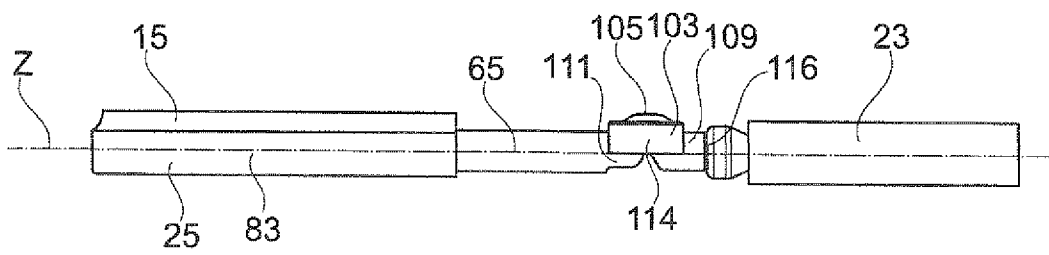


Fig. 24

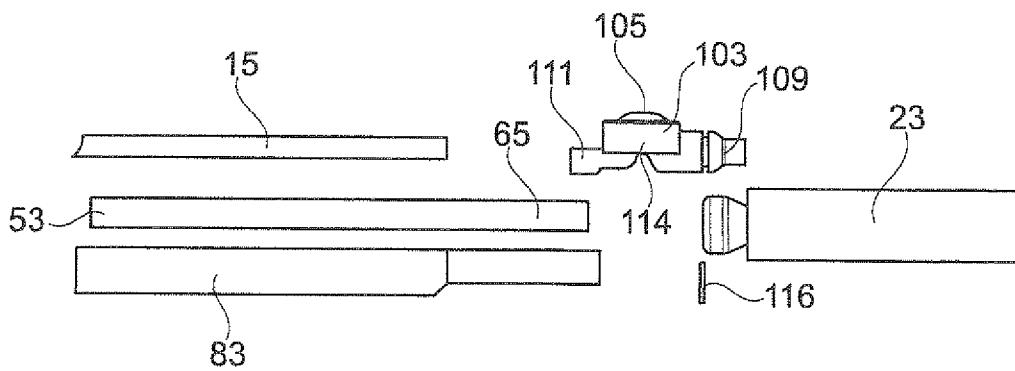


Fig. 25

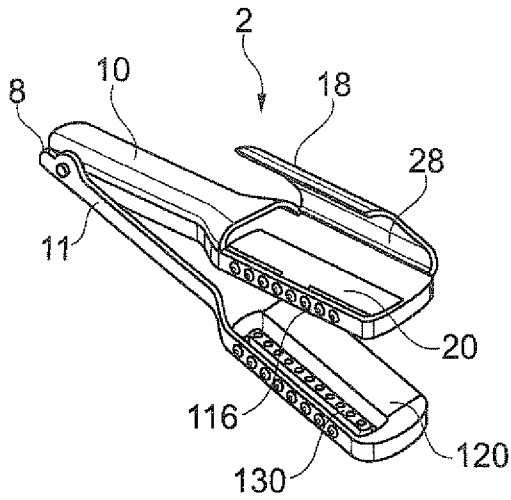


Fig. 26

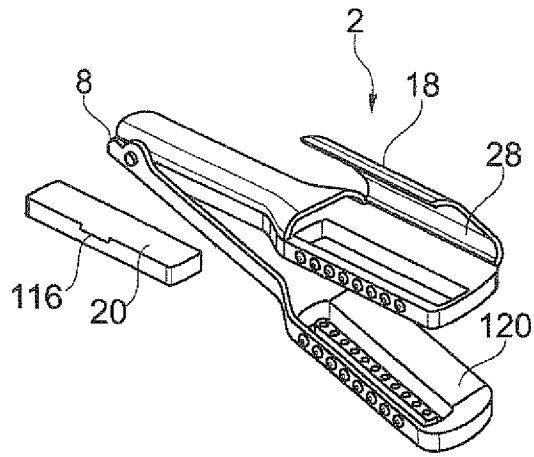


Fig. 27

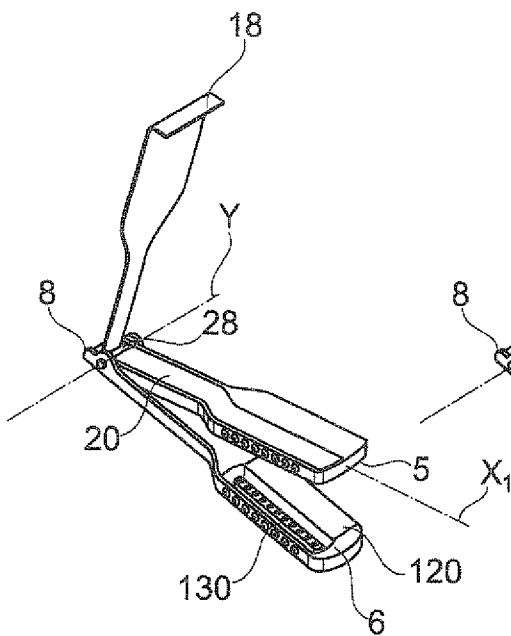


Fig. 28

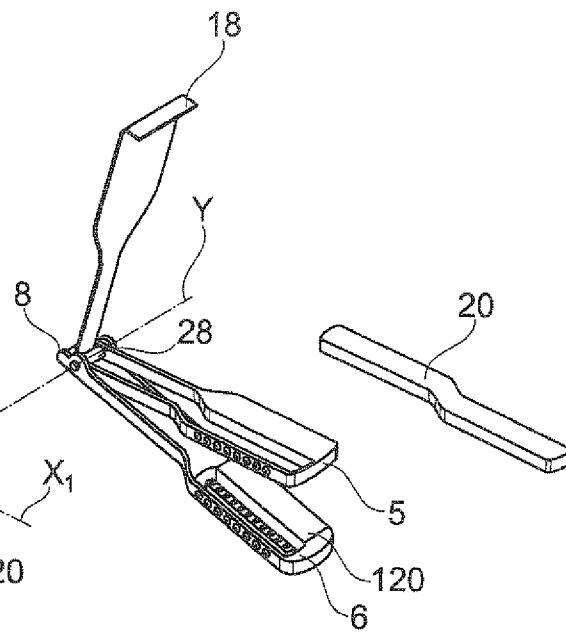


Fig. 29

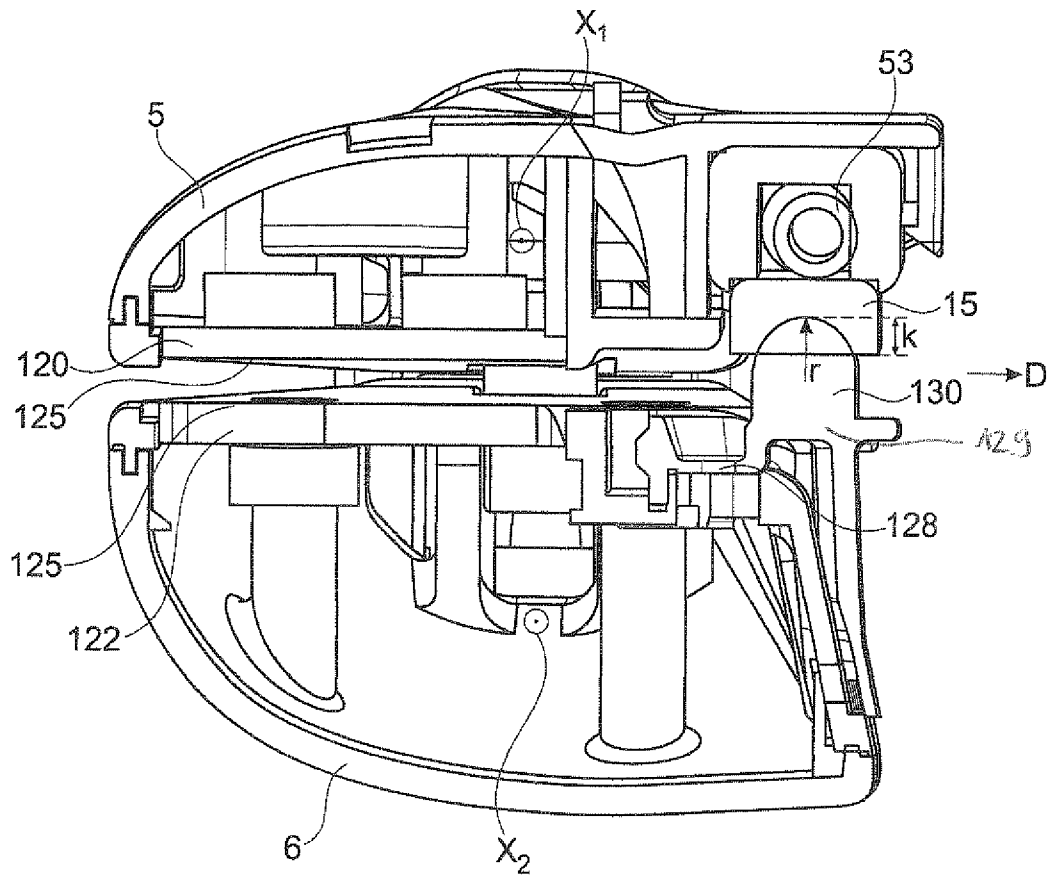


Fig. 30

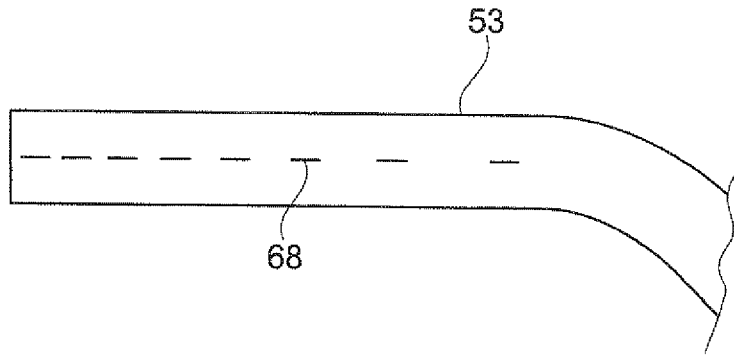


Fig. 31

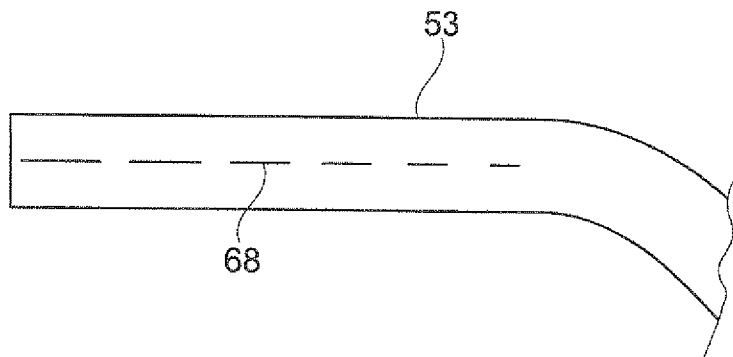


Fig. 32

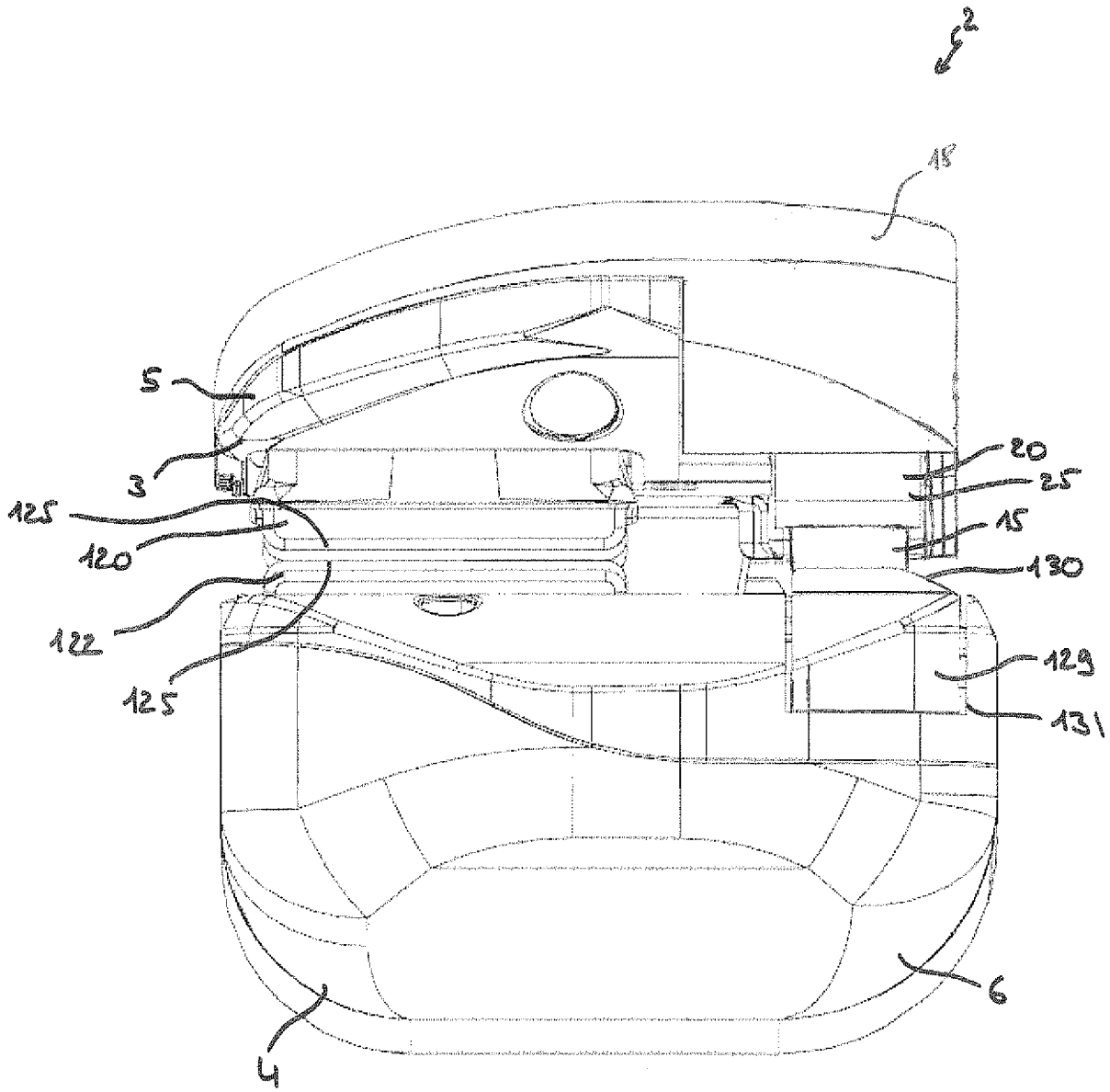


Fig. 33

