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(54) Title: REFILL FOR A DEVICE FOR TREATING THE HAIR, HAVING A COUPLING RELIEF

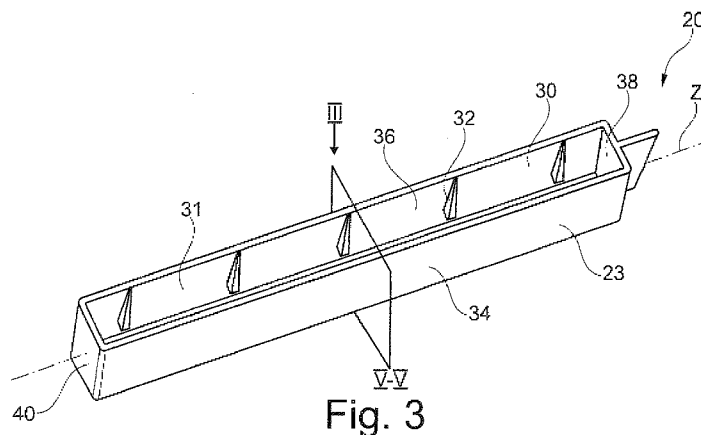


Fig. 3

(57) Abstract: The invention relates to a refill (20) for a device for treating the hair, comprising a body (23) having a cavity (30) that is formed at least partially by two opposite walls (34, 36; 38, 40) and a bottom and opens towards the outside by way of an opening (31), and an applicator member that is inserted into the cavity (30) in the body (23) along an insertion axis and extends out of the cavity (30) through the opening (31). At least one of the walls (34, 36; 38, 40) and the bottom comprises at least one coupling relief (32) that engages with the applicator member in order to prevent it from being extracted from the cavity (30), this coupling relief (32) being designed such that the force for inserting the applicator member into the cavity is weaker than the extraction force.



“Refill for a device for treating the hair, having a coupling relief”

The present invention relates to devices for treating the hair, and more particularly, but not exclusively, those intended for shaping the hair, in particular for
5 straightening, curling or crimping the hair, comprising a refill of cosmetic product.

The invention relates more particularly to devices comprising two jaws that are able to move with respect to one another and are able to take up a spaced-apart configuration for introducing a lock of hair between said jaws and a moved-together configuration for treating the lock, the jaws being movable along the lock in this moved-
10 together configuration. In such devices, the jaws 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.

15 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 to the heat output by the
20 heating element, until the two arms are opened and the lock of hair is removed.

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 latter allowing a haircare product to be dispensed during operation. The hair
25 treatment device is composed of a support material impregnated with a haircare product and suitable for a single use.

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 its application. Said removable
30 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 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.

Application WO 2013/045331 discloses an applicator for applying a care substance to the hair, comprising a cartridge of care substance held in a housing of the applicator. The cartridge comprises a porous support saturated with the care substance.

Application WO 2013/090896 relates to an appliance for treating the hair, in particular a hairstyling appliance, comprising a treatment agent support, in particular a saturated porous material, to be applied to the hair or the skin. The support is fixed to an accessory, which is itself mounted in a removable manner on a hair treatment appliance. The support is T-shaped, allowing it to be mounted in a complementary groove in the accessory.

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

15 **Summary**

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

- a body having a cavity that is formed at least partially by two opposite walls and a bottom and opens towards the outside by way of an opening, and
- an applicator member that is inserted into the cavity in the body along an insertion axis X and extends out of the cavity through the opening.

At least one of the walls and the bottom of the cavity comprises at least one coupling relief that engages with the applicator member in order to prevent it from being extracted from the cavity, this coupling relief being designed such that the force for inserting the applicator member into the cavity is weaker than the extraction force.

The applicator member can be inserted easily into the cavity and extracted with more difficulty. This makes it possible for the applicator member to be held therein properly.

The applicator member is inserted and extracted here along the same path but in opposite directions.

The coupling relief can be designed to damage the applicator member during the extraction of the latter. Thus, the applicator member is not reusable, thereby making it possible to limit the health risks associated with its reuse.

The coupling relief can be designed to separate from the wall or the bottom that carries it, in particular by breaking, during the extraction of the applicator member from the cavity, such that the refill is not reusable.

The difference ΔF between the force for inserting the applicator member into the cavity and the force for extracting it therefrom may be greater than or equal to 3 N, preferably greater than or equal to 4 N.

Preferably, the applicator member is made of a porous material, in particular of synthetic or natural fibres that are all oriented substantially in the same direction and assembled to form a felt. The applicator member may have a fibre density of between 0.080 g/cm^3 and 0.400 g/cm^3 . Such a material makes it possible in particular to package and apply the cosmetic product.

In a variant, the applicator member comprises at least two parts having different fibre densities and/or fibre orientations. For example, one of the two parts may form a product reservoir and the other may allow the application of the cosmetic product.

Preferably, the applicator member is impregnated with cosmetic product.

Preferably, the applicator member is compressible. During the insertion of the applicator member into the cavity, said applicator member can deform locally in contact with the coupling relief and mould itself more or less to the shape of the cavity. During the extraction of the applicator member from the cavity, the coupling relief may retain the applicator member therein by engaging in particular with the latter, in particular with the fibres of the applicator member.

The applicator member may comprise precut regions that are intended to tear during the extraction of said applicator member from the cavity, making the applicator member non-reusable.

Preferably, the coupling relief extends from said wall or said bottom in a direction substantially perpendicular to that of the fibres of the applicator member. In this configuration, the coupling relief, by engaging with the fibres of the applicator member perpendicularly to the latter, can tear the fibres, thereby damaging the applicator member and preventing it from being reused.

Preferably, the cavity has a height H , defined along the insertion axis X from the opening, the coupling relief extending along the insertion axis X along a length l less than this height H .

Preferably, the coupling relief is asymmetric with respect to a median transverse plane therefor. Such asymmetry makes it possible in particular to have insertion properties of the applicator member that are different from the extraction properties thereof.

Preferably, the coupling relief has a thickness e , measured in a plane perpendicular to said wall or said bottom, which is variable along the insertion axis X.

Preferably, the thickness e

- increases along the entire length l of the coupling relief along the insertion axis X of the applicator member, or
- increases along a first portion of length l_1 along the insertion axis X and then decreases along a second portion of length l_2 along the insertion axis X, the ratio between the lengths l_2/l_1 being less than 1, preferably less than or equal to 0.5, even better still less than or equal to 0.2, or
- increases along a first portion of length l_1 along the insertion axis X and is then constant along a second portion of length l_3 along the insertion axis X, the thickness of the second portion being less than the maximum thickness e_{max} of the first portion.

This makes it possible to have a coupling relief that has a shallower slope in the direction of insertion of the applicator member than the slope in the direction of extraction. This makes it possible in particular to make it more difficult to extract the applicator member.

When the coupling relief is on one of the opposite walls, it is possible for the opposite walls not to have a coupling relief over a non-zero height h starting from the bottom of the cavity. As a result, the applicator member, once it has been introduced into the cavity, extends at least partially under the coupling relief in the cavity. This allows in particular the coupling relief to engage better with the applicator member, in particular the fibres thereof, in the direction of its extraction.

Preferably, the or each coupling relief has:

- a first face that is oriented towards the opening and has an average slope forming an angle α less than or equal to 45° with the insertion axis X, and
- a second face that is oriented towards the side away from the opening and has an average slope forming an angle β greater than or equal to 45° with the introduction axis X, better still greater than or equal to 80° , even better still greater than or equal to 90° .

The first face and the second face may form an angle γ less than or equal to 110° , better still less than or equal to 90° and/or greater than 45° , at their meeting point.

The coupling relief may have at least one ridge, in particular a longitudinal ridge and/or a transverse ridge, at the meeting point between the first and the second face.

The coupling relief may have a substantially triangular shape in longitudinal section, in particular when said coupling relief is on one of the opposite walls, or the shape of an arrow, the tip being oriented towards the opening of the cavity, in particular when the coupling relief is on the bottom.

When the coupling relief is on one of the opposite walls, the coupling relief may have a shape which is or is not semicircular, notably polygonal, in particular rectangular, square or triangular, in cross section. When the coupling relief is on the bottom, the coupling relief may have a shape which is or is not circular, notably polygonal, in cross section.

The maximum thickness e_{max} of the coupling relief, measured in a plane perpendicular to said wall or to said bottom to which it is attached, may be between 0.2 mm and 3 mm, better still between 0.5 mm and 2 mm.

The coupling relief may extend along the insertion axis X along a length l of between 1 mm and 30 mm, better still between 5 mm and 15 mm.

The coupling relief may have a maximum width k , measured parallel to said wall, of between 0.2 mm and 5 mm, better still between 0.5 mm and 2 mm.

Preferably, the coupling relief is moulded together with the body.

In a variant, the coupling relief is fitted into the cavity. The coupling relief may be made of a different material from the body.

The coupling relief may comprise a narrowed region, in particular a region with a smaller width, which is configured to break if the user withdraws the applicator member from the cavity.

At least one of the walls or the bottom may comprise a plurality of coupling
5 reliefs. At least one wall or the bottom may comprise fewer than 10 coupling reliefs, better still between 3 and 8 coupling reliefs.

All of the coupling reliefs may be identical. In a variant, at least one of the coupling reliefs is different from the others.

It is possible for one of the two opposite walls and/or the bottom not to have a
10 coupling relief, or the two opposite walls and/or the bottom may each have at least one coupling relief.

The coupling reliefs on one of the opposite walls may be situated facing the coupling reliefs on the other of the opposite walls. In a variant, the coupling reliefs on one of the opposite walls alternate with the coupling reliefs on the other of the opposite walls.

15 One of the two opposite walls may comprise at least one protruding compression relief. The other of the two opposite walls preferably comprises coupling reliefs, the compression relief pressing the applicator member against the coupling reliefs on the other of the side walls.

Preferably, the opposite walls are planar and parallel to one another. The
20 bottom may be planar.

Preferably, the cavity has an elongate shape in a direction perpendicular to the insertion axis.

Preferably, the cavity is closed other than at the opening.

Preferably, the cavity has substantially the shape of a rectangular
25 parallelepiped.

Preferably, the body of the refill is U-shaped in cross section.

Preferably, the applicator member has a shape complementary to that of the cavity, in particular the shape of a rectangular parallelepiped.

The cavity may be delimited by a front wall and a rear wall opposite the front
30 wall, two opposite side walls and a bottom against which the applicator member can butt. At least one of the front and rear walls and the side walls and the bottom comprises a coupling relief.

The body of the refill may be made of thermoplastic material, in particular polybutylene terephthalate (PBT), polyethylene terephthalate (PET), polyamide (PA), elastomer, polypropylene, copolyester, in particular Tritan®, or a mixture thereof, in particular a mixture of PBT and PET.

5 The applicator member is preferably packaged already in place in the cavity.

A further 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
10 the arms comprising a housing,
- a refill according to the invention, as defined above, which is disposed in a removable manner in the housing.

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

15 This also allows the user to be able to change the refill when the latter no longer contains any or enough cosmetic product.

The arm opposite the one on which the refill is disposed may have a steam outlet, and preferably also a comb.

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 straightening by the heating element(s) and/or combing. 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 moved-together configuration of the arms.

The invention may be better understood from reading the following detailed description of non-limiting illustrative embodiments thereof and from examining the appended drawing, in which:

- 5 - Figure 1 shows a perspective view of an example of a device for treating the hair,
- Figure 2 is a cross-sectional view on II-II in Figure 1;
- Figure 3 illustrates a perspective view of an example of a body of the refill,
- Figure 4 is a top view along IV in Figure 3,
- 10 - Figure 5 is a cross-sectional view on V-V in Figures 3 and 4,
- Figure 6 shows a coupling relief according to Figures 3 to 5, in cross section on VI-VI in Figure 5,
- Figure 7 illustrates a perspective view of a variant body of the refill,
- Figure 8 is a top view along VIII in Figure 6,
- 15 - Figure 9 shows a cross-sectional view on IX-IX in Figures 7 and 8,
- Figure 10 shows a coupling relief from Figures 7 to 9, in cross section on X-X in Figure 9,
- Figures 11A to 11M are cross-sectional views of variant bodies of the refill,
- 20 - Figures 12A to 12E show variant coupling reliefs in top view, and
- Figures 13A to 13C are top views of variant bodies of the refill.

25 In the rest of the description, identical elements or elements having identical functions bear the same reference signs. In order to make the present description concise, they are not described for each of the figures, only the differences between the embodiments being described.

 Figures 1 and 2 show the handpiece 2 of an example of a device for treating the hair according to the invention.

30 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 introduction between said jaws of a lock of hair, and a moved-together configuration for treatment.

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.

5 The upper arm 5 and lower arm 6 each preferably have a total length of between 22 cm and 37 cm, preferably 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.

10 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.

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.

15 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.

20 In the example in question, the handpiece 2 is configured to apply a cosmetic product, to treat the hair by way of steam and then to carry out a heat treatment of the hair by contact with two hot surfaces 15 and 16.

The direction D of movement of the handpiece 2 over the hair, illustrated in Figure 4, is preferably substantially perpendicular to the upper arm 5 and lower arm 6.

25 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.

30 This base station provides 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 18 which connects the handpiece 2 to the base station can thus comprise various electrical conductors and a water supply pipe.

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 cosmetic product is applied by a refill 20 carried by one of the two arms, 5 or 6, in this case the upper arm 5, which comes into contact with a pressing element 21. The latter may be removable.

The refill 20 comprises a body 23 and an applicator member 26 disposed so as to come into contact with the hair extending through the treatment region.

The refill 20 can be fixed to the arm 5 or 6 by any means, in particular, as illustrated in Figure 2, by sliding a rib of the body 23 into a groove with a complementary shape.

The body 23 has a cavity 30 that opens towards the outside by way of an opening 31 into which the applicator member 26 is inserted, along an insertion and extraction axis X (insertion axis X below), while the refill is being manufactured. The body 23 comprises coupling reliefs 32 that extend into the cavity 30.

The body 23 is illustrated in more detail in Figures 3 to 6.

The body 23 has substantially the overall shape of a rectangular parallelepiped and is elongate along a longitudinal axis Z. In cross section, the body 23 is U-shaped, as illustrated in Figure 5.

The body 23 comprises a front wall 38 and a rear wall 40 that are opposite one another and are connected by two side walls 34 and 36 and by a bottom 42.

The coupling reliefs 32 are each asymmetric with respect to their median axis M.

The coupling reliefs 32 extend from the two opposite side walls 34 and 36 of the body 30 and are all identical. Each side wall 34 or 36 comprises five coupling reliefs, but this does not have to be the case. The coupling reliefs 32 on one of the two walls 34 and 36 are disposed facing the coupling reliefs 32 on the other of these walls.

The coupling reliefs 32 are elongate along the insertion axis X and have a substantially triangular shape in longitudinal section, as illustrated in Figure 5. In cross section, as illustrated in Figure 6, said coupling reliefs have a substantially rectangular shape, their maximum width k being smaller than their maximum thickness e_{max} .

Each coupling relief 32 comprises a first planar face 46 that is oriented towards the opening 31 and is parallel to the longitudinal axis Z of the cavity 30, and a second planar face 48 that is oriented towards the bottom 42.

The first face 46 forms an angle α approximately equal to 10° with the insertion axis X and extends along the entire length l of the coupling relief 32. The second face 48 is substantially perpendicular to the insertion axis X. The first face 46 and the second face 48 have a common edge 49. The first and the second face 46 and 48 form an angle γ equal to $\beta - \alpha$, i.e. approximately equal to 80° here, between one another. The coupling relief 32 can thus, as illustrated, have a thickness e that increases along its entire length l .

The first planar face 46 is connected to the wall from which it extends 34 or 36 by two planar faces 50 and 52 that form the sides of the coupling relief 32. The faces 50 and 52 form an angle with the longitudinal axis X that is equal to the angle α formed by the first face 46.

The coupling reliefs 32 are moulded together with the body 23.

The body 23 and the coupling reliefs 32 are made of thermoplastic material, in particular polybutylene terephthalate (PBT), polyethylene terephthalate (PET), polyamide (PA), polypropylene, copolyester, in particular Tritan®, elastomer or a mixture thereof, in particular a mixture of PBT and PET.

The coupling reliefs 32 extend along a length l from the opening 31 towards the bottom 42 that is equal to around 10 mm here. The maximum thickness e_{max} of the coupling reliefs 32 starting from the wall 34 or 36 is equal to around 1.5 mm here. The maximum width k of the coupling reliefs 32, measured parallel to the wall 36, is equal to around 1 mm here.

The cavity 30 has a width K equal to around 8 mm, a length L equal to around 90 mm and a height H equal to around 15 mm.

The side walls 34 and 36 do not have coupling reliefs 32 over a height h starting from the bottom that is equal to $H - l$, i.e. around 5 mm here.

In a variant, the first and the second faces 46 and 48 are connected by a rounded portion 49.

The applicator member 26 has substantially the shape of a rectangular parallelepiped, in particular having dimensions equal to those of the cavity 30.

Such a refill 20 is particularly suitable when the applicator member 26 is a felt:

- that has a shape complementary to that of the cavity 30,

- is formed of fibres that are all oriented substantially along the longitudinal axis Z of the cavity 30, and
- has a fibre density of between 0.080 g/cm^3 and 0.400 g/cm^3 .

The example in Figures 7 to 10 differs from the one in Figures 3 to 6 by way of the shape of the coupling reliefs 32. In cross section, as illustrated in Figure 10, the coupling reliefs 32 have the shape of a right-angled triangle. Each coupling relief 32 has two first planar faces 46a and 46b that extend longitudinally along the entire length l of the coupling relief 32, and a second face 48. The latter is identical to the one described above. The two first faces 46a and 46b extend from the wall 36 to a common longitudinal edge 60. They form an angle λ approximately equal to 45° between one another. The edge 60 and the two first faces 46a and 46b form an angle α with the insertion axis X that is approximately equal to 5° . The angle γ between the first faces 46a and 46b and the second face 48 is approximately equal to 85° . The first face 60 is perpendicular to the wall 36.

The maximum thickness e_{max} and the maximum width k of the coupling reliefs 32 are approximately equal to 0.8 mm here.

Such a refill 20 is particularly suitable when the applicator member 26 is a felt:

- that has a shape complementary to that of the cavity 30,
- is formed of fibres that are all oriented substantially along the longitudinal axis Z of the cavity 30, and
- has a fibre density of between 0.080 g/cm^3 and 0.400 g/cm^3 .

The examples in Figures 11A to 11M differ from those in the preceding figures by way of the shape, in longitudinal section, and/or the position of the coupling reliefs 32.

The example in Figure 11A has coupling reliefs 32 in the shape of half a fir tree in longitudinal section. Each coupling relief 32 has a plurality of edges 49 that are oriented towards the bottom 42 of the body 23.

The example in Figure 11B comprises coupling reliefs 32 that are attached to the walls 34 and 36 of the body 23 and extend over the entire height H of the cavity 30.

The example in Figure 11C has coupling reliefs 32 that each have an edge 49 oriented towards the bottom 42. The second face 48 forms an angle β greater than 90° , better still greater than or equal to 135° . The coupling reliefs 32 deform elastically. During the insertion of the applicator member 26, the coupling reliefs 32 deform by curving more towards the bottom of the cavity 30, such that the angle β increases and the distance of the

edge from the wall 34 or 36 decreases. During the extraction of the applicator member 26, the coupling reliefs 32 can deform towards the opening 31 such that the angle β decreases, the distance of the tip 70 from the wall 34 or 36 increases and, by deforming, further compresses the applicator member 26, making its extraction more difficult.

5 In a variant, the coupling reliefs 32 as described above are not deformable. The coupling reliefs 32 can, during the extraction of the applicator member 26, hook in the latter in order to prevent its extraction.

10 The example in Figure 11D comprises coupling reliefs 32 that are attached to the walls 34 and 36 of the body 23. The coupling reliefs 32 are formed by cutting and bending plates 72 and 74 that are fitted on the side walls 34 and 36 of the body 23. The coupling reliefs are formed by portions of plates 72 and 74 that are bent towards the inside of the cavity. The coupling reliefs 32 are oriented downwards and form an angle θ with the walls 34 or 36 from which they extend, the angle θ being less than or equal to 90° .

15 The first face(s) 46 or 46a and 46b of each coupling relief 32 in Figure 11E are convex towards the outside.

20 The second face 48 of each coupling relief 32 in Figure 11F forms an angle β of less than 90° with the insertion axis X. The coupling relief 32 thus comprises a first portion 32a that increases in size towards the bottom 42 and has a length l_1 and a second portion 32b that decreases in size towards the bottom 42 and has a length l_2 . The ratio of the lengths l_2/l_1 is less than 0.2.

The first face 46, 60 or 62 of each coupling relief 32 in Figure 11G is concave towards the outside.

The example in Figure 11H has coupling reliefs 32 in the form of tabs perpendicular to the insertion axis X disposed in an indentation 74 in the wall 34 or 36.

25 These coupling reliefs are elastically deformable. During the insertion of the applicator member 26, the coupling reliefs 32 can curve towards the bottom of the cavity 30, such that the angle β becomes greater than 90° . During the extraction of the applicator member 26, the coupling reliefs 32 can deform towards the opening 31 such that the angle β decreases and, by deforming, further compress the applicator member 26, making its
30 extraction more difficult.

In the example illustrated in Figure 11I, the body 23 has, facing the coupling reliefs 32, compression reliefs 76. During the insertion of the applicator member 26 into

the cavity 30, said compression reliefs make it possible to compress said applicator member 26 against the coupling relief 32 facing it so as to further improve the retention of the applicator member 26. Here, the compression reliefs 76 extend over the entire height H of the cavity 30 and have a symmetric shape about their median axis and in the form of a pad.

In the examples illustrated in Figures 11J to 11M, the coupling relief 32 is a bottom relief 42 which is in the form of an arrow with the tip 80 oriented towards the opening 31 of the cavity 30. The distal end 82 of the arrow, extending along a length l_1 , is carried by a foot 84 of constant thickness. Said distal end widens from the tip 80 in the direction of the bottom 42. The foot 84 has a constant thickness and is less thick than the greatest thickness e_{max} of the distal end 82. Starting from the tip 80 towards the base of the foot 84, the thickness increases along the length l_1 from the distal end 82 and is then constant along the length l_3 corresponding to at least a part of the foot 84. The distal end 82 may be in the shape of an inverted V, as illustrated in Figure 11J, in the shape of a triangle, as illustrated in Figure 11K, or in the shape of an inverted V with lips parallel to the bottom 42 at each of the ends of the V, as illustrated in Figure 11L. The distal end, as illustrated in Figure 11M, may have a recess 86 at the tip 80.

The examples in Figures 12A to 12E differ from those in Figures 3 to 10 by way of the shape, in cross section, of the coupling reliefs 32. The coupling reliefs 32 may be in the shape of an isosceles triangle, as illustrated in Figure 12a, in the form of a semicircle, as illustrated in Figure 12B, in the shape of a semi-polygon, in particular a semi-hexagon, as illustrated in Figure 12C, or of a rectangle having a maximum width k that is greater than its maximum thickness e_{max} , as illustrated in Figure 12D. In the example illustrated in Figure 12E, the coupling relief 32 has a narrowed region 90, in particular at its meeting point with the wall 34. This narrowed region 90 can break when the user attempts to remove the applicator member 26.

The examples in Figures 13A to 13C differ from those in Figures 3 to 10 by way of the position of the coupling reliefs 32 on the body 23.

In the example in Figure 13A, the body 23 comprises two coupling reliefs 32 that are respectively disposed on the opposite front 38 and rear 40 walls.

In the example in Figure 13B, the body 23 comprises coupling reliefs 32 on a single one of the side walls 34 or 36.

In the example in Figure 13C, the body 23 comprises coupling reliefs 32 on the bottom 42.

The invention is not limited to the exemplary embodiments which have just been described, the characteristics of which may be combined with one another as parts of
5 variants which are not illustrated.

For example, the body may comprise coupling reliefs on the opposite side walls, the front wall and the rear wall.

The applicator member may comprise at least two parts having different fibre densities and/or fibre orientations.

10 The expression "comprising a" should be understood as being synonymous with "comprising at least one".

CLAIMS

1. Refill (20) for a device for treating the hair, comprising:
- a body (23) having a cavity (30) that is formed at least partially by two opposite walls (34, 36; 38, 40) and a bottom (42) and opens towards the outside by way of an opening (31), and
 - an applicator member (26) that is inserted into the cavity (30) in the body (23) along an insertion axis (X) and extends out of the cavity (30) through the opening (31),

at least one of the walls (34, 36; 38, 40) and the bottom (42) comprising at least one

coupling relief (32) that engages with the applicator member (26) in order to prevent it from being extracted from the cavity (30), this coupling relief (32) being designed such that the force for inserting the applicator member into the cavity is weaker than the extraction force.

2. Refill according to Claim 1, wherein the difference ΔF between the force for inserting the applicator member into the cavity and the force for extracting it therefrom is greater than or equal to 3 N, preferably greater than or equal to 4 N.

3. Refill according to Claim 1 or 2, wherein the cavity (30) has an elongate shape in a direction perpendicular to the insertion axis.

4. Refill according to any one of the preceding claims, wherein the coupling relief (32) is asymmetric with respect to a median transverse plane (M) therefor.

5. Refill according to any one of the preceding claims, wherein the cavity (30) has a height H , defined along the insertion axis (X) from the opening (31), the coupling relief (32) extending along the insertion axis (X) along a length l less than this height H .

6. Refill according to any one of the preceding claims, wherein the coupling relief (32) projects into the cavity (30) and has a thickness e , measured perpendicularly to said wall (34, 36; 38, 40), which is variable along the insertion axis (X), the thickness e

- increasing along the entire length l of the coupling relief (32), or
- increasing along a first portion of length l_1 along the insertion axis (X) and decreasing along a second portion of length l_2 along the insertion

axis (X), the ratio between the lengths l_2/l_1 being less than 1, better still less than or equal to 0.5, even better still less than or equal to 0.2, or

- increasing along a first portion of length l_1 along the insertion axis X and then being constant along a second portion of length l_3 along the insertion axis X, the thickness of the second portion being less than the maximum thickness e_{max} of the first portion.

7. Refill according to any one of the preceding claims, wherein the or each coupling relief (32) has:

- a first face (46; 46a; 46b) that is oriented towards the opening (31) and has an average slope forming an angle α less than or equal to 45° with the introduction axis (X), and
- a second face (48) that is oriented towards the side away from the opening (31) and has an average slope forming an angle β greater than or equal to 45° with the introduction axis (X), better still greater than or equal to 80° , even better still greater than or equal to 90° .

8. Refill according to Claim 7, wherein the first face (46; 46a; 46b) and the second face (48) form an angle γ less than or equal to 110° , better still less than or equal to 90° and/or greater than 45° , at their meeting point.

9. Refill according to any one of the preceding claims, wherein the maximum thickness e_{max} of the coupling relief (32), measured in a plane perpendicular to the wall (34; 36; 38; 40) or to said bottom (42) to which it is attached, is between 0.2 mm and 3 mm, better still between 0.5 mm and 2 mm.

10. Refill according to any one of the preceding claims, wherein the coupling relief (32) extends along the insertion axis (X) along a length l of between 1 mm and 30 mm, better still between 5 mm and 15 mm.

11. Refill according to any one of the preceding claims, wherein at least one of the walls (34; 36; 38; 40) or the wall (42) comprises a plurality of coupling reliefs (32).

12. Refill according to any one of the preceding claims, wherein one of the two opposite walls (34; 36; 38; 40) and/or the wall (42) does not have a coupling relief (32).

13. Refill according to any one of Claims 1 to 11, wherein the two opposite walls (34; 36; 38; 40) each have at least one coupling relief (32).

14. Refill according to Claim 13, wherein the coupling reliefs (32) on one of the opposite walls (34; 36; 38; 40) are situated facing the coupling reliefs (32) on the other of the opposite walls (34; 36; 38; 40).

15. Refill according to any one of the preceding claims, wherein the applicator member (26) is made of a porous material, in particular of synthetic or natural fibres that are all oriented substantially in the same direction and moulded to form a felt.

16. Refill according to any one of the preceding claims, wherein the applicator member (26) has a fibre density of between 0.080 g/cm^3 and 0.400 g/cm^3 .

17. Refill according to Claim 16, wherein the coupling relief(s) (32) extend(s) from said wall (34, 36, 38, 40) in a direction generally perpendicular to that of the fibres of the applicator member (26).

18. Refill according to any one of the preceding claims, wherein the applicator member is impregnated with product.

19. Device for treating the hair, comprising:

- two arms (3, 4) 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 (3; 4) comprising a housing,
- a refill (20) according to any one of the preceding claims, which is disposed in a removable manner in the housing.

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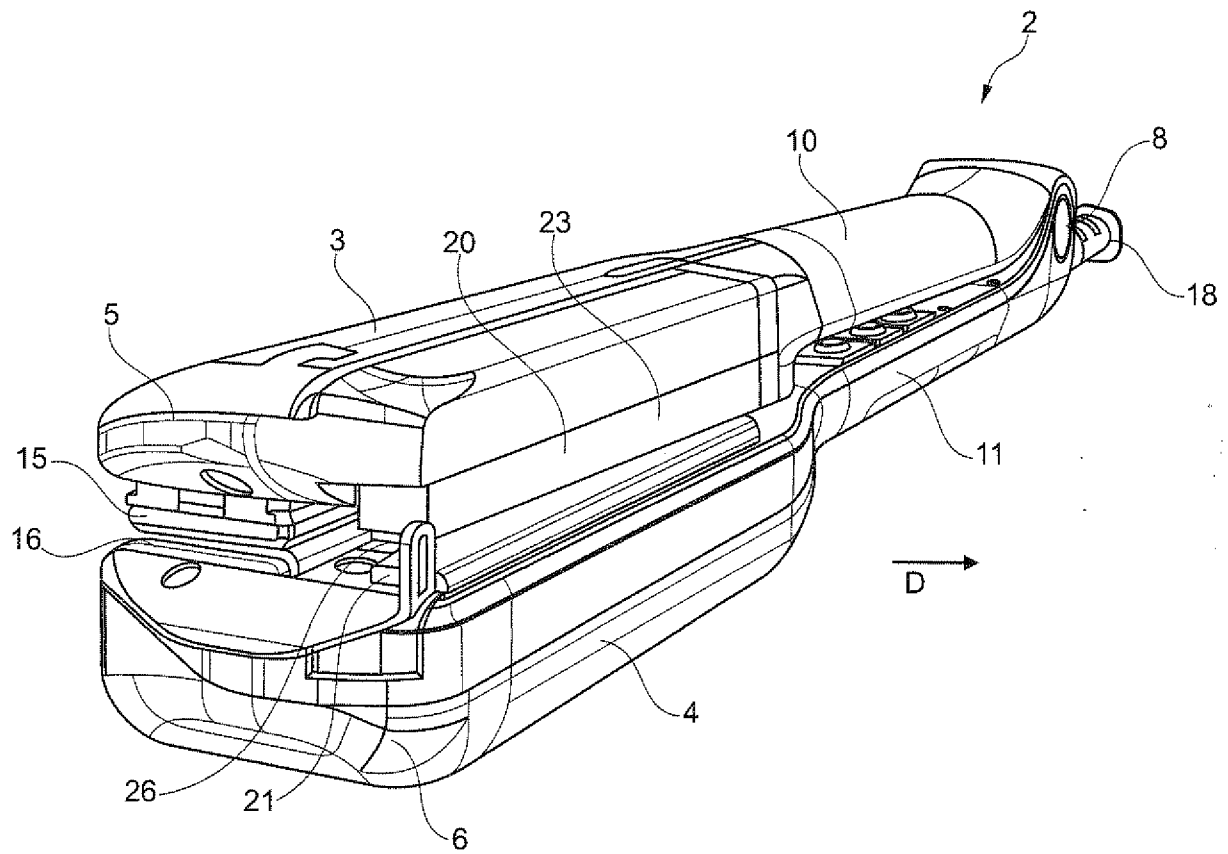


Fig. 1

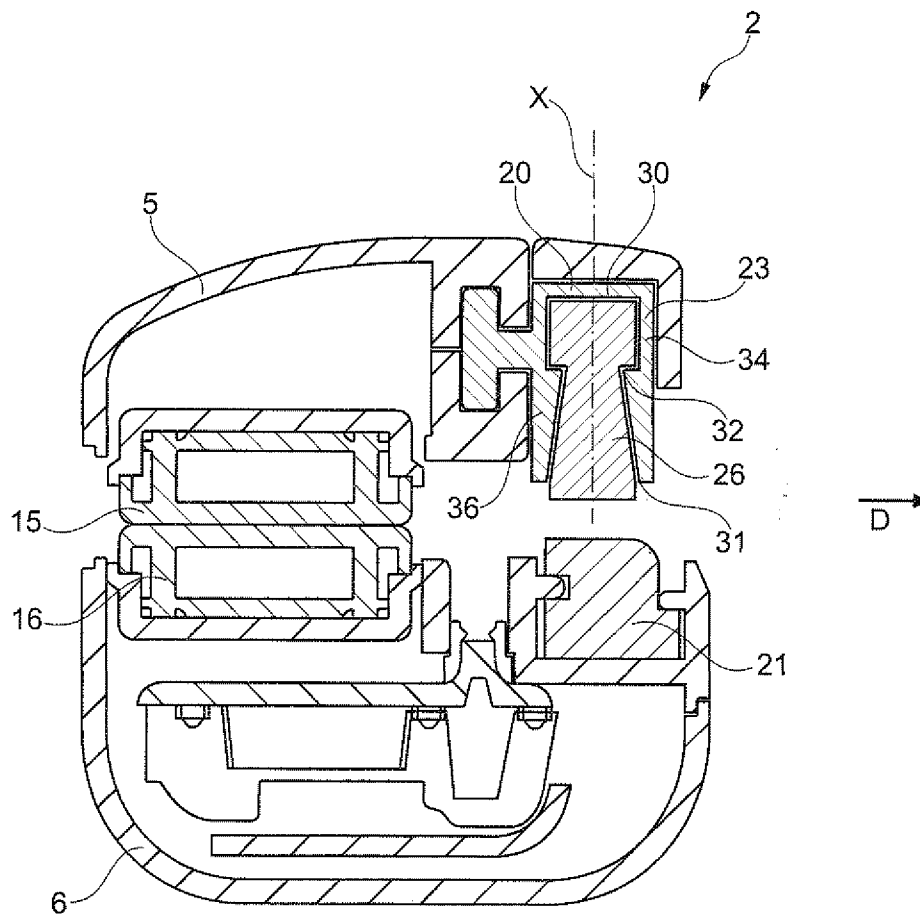
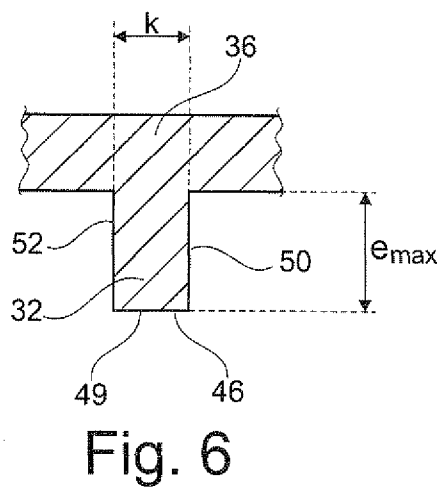
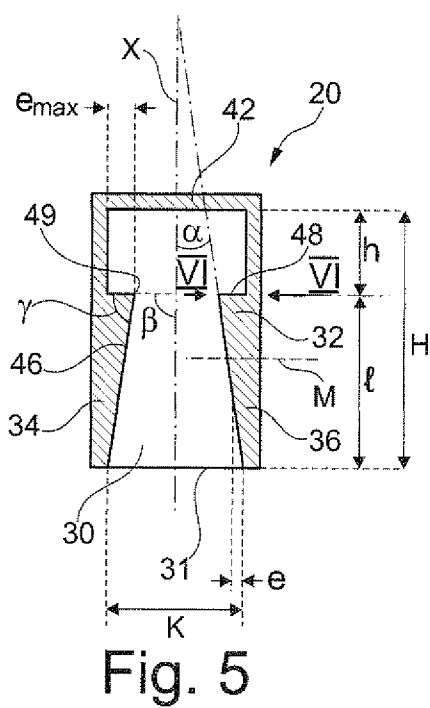
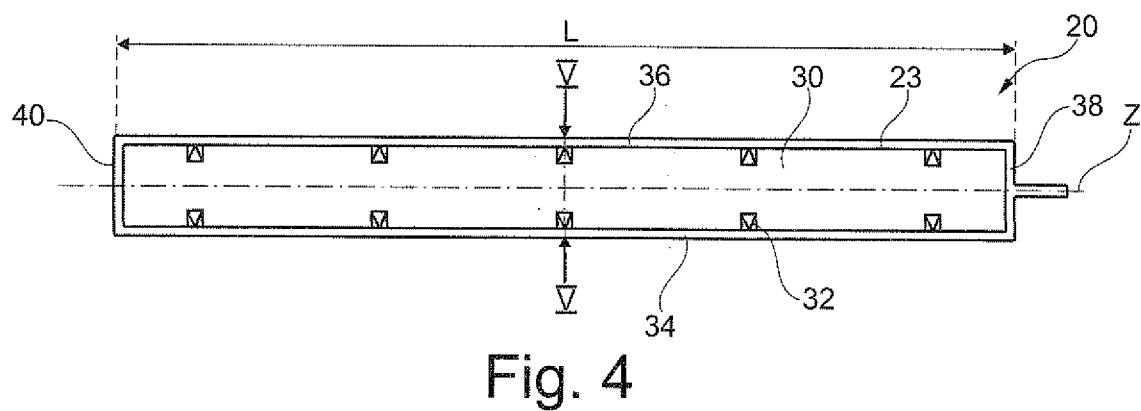
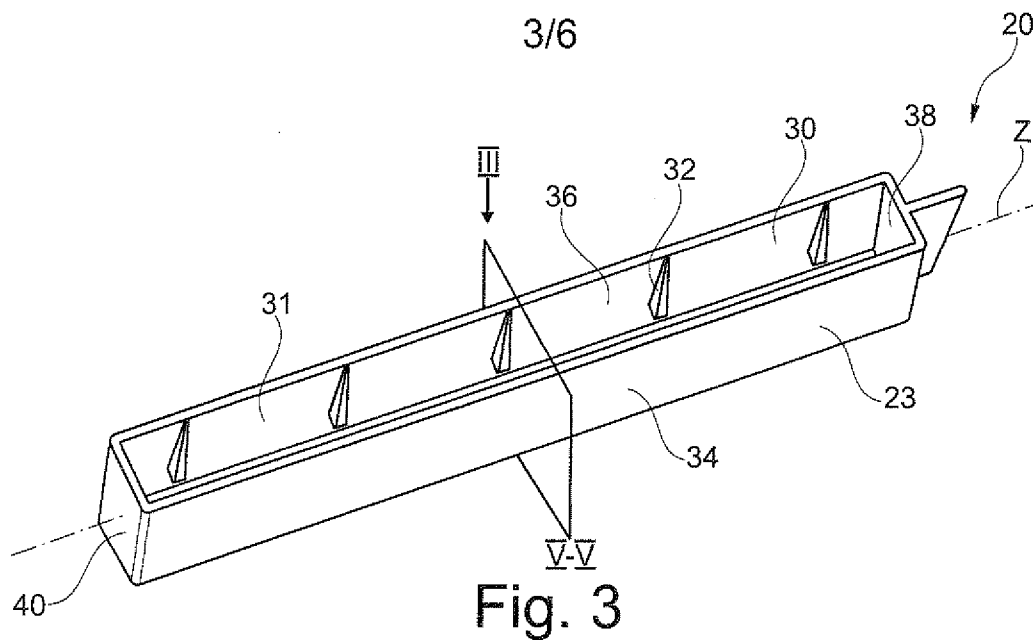


Fig. 2



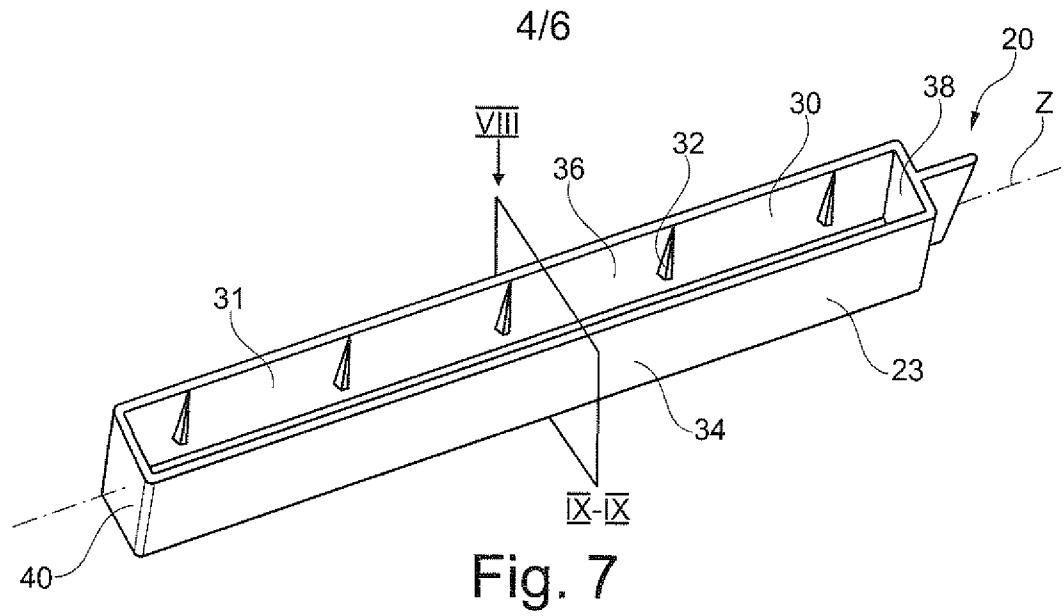


Fig. 7

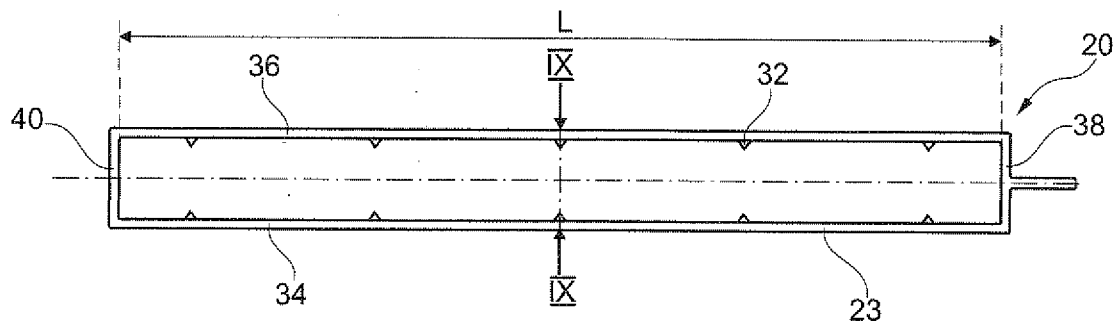


Fig. 8

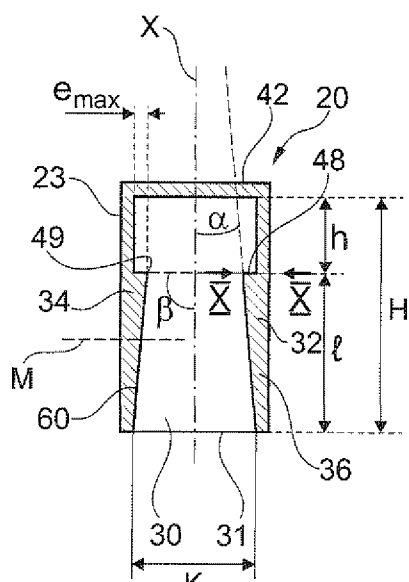


Fig. 9

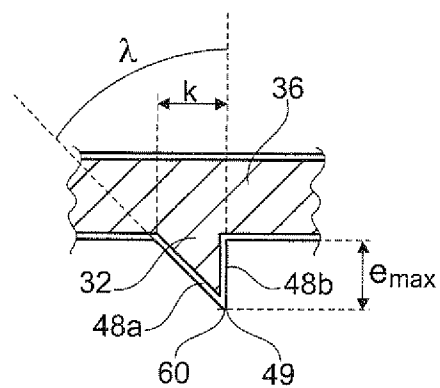


Fig. 10

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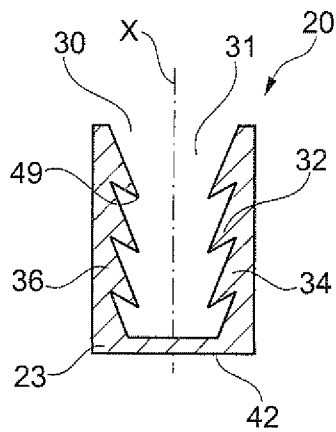


Fig. 11A

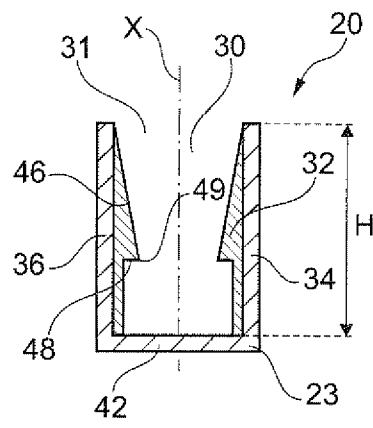


Fig. 11B

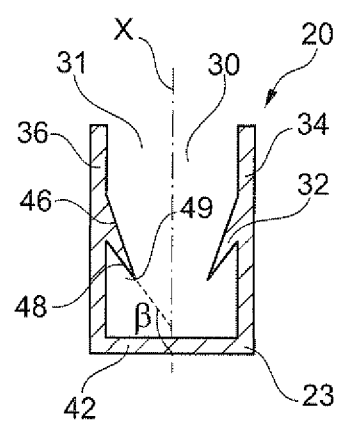


Fig. 11C

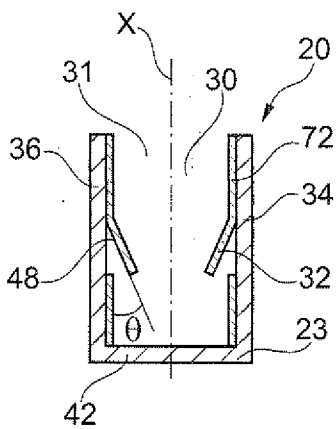


Fig. 11D

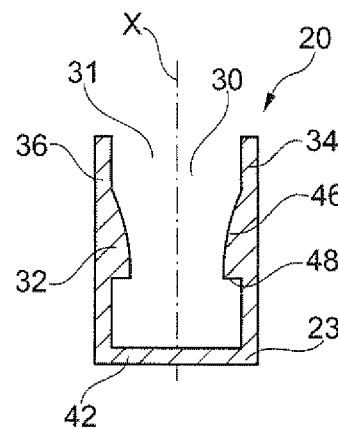


Fig. 11E

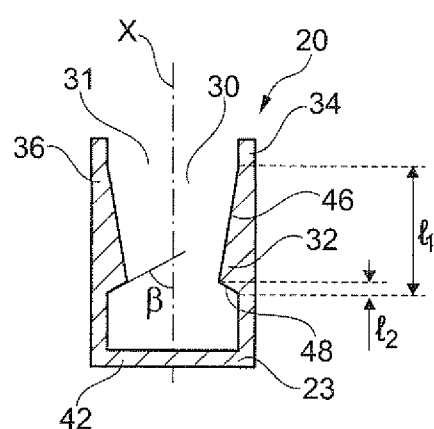


Fig. 11F

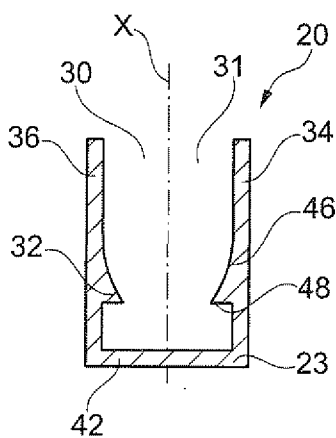


Fig. 11G

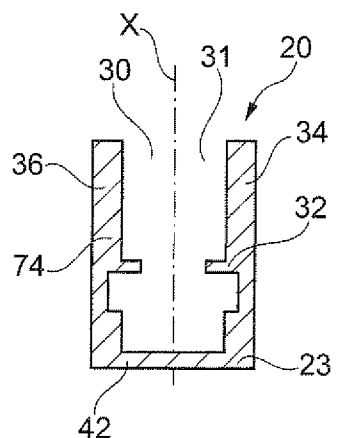


Fig. 11H

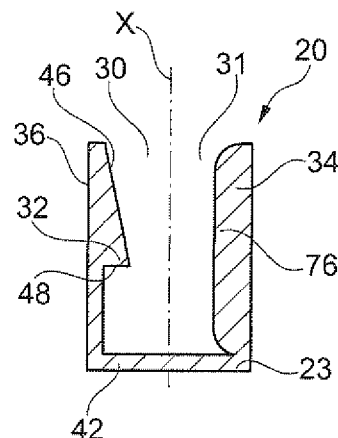


Fig. 11I

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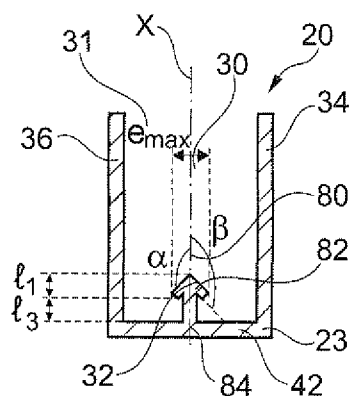


Fig. 11J

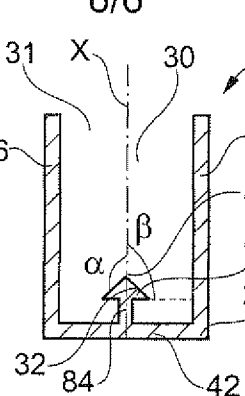


Fig. 11K

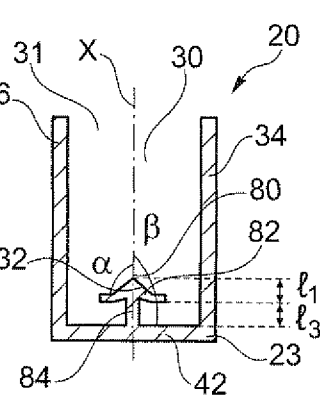


Fig. 11L

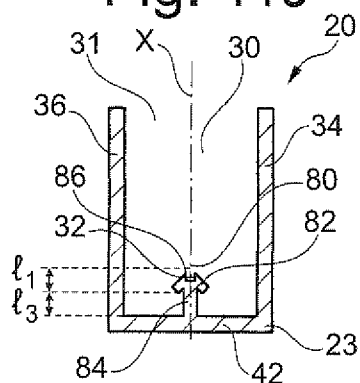


Fig. 11M

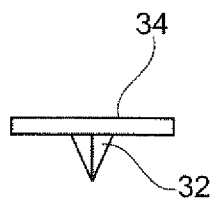


Fig. 12A

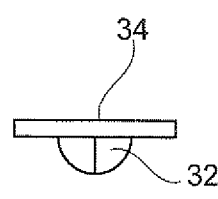


Fig. 12B

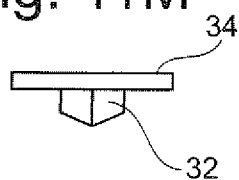


Fig. 12C

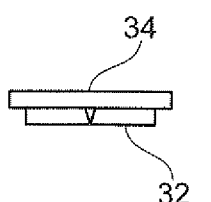


Fig. 12D

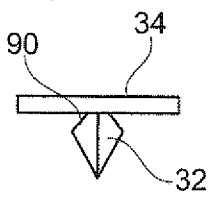


Fig. 12E

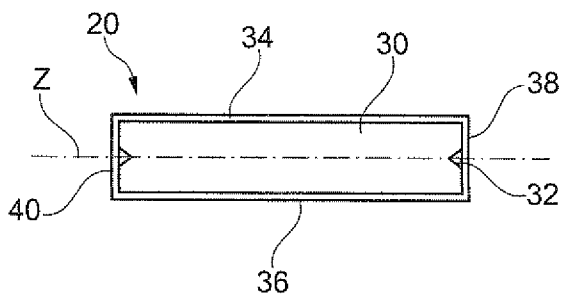


Fig. 13A

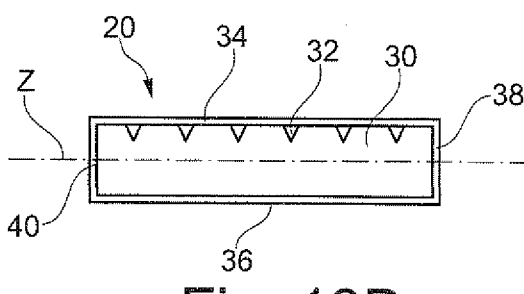


Fig. 13B

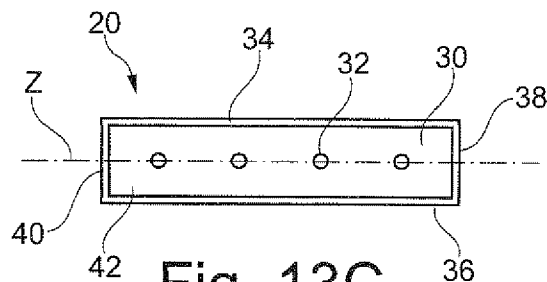


Fig. 13C

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2015/081250

A. CLASSIFICATION OF SUBJECT MATTER
INV. A45D1/04
ADD.

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
A45D

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

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

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	WO 2013/090896 A1 (CONAIR) 20 June 2013 (2013-06-20) paragraphs [0027], [0028], [0038] figures 7, 8	1-3,5,9, 10,12-19 4,6-8,11
X	----- US 2002/131806 A1 (KATZ ROBERT ET AL) 19 September 2002 (2002-09-19) paragraphs [0021], [0028], [0030], [0031] figures 1, 6	1-3,5, 9-18
A	----- DE 20 2011 050477 U1 (WIK FAR EAST LTD) 20 September 2012 (2012-09-20) paragraphs [0022] - [0024] figures 1-6 -----	1-19



Further documents are listed in the continuation of Box C.



See patent family annex.

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"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

15 March 2016

Date of mailing of the international search report

23/03/2016

Name and mailing address of the ISA/

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Authorized officer

Witkowska-Piela, A

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2015/081250

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