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(71) Applicant: **Kao Germany GmbH**
64297 Darmstadt (DE)

(72) Inventor: **Niepoth, Günther**
64297 Darmstadt (DE)

(74) Representative: **Michalski Hüttermann & Partner Patentanwälte**
Speditionstraße 21
40221 Düsseldorf (DE)

(54) Bottle for a pump dispenser and use of a bottle

(57) It is provided a bottle for a pump dispenser, comprising a bottle body for bordering a filling volume, wherein the bottle body comprises a bottom part for closing the filling volume at the bottom, the bottom part comprising a mainly ring-shaped stand face for placing the bottle onto a ground, a centre part arranged radially inside the stand face, wherein the centre part is formed mainly convex at an inside face pointing towards the filling volume and the centre part is formed mainly concave at an outside face pointing away from the filling volume, a channel part for accommodating a dip tube of a pump dispenser pump, wherein the channel part is formed as a deepening at the inside face of the centre part and the channel part is formed as a protrusion at the outside face of the centre part, and at least one stiffening rib connected with the outside face of the centre part and a side face of the channel part outside the filling volume. Due to the forming of the centre part and the channel part as well as due to the provided stiffening rib(s) the bottom part comprises a significantly increased stiffness against popping out the bottom part of the bottle body at increasing inside gas pressure, so that the filling volume of the bottle body may collect a higher amount of out-gassed components of a liquid over a longer storing term.

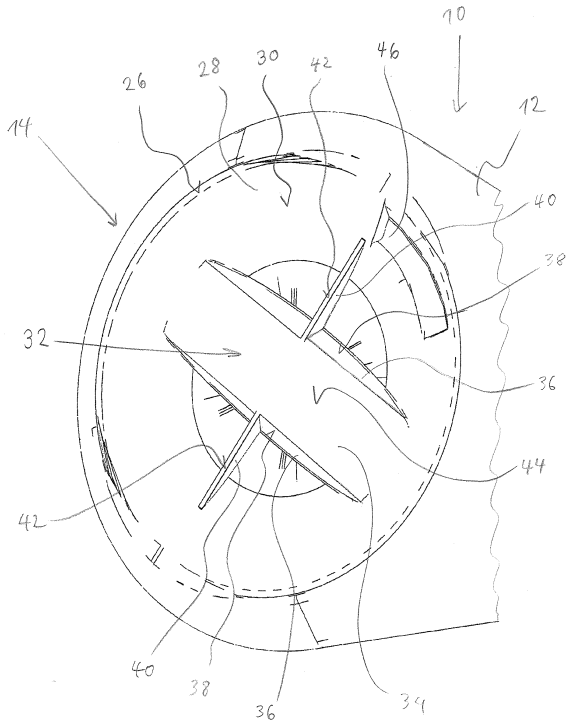

Fig. 2

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Description

[0001] The invention relates to a bottle for a pump dispenser and a use of such kind of a bottle, by which a liquid can be stored and discharged by means of a pump dispenser pump, particularly for applying a liquid hair coloration means for the hair coloration of human hair, which may comprise an oxidizer means.

[0002] From EP 2 017 011 A1 a bottle for pump dispenser is known comprising a bottle body for bordering a filling volume, wherein the filling volume is closed at the bottom by means of a bottom part. The bottom part comprises a ring-shaped stand face for placing the bottle onto a ground, wherein an outside face of a centre part radially inside the stand face is arranged spaced to ground. The outside face of centre part is designed slightly convex. The centre part comprises a deepening in the centre, from which four channels provided by the material of the centre part originates in different directions. Residual liquid can reach the deepening in the centre via the four channels for being discharged by means of a pump dispenser pump comprising a dip tube which reaches into the central deepening.

[0003] There is a permanent need increasing the storing term of such kind of a bottle for storing a liquid, particularly a liquid comprising out-gassing components, wherein the liquid particularly comprises an oxidizer means for hair coloration of human hair.

[0004] It is an object of the invention providing measures enabling a long storing term of a liquid, particularly a liquid comprising out-gassing components, wherein the liquid particularly comprises an oxidizer means for hair coloration of human hair.

[0005] The solution of this object is provided according to the invention by a bottle according to the features of claim 1 and a use of a bottle according to the features of claim 14. Preferred embodiments of the invention are given by the dependent claims, which can constitute each solely or in combination an aspect of the invention.

[0006] An aspect of the invention is directed to a bottle for a pump dispenser, comprising a bottle body for bordering a filling volume, wherein the bottle body comprises a bottom part for closing the filling volume at the bottom, the bottom part comprising a mainly ring-shaped stand face for placing the bottle onto a ground, a centre part arranged radially inside the stand face, wherein the centre part is formed mainly convex at an inside face pointing towards the filling volume and the centre part is formed mainly concave at an outside face pointing away from the filling volume, a channel part for accommodating a dip tube of a pump dispenser pump, wherein the channel part is formed as a deepening at the inside face of the centre part and the channel part is formed as a protrusion at the outside face of the centre part, and at least one stiffening rib connected with the outside face of the centre part and a side face of the channel part outside the filling volume.

[0007] Since the centre part is designed concave at the outside face a resistance force against popping out the centre part is increased. Particularly the whole centre part at least outside the channel part and/or the stiffening rib is designed concave at the outside face. Preferably the whole centre part at least outside the channel part is designed convex at the inside face. The side face of the channel part may be part of a sidewall of the channel part bordering a channel for accommodating the dip tube of the pump dispenser pump. The side face may point away from the channel part. Since the channel part is formed as a protrusion at the outside face of the centre part, the side wall(s) of the channel part may stiffen the bottom part of the bottle body. Due to the stiffening rib connected with the side face of the channel part and the outside face of centre part the area of the centre part radially outside the channel part may be significantly stiffened. Particularly the stiffening rib may be arranged mainly perpendicular to the side face in plan view of the bottom part. The channel part and the stiffening rib(s) may be arranged mainly crosswise. Preferably just one stiffening rib is directly connected with each respective side face of the channel part. Particularly the stiffening rib is provided completely outside the filling volume, so that the stiffening rib does not reach into the filling volume or may have contact to the liquid filled into the filling volume. Due to the forming of the centre part and the channel part as well as due to the provided stiffening rib(s) the bottom part comprises a significantly increased stiffness against popping out the bottom part of the bottle body at increasing inside gas pressure, so that the filling volume of the bottle body may collect a higher amount of out-gassed components of a liquid over a longer storing term. Particularly a long storing term of a liquid is enabled, particularly a liquid comprising out-gassing components, wherein the liquid particularly comprises an oxidizer means for hair coloration of human hair.

[0008] Further it is possible that even at conditions which would assists an out-gassing of components, like high temperatures, a deformation of the bottom part as a result of an increased inside gas pressure is prevented. Further the stiffness of the bottom part may be such high that the thickness of the bottle body, particularly the thickness of the bottom part, can be reduced. The bottle may stand a higher inside gas pressure without a bottom part being popped out and coming into contact with the ground. An instable stand of the bottle onto a ground even at a high inside gas pressure is prevented. Since the channel part is designed as a deepening at the inside face of the centre part the dip tube of the pump dispenser pump may reach a very low point inside the filling volume. A residual volume of unused liquid which can not be dispensed anymore via the dip tube can be reduced to a minimum without weakening the bottom part. The mainly ring-shaped stand face can be provided by a corresponding groove in the bottom part opened towards the filling volume. In the alternate the mainly ring-shaped stand face can be provided as a rising protruding from the bottom part outwards, so that the thickness of the bottom

part is increased at the area of the stand face and a circumferential groove is prevented. The ring-shaped stand face particularly comprises standing areas which may be arranged on mainly the same diameter, wherein the standing areas may be spaced to each in circumferential direction. Preferably the standing areas may be closed with each other without a disconnection in circumferential direction so that one continuous stand face which is closed in circumferential direction is proved. If so, the preferably in circumferential direction closed, standing face may follow a non-circular, for instance angular, course in circumferential direction so that not every part of the stand face is arranged on the same diameter. Further it is possible that the extension in radial direction of the stand face may differ along the circumferential direction. Particularly preferred the stand face is closed in circumferential direction and arranged on a constant diameter with a constant radial extension so that the stand face may be particularly circular formed. Particularly preferred the stiffening rib is provided between two halves of a mold particularly for blow molding so that a demolding is facilitated. Particularly the whole bottle body including the bottom part, the channel part and the stiffening rib(s) is one-piece.

[0009] Preferably the bottle body comprises outside the bottom part at least one wall depression protruding towards the filling volume, particularly a finger depressing for receiving a part of a human thumb, wherein the wall depression is designed for popping out sooner than a part of the bottom part at increasing inside gas pressure. Before the bottom part may pop out at an increased inside gas pressure the wall depression may pop out. The filling volume of the bottle body may increased due to the popping out of the wall depression reducing the inside gas pressure. Further the popped out wall depression renders it visible that the inside gas pressure is significantly increased. This may be used as a warning signal for further handling. As long as the wall depression is not popped out, the wall depression may provide an additional functionality in addition to the function of indicating a high inside gas pressure. Particularly the wall depression may provide the additional functionality of facilitating the holding and/or the handling of the bottle by providing a good grip of a human hand. Particularly the wall depression is adapted for receiving a human finger, preferably a thumb, when the bottle is held by a user so that the user will immediately feel when the wall depression is popped out. The wall depression is particularly provided at a lateral area of the bottle body. The necessary inside gas pressure for popping out the wall depression can be adjusted for instance by the thickness of the bottle body at the wall depression and/or the geometry of the wall depression, particularly the curvature and/or the extension of the wall depression. Particularly the wall depression may be designed as a part of a spherical shell. It is possible shifting a part of the bottle body popping out at a sufficient high inside gas pressure from the bottom part of the bottle body to another part of the bottle body, particularly the lateral area.

[0010] Particularly the channel part comprises a ground wall connected to sidewalls, wherein the at least one stiffening rib is mainly flush with a bottom face of the ground wall pointing away from the filling volume. The stiffening rib may use the whole height of the side face provided by the sidewall of the bottom part. Further disturbing edges in the transition area between the channel part and the stiffening are prevented.

[0011] Preferably an end face of the at least one stiffening rib pointing away from the filling volume and the bottom face of the ground wall are arranged in a common straight or constantly curved plane. The curved plane may be the curved surface area of a cylinder or sphere, wherein particularly the radius of the cylinder or sphere could be infinite rendering the constantly curved plane to a plate arranged in a common straight plane. A tool for manufacturing the bottle body particularly by blow molding may comprise a simple design. For instance a wall of the tool for forming the bottom face of the ground wall and the end face of the stiffening rib may be formed plane so that after a shrinking of the plastic material of the bottle body the bottom face of the ground wall and the end face of the stiffening rib may be arranged in a slightly curved plane.

[0012] Particularly preferred the channel part comprises one ground wall connected to sidewalls, wherein the ground wall and the sidewalls extend continuously straight, particularly more than 50%, preferably more than 60%, more preferred more than 70% and most preferred more than 80% of the radial extension of the centre part. Preferably the extension of the sidewalls is less than 95%, particularly less than 90%, more preferred less than 80% and most preferred less than 70% of the radial extension of the centre part. The radial extension of the centre part corresponds to an average diameter of the centre part in the case of a mainly circular stand face. In a preferred embodiment the stiffening rib extends until mainly the same radius as the sidewalls. Particularly the sidewalls and the at least one stiffening rib comprise the same distance to the mainly ring-shaped stand face, wherein the stand face is particularly circular. Since the sidewalls and/or the stiffening rib(s) are spaced to the stand face it is prevented that the channel part and/or the stiffening rib meet the ground when the inside gas pressure increases. At the same time the lengths of the sidewalls and/or of the stiffening rib(s) are long enough for a sufficient stiffening effect.

[0013] Preferably the channel part comprises one ground wall connected to sidewalls, wherein the width of the ground wall is more than 5%, preferably more than 10%, more preferred more than 20% and most preferred more than 30% of the radial extension of the centre part. Preferably the width of the ground wall is less than 60%, particularly less than 50%, more preferred less than 40% and most preferred less than 30% of the radial extension of the centre part. The radial extension of the centre part corresponds to an average diameter of the centre part in

the case of a mainly circular stand face. Due to the particularly broad width of the ground wall the sidewalls are such spaced by the width of the ground wall to each others that the sidewalls provide a significant stiffening effect to the bottom part in addition to the stiffening ribs.

[0014] Particularly the at least one stiffening rib contacts the side face of the channel part until the side face contacts the outside face of the centre part and/or the at least one stiffening rib contacts the outside face of the centre part over mainly the whole length of the stiffening rib. The stiffening rib may be connected to the side face of the bottom part over the whole height. Further the stiffening rib may be connected to the outside face over the whole length of the stiffening rib. An unnecessary gab between the stiffening rib and the bottom part and/or an unnecessary gab between the stiffening rib and the centre part can be omitted so that the whole length of the stiffening rib may be used for providing an increased stiffness of the bottom part. Particularly material of the bottom part and/or of the center part may be used during manufacturing of the bottle body for forming the stiffening rib, for instance by squeezing the material when the material is still warm and ductile.

[0015] Preferably the channel part comprises a ground wall connected to sidewalls, wherein an angle α is provided between at least one side wall and the ground wall at the inside of the channel part pointing towards the filling volume, wherein $90° \leq \alpha \leq 170°$, particularly $120° \leq \alpha \leq 150°$, preferably $130° \leq \alpha \leq 140°$ und most preferred $\alpha = 135° \pm 2°$ applies. The opening area of the channel provided by the channel part at the upper end of the sidewalls may be larger than the area of the ground wall. The sidewalls of the channel may be aligned like a V, wherein between the lower ends of the legs of the V the ground wall is provided so that the cross section of the channel is like a U with inclined legs. Due the inclined alignment of the sidewalls the channel may be designed comparably to a funnel so that residual liquid may be collected inside the channel by the channel part.

[0016] Particularly preferred an alignment depression for aligning the bottle in a labeling machine and/or printing machine is provided by the centre part, wherein the alignment depression is positioned particularly radially outside of the at least one stiffening rib. Due to the alignment depression the bottle may be rotated inside a labeling machine and/or printing machine until a corresponding part of the labeling machine and/or printing machine fit into the alignment depression preventing a further rotation. Thereby a correct position of the bottle may be guaranteed for positioning a label at the intended position. Particularly the alignment depression is positioned radially outside of the stiffening rib(s) so that the part of the labeling machine and/or printing machine which should fit into the alignment depression does not meet the stiffening rib which also could prevent a further rotation but at a false alignment. The providing of the stiffening rib does not complicate the correct position of the bottle in a labeling machine and/or printing machine. Since the alignment function is provided by means of a depression but not by means of a protrusion the alignment depression may be positioned close to the stand face without affecting the standing function of the stand face when the inside gas pressure increases.

[0017] Preferably the bottom part comprises everywhere except the area where the at least one stiffening rib is positioned mainly the same thickness. The manufacturing process of the bottle body may be simplified. The bottom part and if so the whole bottle body may by manufactured by molding.

[0018] Particularly preferred the bottle body is made from a plastic material, particularly by blow molding. The plastic material is particularly a thermoplastic material. The manufacturing process of the bottle body may be simplified and cost effective.

[0019] Particularly the bottle body comprises an outlet opening detachably or non-detachably closed by a cap or pump dispenser pump. Preferably the bottle body comprises a thread surrounding the outlet opening for screwing the cap or the pump dispenser pump with the bottle body. Particularly the cap or pump dispenser pump may seal the outlet opening reducing an aging of the contained liquid by escaping out-gassed components. This increases the storing term of the liquid filled into the bottle. When storing the liquid inside the bottle the outlet opening may be closed by the cap. When the stored liquid should be discharged the cap can be detached and particularly replaced by the pump dispenser pump. After discharging the liquid the outlet opening may stay closed by the pump dispenser pump for further in the future or the pump dispenser pump may by replaced by the cap for providing a good sealing of the outlet opening.

[0020] Preferably a pump dispenser pump comprising a dip tube is provided, wherein the dip tube reaches into the channel part, wherein particularly the dip tube contacts a ground wall of the channel part. The dip tube of the pump dispenser pump may be designed such that in fastened state of the pump dispenser pump with the bottle body the dip tube reaches close to the lowest point of the channel part. The dip tube may end close above the ground wall of the channel for sucking in all liquid between the ground wall and the lower end of the dip tube. In the alternate the dip tube may contact the ground wall of the channel for sucking in liquid via a side opening or a slit at the lower end of the dip tube. Further it is possible that the dip tube may be bended at the lower end inside the channel of the channel part.

[0021] Particularly preferred the filling volume of the bottle body is partially filled with a liquid comprising outgassing components, wherein the liquid particularly comprises an oxidizer means for hair coloration of human hair. Due to the design of the bottom part the bottle body may receive and store liquids with out-gassing components over a long storing term. The liquid particularly may comprise a component producing a gas in a function of time and temperature. For instance a hair coloration agent may be present comprising an oxidizer means

which may create O_2.

[0022] A further aspect of the invention is directed to an use of a bottle which may be designed as previously described for storing a liquid comprising out-gassing components, wherein the liquid particularly comprises an oxidizer means for hair coloration of human hair, at least during a storing term until gaseous components outgassed from the liquid are present in the filling volume. Due to the forming of the centre part and the channel part as well as due to the provided stiffening rib(s) the bottom part comprises a significantly increased stiffness against popping out the bottom part of the bottle body at increasing inside gas pressure, so that the filling volume of the bottle body may collect a higher amount of outgassed components of a liquid over a longer storing term.

[0023] Particularly the inside gas pressure of the filling volume increases by a pressure difference Δp during the storing term, wherein 0.01 bar$\leq \Delta p \leq$ 4.0 bar, particularly 0.05 bar$\leq \Delta p \leq$ 3.0 bar, preferably 0.1 bar$\leq \Delta p \leq$ 2.0 bar and most preferred 0.4 bar$\leq \Delta p \leq$ 1.0 bar applies. Due to the design of the bottom part of the bottle body the bottle may stand such a pressure difference over the storing term without affecting the stand of the bottle onto a ground. Based on a given temperature, particularly room temperature, the storing term until a predefined maximum pressure difference Δp is reached can be calculated for a specific liquid.

[0024] These and other aspects of the invention will be apparent from and elucidated with reference to the embodiments described hereinafter, wherein the described features can constitute each solely or in combination an independent aspect of the invention. In the drawings:

Fig. 1: shows a schematic side view of a bottle and
Fig. 2: shows a schematic perspective view from below of the bottle of Fig. 1.

[0025] The bottle 10 illustrated in Fig. 1 comprises a bottle body 12 with a bottom part 14 for placing the bottle 10 in upright position onto a ground so that the bottom part 14 is the lowest part of the bottle body 12 in gravity direction 16. The bottle body 12 comprises an outlet opening 18 opposed to the bottom part 14 at the opposite end of the bottle body 12. The outlet opening 18 is surrounded by a thread 20 provided by the material of the bottle body 12 for screwing a cap and/or a pump dispenser pump with the bottle body 12. The bottle body 12 comprises a grip area 22 which facilitates the holding of the bottle 10 by means of a human hand. The grip area 22 comprises at least one wall depression 24 designed like a part of a spherical shell protruding inwards to a filling volume bordered by the bottle body 12. The wall depression 24 may be designed for popping out before a part of the bottom part 14 may pop out when the inside gas pressure inside the bottle 10 increases significantly due to out-gassing components of a filled in liquid.

[0026] As illustrated in Fig. 2 the bottom part 14 comprises a mainly ring-shaped circular stand face 26 for placing the bottle 10 onto a ground. The stand face 26 borders a centre part 28 of the bottom part 14 arranged radially inside the stand face 26. The centre part 28 comprises an outside face 30 pointing outwards and an inside face pointing towards the filling volume. The bottom part 14 further comprises a channel part 32 providing a channel opened to the filling volume for receiving residual liquid. The channel is bordered by a ground wall 34 connected to two opposing sidewalls 36 so that the channel part 32 provides one straight channel extending over ca. 75% of the diameter of the centre part 28. The sidewalls 36 are aligned to the ground wall 34 under an angle α of ca. α = 135°. Each sidewall 36 comprises a side face 38 pointing outwards. Each side face 38 of the channel part 32 is connected with a stiffening rib 40 which is one-piece with the centre part 28 and the channel part 32. Each stiffening rib 40 comprises an end face 42 which is flush with a bottom face 44 at the outside of the ground wall 34.

[0027] Further an alignment depression 46 protruding inwards to the filling volume is provided for aligning the bottle 10 inside a labeling machine and/or printing machine at a correct angle of rotation. The alignment depression 46 is provided at a radius between the stand face 26 and the stiffening rib 40.

[0028] The outside face 30 of the centre part 28 is formed concave over the whole centre part 28 outside the channel part 32, the stiffening rib 40 and the alignment depression 46. In addition the inside face of the centre part 28 is formed convex over the whole centre part 28 outside the channel part 32, the stiffening rib 40 and the alignment depression 46. Due to the design of the centre part 28 and the provision of the stiffening ribs 40 connected to the straight channel part 32 the bottom part 14 is quite stiff so that a standing of the bottle 10 onto a ground is not affected by a popped out part of the bottom part 14.

Claims

1. Bottle for a pump dispenser, comprising
a bottle body (12) for bordering a filling volume, wherein the bottle body (12) comprises a bottom part (14) for closing the filling volume at the bottom,
the bottom part (14) comprising
a mainly ring-shaped stand face (26) for placing the bottle (10) onto a ground, a centre part (28) arranged radially inside the stand face (26), wherein the centre part (28) is formed mainly convex at an inside face pointing towards the filling volume and the centre part (28) is formed mainly concave at an outside face (30) pointing away from the filling volume,
a channel part (32) for accommodating a dip tube of a pump dispenser pump, wherein the channel part (32) is formed as a deepening at the inside face of the centre part (28) and the channel part (32) is formed as a protrusion at the outside face (30) of the centre part (28), and

at least one stiffening rib (40) connected with the outside face (30) of the centre part (28) and a side face (38) of the channel part (32) outside the filling volume.

2. Bottle according to claim 1, wherein the bottle body (12) comprises outside the bottom part (14) at least one wall depression (24) protruding towards the filling volume, particularly a finger depressing for receiving a part of a human thumb, wherein the wall depression (24) is designed for popping out sooner than a part of the bottom part (14) at increasing inside gas pressure.

3. Bottle according to claim 1 or 2, wherein the channel part (32) comprises a ground wall (34) connected to sidewalls (36), wherein the at least one stiffening rib (40) is mainly flush with a bottom face (44) of the ground wall (34) pointing away from the filling volume.

4. Bottle according to 3, wherein an end face (42) of the at least one stiffening rib (40) pointing away from the filling volume and the bottom face (44) of the ground wall (34) are arranged in a common straight or constantly curved plane.

5. Bottle according to anyone of claims 1 to 4, wherein the channel part (32) comprises one ground wall (34) connected to sidewalls (36), wherein the ground wall (34) and the sidewalls (40) extend continuously straight, particularly more than 50%, preferably more than 60%, more preferred more than 70% and most preferred more than 80% of the radial extension of the centre part (28).

6. Bottle according to anyone of claims 1 to 5, wherein the at least one stiffening rib (40) contacts the side face (38) of the channel part (32) until the side face (38) contacts the outside face (30) of the centre part (28) and/or the at least one stiffening rib (40) contacts the outside face (30) of the centre part (28) over mainly the whole length of the stiffening rib (40).

7. Bottle according to anyone of claims 1 to 6, wherein the channel part (32) comprises a ground wall (34) connected to sidewalls (36), wherein an angle α is provided between at least one side wall (36) and the ground wall (34) at the inside of the channel part (32) pointing towards the filling volume, wherein $90° \leq \alpha \leq 170°$, particularly $120° \leq \alpha \leq 150°$, preferably $130° \leq \alpha \leq 140°$ und most preferred $\alpha = 135° \pm 2°$ applies.

8. Bottle according to anyone of claims 1 to 7, wherein an alignment depression (46) for aligning the bottle (10) in a labeling machine and/or printing machine is provided by the centre part (28), wherein the alignment depression (46) is positioned particularly radially outside of the at least one stiffening rib (40).

9. Bottle according to anyone of claims 1 to 8, wherein the bottom part (14) comprises everywhere except the area where the at least one stiffening rib (40) is positioned mainly the same thickness.

10. Bottle according to anyone of claims 1 to 9, wherein the bottle body (12) is made from a plastic material, particularly by blow molding.

11. Bottle according to anyone of claims 1 to 10, wherein the bottle body (12) comprises an outlet opening (18) detachably or non-detachably closed by a cap or pump dispenser pump.

12. Bottle according to anyone of claims 1 to 11, wherein a pump dispenser pump comprising a dip tube is provided, wherein the dip tube reaches into the channel part (32), wherein particularly the dip tube contacts a ground wall (34) of the channel part (32).

13. Bottle according to anyone of claims 1 to 12, wherein the filling volume of the bottle body (12) is partially filled with a liquid comprising out-gassing components, wherein the liquid particularly comprises an oxidizer means for hair coloration of human hair.

14. Use of a bottle (10) according to anyone of claims 1 to 13 for storing a liquid comprising out-gassing components, wherein the liquid particularly comprises an oxidizer means for hair coloration of human hair, at least during a storing term until gaseous components out-gassed from the liquid are present in the filling volume.

15. Use according to claim 14, wherein the inside gas pressure of the filling volume increases by a pressure difference Δp during the storing term, wherein $0.01 \text{ bar} \leq \Delta p \leq 4.0 \text{ bar}$, particularly $0.05 \text{ bar} \leq \Delta p \leq 3.0 \text{ bar}$, preferably $0.1 \text{ bar} \leq \Delta p \leq 2.0 \text{ bar}$ and most preferred $0.4 \text{ bar} \leq \Delta p \leq 1.0 \text{ bar}$ applies.

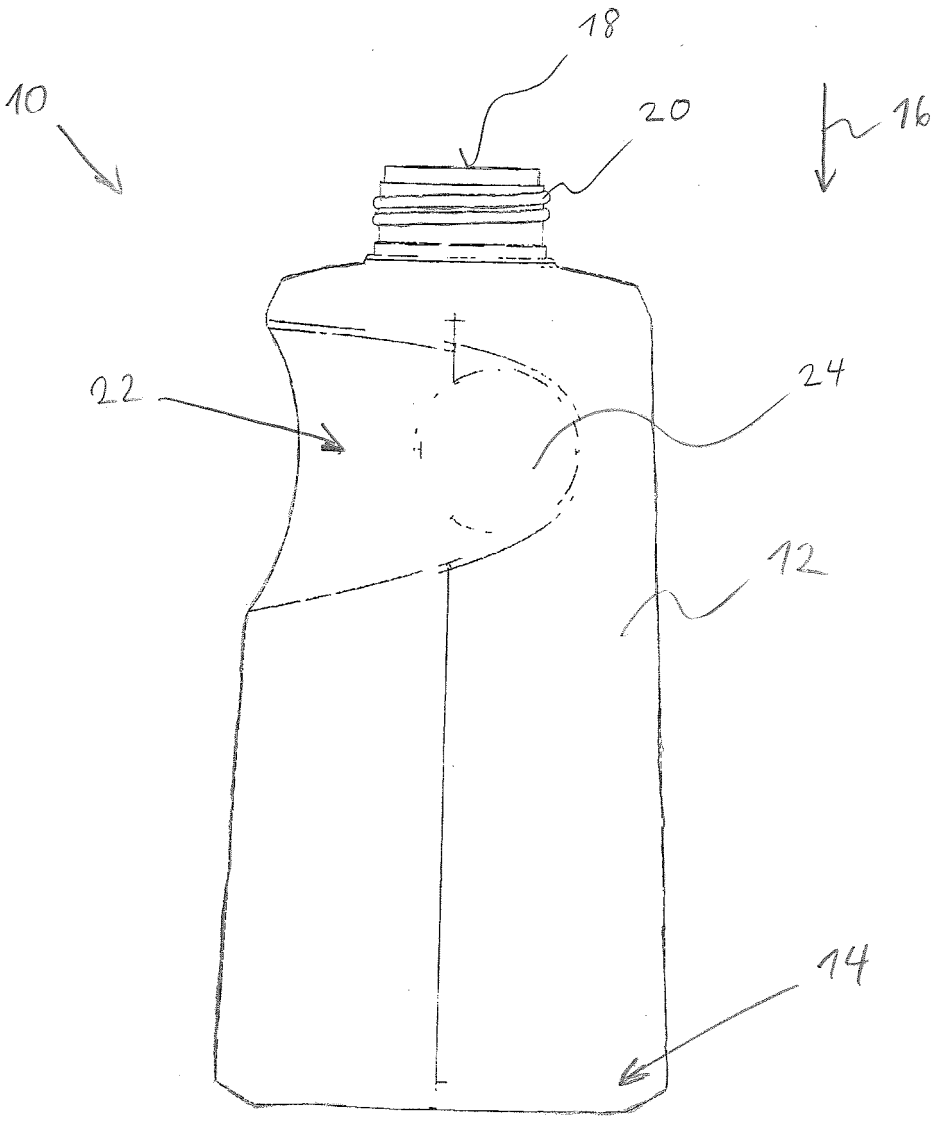

Fig. 1

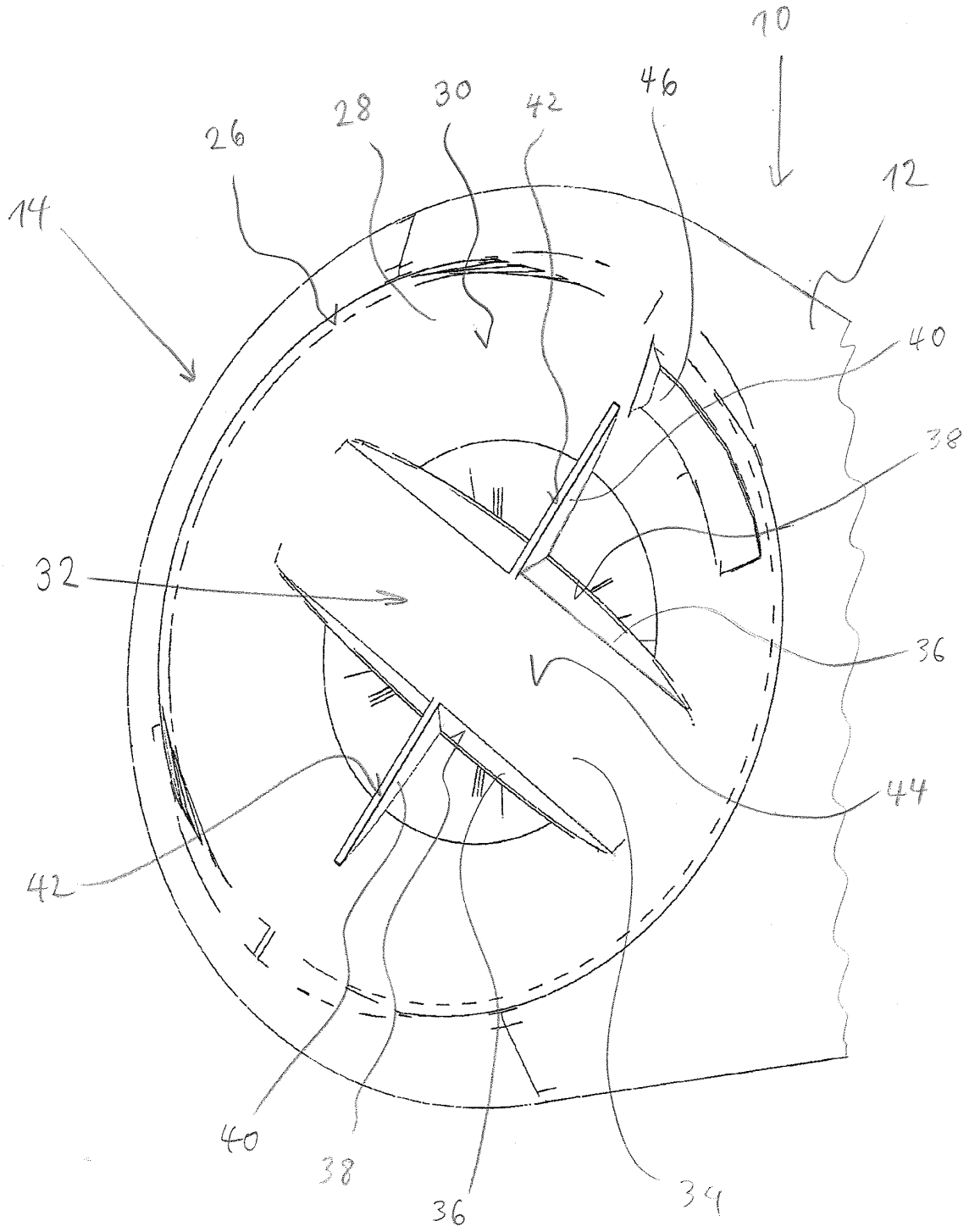

Fig. 2

Europäisches Patentamt
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EUROPEAN SEARCH REPORT

Application Number
EP 12 19 5107

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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TECHNICAL FIELDS SEARCHED (IPC)

A45D
B65D
B05B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	19 March 2013	Frego, Maria Chiara

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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A : technological background
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EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 12 19 5107

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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