ABSTRACT

The invention relates to an applicator device for applying at least one application agent (10a) to fibrous material, in particular an applicator device for applying an application agent (10a) to hair. Said device comprises a housing unit (11a) that contains at least one depot volume (12a) for storing the application agent(s) (10a) and at least one application volume (13a) that is connected to the depot volume (12a).
Fig. 2
APPLICATOR DEVICE FOR APPLYING AT LEAST ONE APPLICATION AGENT TO FIBROUS MATERIALS

PRIOR ART

[0001] The invention relates to an applicator device for applying at least one application agent to fibrous materials.

[0002] The problem addressed by the invention is particularly that of providing an applicator device which offers easy handling and effective protection against any unintentional discharge of the application agent. This problem is solved according to the invention by the features of claim 2 and of the dependent claims. Additional embodiments are specified in the dependent claims.

ADVANTAGES OF THE INVENTION

[0003] According to the invention, an applicator device for applying at least one application agent to fibrous materials is proposed, particularly an applicator device for applying an application agent to hair, comprising a housing unit which encloses at least one depot volume for storing the at least one application agent and at least one application volume connected to the depot volume.

[0004] Dividing a total volume into the depot volume and the application volume allows an application device to be provided by means of which particularly a liquid application agent can be applied safely to fibrous materials. The division allows the application volume to be advantageously embodied as small, thereby particularly decreasing the position dependency of a supply to application sites where the application agent is to be applied to the materials.

[0005] A “depot volume” is particularly understood in this context as a volume enclosed by the housing unit, which is provided for accommodating and storing the application agent. An “application volume” is particularly understood as a volume that borders at least one application site, preferably at least two application sites. The application volume is preferably situated downstream of the depot volume in terms of flow, and is designed to hold the application agent immediately prior to application to the fibrous materials, especially hair. An “application volume” particularly is not understood as a channel, i.e., an open space, which has a specified flow direction and is provided for conducting the application agent from a depot volume to an application site. “Provided” is particularly understood to mean specially equipped and/or designed.

[0006] An “application agent” is particularly understood to mean a liquid, paste-like or powdered medium which is provided for application to hair, particularly a hair dye, hair treatment agent, hair gloss, dispersion, body modifying agent, and/or pharmaceutical hair treatment agent. In principle, the application agent can be embodied as a single-component agent or as a multicomponent agent. A “single-component agent” is understood as an agent that is stored ready for use in the application agent container. A “multicomponent agent” is understood particularly as an agent that comprises two separately stored components, which are designed to be mixed together for application.

[0007] It is further proposed that the size of the application volume is smaller than the size of the depot volume. A particularly safe filling of the application volume can thereby be realized. Preferably, the application volume is no more than half as large as the depot volume.

[0008] It is further advantageous for the applicator device to have a pump unit, which is provided to at least support a filling of the application volume with the at least one application agent. A particularly advantageous filling of the application volume can thereby be achieved. The pump unit is preferably provided for inducing the application agent to a turbulent flow inside the depot volume, as a result of which, for one thing, an advantageous thorough mixing of the application agent can be achieved, particularly when the application agent is embodied as a multicomponent agent, and for another, with the turbulent flow, a pumping effect for filling the application volume can be easily achieved. The pump element of the pump unit is preferably embodied as spherical. However, other pump units are also conceivable in principle. More particularly, it is conceivable for the pump element to be movably connected to the housing unit, for example, in the form of a pendulum, which is designed for suspension inside the depot volume. In a further embodiment, it is conceivable for the pump unit to be provided merely for exciting the housing unit to oscillation or vibration. A “pump unit” is understood as a unit that is provided for exciting turbulence, a laminar flow and/or a change in pressure in the application agent.

[0009] The pump unit preferably comprises at least one pump element arranged in the depot volume and/or the application volume, which is provided for achieving a pumping effect. In this manner, a flow can advantageously be easily generated in the depot volume, with which the application agent can advantageously be thoroughly mixed, and can advantageously be conducted from the depot volume into the application volume. In this context, a pump element is particularly understood to be an element that is movable relative to the housing unit and is provided for exciting the application agent to a flow, for example, a pendulum, an impeller, or some other element. In principle, the pump element can be provided for guided motion, for example, a pump element that is mounted so as to rotate around a rotational axis, or for free motion.

[0010] Particularly advantageously, the pump element is arranged freely movable in the depot volume that is enclosed by the housing unit. In this manner, the pump unit can be particularly simple in design, particularly allowing a simple, manual pump unit to be realized. “Freely movable in the depot volume” is particularly understood in this context to mean that the pump element is not fastened to the housing unit that encloses the depot volume. Movement of the pump element is preferably limited to the depot volume. The at least one pump element is advantageously spherical. This allows a particularly simple pump element to be realized.

[0011] It is further proposed that the applicator device has a mixing unit, which comprises at least one mixing element inserted into the depot volume and/or the application volume, and provided for thoroughly mixing the application agent. In this manner, a high degree of homogeneity of the application agent can be achieved, particularly when the application agent is embodied as a multicomponent agent.

[0012] The pump unit and the mixing unit are preferably embodied as at least partially integral. The number of components can thereby be advantageously reduced. Particularly preferably, the pump element and the mixing element are embodied as integral. In principle, it is additionally or alternatively conceivable for the mixing unit to have a mixing element that is arranged in the application volume.
In a further development of the invention, it is proposed that the applicator device has a divider unit, which is provided for at least partially uncoupling the application volume in terms of flow from the depot volume. "Uncoupling in terms of flow" is particularly understood in this context to mean that an exchange of volume between the application volume and the depot volume is at least partially prevented. For example, it is understood to mean that a flow of the application agent in the depot volume, particularly a turbulent flow, is transferred no more than partially to the application agent in the application volume.

The device is especially easy to handle particularly if the divider unit is provided for at least partially preventing the application agent from flowing back from the application volume into the depot volume. With such an embodiment, for example, the application agent held in the application volume can be prevented from flowing back into the depot volume, thereby at least largely ensuring adequate filling of the application volume. This allows the applicator device to be used at least largely independent of orientation, i.e., even after a partial consumption of the application agent, the applicator device can be used even in a tilted state. The divider unit preferably comprises rigid separator elements, which particularly preferably form a labyrinthine structure. In principle, however, it is also conceivable for the divider unit to be embodied as a valve unit, for example, in the form of a leaf valve, which acts as a flow-check valve.

It is further advantageous for the housing unit to be substantially dimensionally stable, in order to prevent a partial vacuum of the application agent at least during use. It can thereby be prevented that too much application agent is discharged during handling as a result of a partial vacuum, thereby allowing the hair to be wetted uniformly while simultaneously preventing application agent from being applied to the scalp. "Preventing" is particularly understood in this context to mean that with normal handling of the applicator device, i.e., when the housing unit is grasped by a user, the housing unit is at least dimensionally stable enough that application agent is prevented from escaping through the application gaps. The housing unit is preferably at least partially rigid. "Rigid" is particularly understood in this context to mean that a force exerted on the housing unit for the purpose of reducing the application volume or depot volume enclosed by the housing unit by at least 10 percent will result in the destruction of the housing unit.

Further proposed is an applicator device for applying at least one application agent to fibrous materials, particularly an applicator device for applying an application agent to hair, with a separation unit having at least two separator elements, which form at least one application gap which is designed to receive hair for application of the application agent, and with at least one application volume that is at least partially enclosed by at least one of the separator elements. This allows the application agent to be applied particularly easily and safely to the hair, particularly if the application gaps of the separation unit have a very small gap width. With an embodiment of this type, the applicator device can be provided particularly advantageously for applying the application agent to isolated hairs, thereby particularly avoiding an unnaturally uniform coloring of a large number of hairs, particularly of entire strands of hair.

An "application gap arranged between two separator elements" is particularly understood as an open space between two adjacent separator elements, spaced from one another. An "application volume" is particularly understood as a volume for accommodating and storing the application agent. A "separator element" is particularly understood in this context as an element of the separation unit that is provided for introducing the hair placed in the separation unit into the at least one application gap or guiding it past the application gap. "An application volume that is at least partially enclosed by at least one of the separator elements" is particularly understood to mean that the internal contour of at least one of the separator elements forms a wall for the application volume. The separator elements preferably partially span the application volume, whereby the hairs, when placed in the application gap, penetrate into the application volume in which the application agent is stored and become wetted. The application volume is preferably at least one milliliter in size.

The application volume is particularly preferably designed to at least partially accommodate hair that is introduced into the at least one application gap. In this manner, hair can be passed through the application agent stored in the application volume, allowing the hair to be particularly easily provided with application agent.

The application gap preferably has a constant gap width in at least one partial area along its main direction of extension. Particularly advantageously, part of the at least one application gap has a gap width that varies along at least one direction. An opening width in the region of a tip line can preferably be larger than the gap width, wherein the gap width can also decrease starting from the tip line and extending in the direction of a base line. In principle, the at least one application gap can also have a conical, angled, or wedge-shaped structure.

The application volume and the at least one application gap preferably merge with one another in at least one partial area. A particularly advantageous quantity of the application agent can be introduced into the applicator device, wherein a particularly reliable supply of the application gap with the application agent can be achieved, while at the same time, application agent can be prevented from unintentionally escaping.

It is further proposed that the applicator device has a porous material, which is introduced at least partially into the at least one application volume. An additional simple embodiment can thereby be implemented. More particularly, the application sites can thereby be simple in design, resulting in an advantageous embodiment. A porous material is particularly understood in this context as a material that forms cavities designed for conducting the application agent, particularly a sintered material, a sponge material, or a wicking material, for example, a fibrous material.

Further proposed is an applicator device for applying at least one application agent to fibrous materials, particularly an applicator device for applying an application agent to hair, comprising a separation unit which has a comb-like structure with at least two separator elements and at least one application gap arranged between the separator elements, and comprising a housing unit which encloses at least one depot
In this case, the device is particularly embodied as a hair dye applicator device, which is designed for generating mottled coloring. Using the applicator device, the application agent 10a is applied to the hair statistically distributed, i.e., hairs that are fully or partially provided with the application agent 10a are adjacent to hairs that are not fully or partially provided with the application agent.

The applicant device has a direction of use 34a, in which it is passed through the hair during application of the application agent 10a. In order for only a part of the hair to be provided with application agent 10a when the applicant device is drawn through the hair a single time, the applicant device comprises a comb-like separation unit 17a. The separation unit 17a is designed to divide the hair that is placed in the applicant device and passed through the applicant device into a first part, to which the application agent 10a is applied, and a second part, which will remain untreated.

The separation unit 17a comprises a plurality of separator elements 18a, 19a, 20a, 21a, 22a, 23a. The separator elements 18a, 19a, 20a, 21a, 22a, 23a form a comb-like structure. The separator elements 18a, 19a, 20a, 21a, 22a, 23a have a main direction of extension which is oriented substantially parallel to the direction of use 34a. The separator elements 18a, 19a, 20a, 21a, 22a, 23a are arranged side by side along a transverse direction of extension 35a, which is oriented perpendicular to the direction of use 34a.

The two separator elements 18a, 23a are arranged on the outside. The two outer separator elements 18a, 23a each have a separator element 19a, 22a arranged adjacent to them. The remaining separator elements 19a, 20a, 21a, 22a are arranged at the center. Each comprises two adjacent separator elements 18a, 19a, 20a, 21a, 22a, 23a.

Each of the center separator elements 19a, 20a, 21a, 22a has two rounded tips. The outer separator elements 18a, 23a each have one tip. The two tips of each of the separator elements 19a, 20a, 21a, 22a are arranged spaced from another. The tips of all the separator elements 19a, 20a, 21a, 22a, 23a are arranged on a single line along the transverse direction of extension 35a. Starting from one of the tips of one of the separator elements 18a, 19a, 20a, 21a, 22a, 23a, the tips of adjacent separator elements 18a, 19a, 20a, 21a, 22a, 23a are arranged spaced from one another.

The center separator elements 19a, 20a, 21a, 22a each have two side walls. The side walls form an acute angle with the direction of use 34a. The side walls extend nearly parallel to the direction of use 34a. Each of the side walls ends at one of the two tips of the corresponding separator element 19a, 20a, 21a, 22a. The outer separator elements 18a, 23a each have one side wall which is similar in design.

With the arrangement of the separator elements 18a, 19a, 20a, 21a, 22a, 23a along the transverse direction of extension 34a, the side walls of the separator elements 18a, 19a, 20a, 21a, 22a, 23a each lie opposite another one in pairs, i.e., the side wall of one of the separator elements 18a, 19a, 20a, 21a, 22a, 23a lies opposite the side wall of the adjacent separator element 18a, 19a, 20a, 21a, 22a, 23a.

The facing side walls of the separator elements 18a, 19a, 20a, 21a, 22a, 23a each span an intermediate space. The intermediate spaces, which are spanned by the side walls arranged opposite one another in pairs, form application gaps 24a, 25a, 26a, 27a, 28a. All the application gaps 24a, 25a, 26a, 27a, 28a, which are formed by the separator elements 18a, 19a, 20a, 21a, 22a, 23a, begin at a shared tip line 36a and
end at a shared base line 37a. The base line 37a and the tip line 36a in this case extend perpendicular to the direction of use 34a.  

[0040] In addition, each of the center separator elements 19a, 20a, 21a, 22a forms a free bypass space 38a, 39a, 40a, 41a. The tips of the separator elements 18a, 19a, 20a, 21a, 22a, 23a form a part of the separation unit 17a, which is spaced the greatest distance from the base line 37a in relation to the direction of use 34a. The free bypass spaces 38a, 39a, 40a, 41a are embodied as an area between the tips, in which the separator elements 18a, 19a, 20a, 21a, 22a, 23a have a recess starting from the tip line 36a where the tips are arranged and oriented in the direction of the base line 37a. The free bypass spaces 38a, 39a, 40a, 41a are embodied as rounded in at least one cross-sectional plane. They have a shape similar to a semicircle.  

[0041] The depth of the free bypass spaces 38a, 39a, 40a, 41a is substantially smaller than the depth of the application gaps 24a, 25a, 26a, 27a, 28a. The depth of the application gaps 24a, 25a, 26a, 27a, 28a, i.e., an extension of the application gaps 24a, 25a, 26a, 27a, 28a starting from the tip line 36a along the direction of use 34a and extending in the direction of the base line 37a, is greater than a corresponding extension of the free bypass spaces 38a, 39a, 40a, 41a. The separation unit 17a further comprises a bottom side 42a and a top side 43a. The bottom side 42a and the top side 43a converge in the tip line 36a in an acute angle. The bottom side 42a is designed for placement on the scalp. The tip side 43a faces away from the scalp during use. The separator elements 18a, 19a, 20a, 21a, 22a, 23a form a part of the bottom side 42a and the top side 43a.  

[0042] The bottom side 42a and the top side 43a are curved at least in partial areas. The bottom side 42a is curved in a convex shape. The top side 43a is curved in a concave shape. The bottom side 42a has a flatter curvature than the top side 43a. During use, the bottom side 42a is placed on the scalp. The applicator device is guided along the scalp by means of the bottom side 42a. Therefore, the bottom side 42a extends in at least one partial area along the direction of use 34a. The preferred direction of use 34a is determined by the bottom side 42a. The preferred direction of use 34a is determined by the part of the bottom side 42a that directly borders the tip line 36a. A user preferably moves the applicator device along any directions that extend tangentially to the bottom side 42a, in a roll-sliding movement, similar to that of a 23a hairbrush needle, i.e., first along the preferred direction of use 34a and then along the additional directions that extend tangentially to the bottom side 42a, thereby lifting the tips of the separation unit 17a off of the scalp during the movement.  

[0043] When hair is passed through the separation unit 17a, the application gaps 24a, 25a, 26a, 27a, 28a receive the first part of the hair, to which the application agent 10a will be applied. When hair is passed through the separation unit 17a, the free bypass spaces 38a, 39a, 40a, 41a receive the second part of the hair, which will remain untreated. The part of the hair that is received by the application gaps 24a, 25a, 26a, 27a, 28a is at least 5 times greater than the part of the hair that is received by the free bypass spaces 38a, 39a, 40a, 41a.  

[0044] For applying the application agent 10a to the hair, the applicator device comprises an application volume 13a. The application volume 13a is partially enclosed by the separator elements 18a, 19a, 20a, 21a, 22a, 23a, i.e., the separator elements 18a, 19a, 20a, 21a, 22a, 23a form a part of a wall that borders the application volume 13a. The applicator device further comprises a housing unit 11a, which forms additional parts of a wall of the application volume 13a. The housing unit 11a, which forms the top side 43a and the bottom side 42a, and the separator elements 18a, 19a, 20a, 21a, 22a, 23a are embodied as integral. The housing unit 11a is made of a plastic. One material the housing unit 11a is made of is transparent. In principle, however, the housing unit 11a can also be made of other materials, particularly of non-transparent materials.  

[0045] In a cross-sectional plane that extends perpendicular to the transverse direction of extension 35a, the housing unit 11a is an inner contour 44a, which matches an outer contour 45a of the housing unit 11a, particularly in the region of the separator elements 18a, 19a, 20a, 21a, 22a, 23a. The thickness of the housing unit 11a wall in the region of the separator elements 18a, 19a, 20a, 21a, 22a, 23a is smaller than the depth of the separator elements 18a, 19a, 20a, 21a, 22a, 23a.  

[0046] Starting from the base line 37a and extending in the direction of the tip line 36a, the housing unit 11a has different wall thicknesses. The wall thickness in this case is greatest in the region of the base line 37a and decreases continuously in the direction of the tip line 36a. A creeping distance, i.e., a distance that the application agent 10a must traverse in order to exit the corresponding application gap 24a, 25a, 26a, 27a, 28a, is therefore greater in the region of the base line 37a than at an outer end of the partial region that faces the tip line 36a, in which the application gaps 24a, 25a, 26a, 27a, 28a merge into the application volume 13a. With their greater wall thickness as compared with the tip line 36a, the application gaps 24a, 25a, 26a, 27a, 28a place increased resistance to escape against the application agent 10a in the region of the base line 37a as compared with the outer end of the partial region.  

[0047] The inner contour 44a is embodied as curved in the partial region in which it borders the application volume 13a. The part of the inner contour 44a which, together with the bottom side 42a, forms a lower part of the housing unit 11a is curved in a concave shape. The part of the inner contour 44a which, together with the top side 43a, forms an upper part of the housing unit 11a is curved in a convex shape. The convex part of the inner contour 44a has a greater curvature than the concave part of the inner contour 44a. The application volume 13a has a cross-section, the height of which decreases continuously starting from the base line 37a and extending in the direction of the tip line 36a. The width of the cross-section is approximately constant. The application volume 13a has a wedge-shaped basic shape. This basic shape is curved by the shape of the inner contour 44a.  

[0048] The application volume 13a extends through all the center separator elements 19a, 20a, 21a, 22a. The outer separator elements 18a, 23a form a lateral wall for the application volume 13a. The side walls of separator elements 19a, 20a, 21a, 22a have a triangular structure. Starting from the tips, the side walls each have an upper leg and a lower leg. The upper leg of the side wall forms the top side 43a. The lower leg forms the bottom side 42a. The top side 43a and the bottom side 42a therefore form a part of the wall of the application volume 13a. A hair that has been placed in one of the application gaps 24a, 25a, 26a, 27a, 28a therefore penetrates into the application volume 13a which is partially enclosed by the separator elements 18a, 19a, 20a, 21a, 22a, 23a. The application volume 13a and the application gaps 24a, 25a, 26a, 27a, 28a merge into one another in a partial region 55a.  

[0049] The partial region 55a extends starting from the base line 37a in the direction of the tip line 36a. In the region in which the application volume 13a and the application gaps
24a, 25a, 26a, 27a, 28a merge into one another, the application gaps 24a, 25a, 26a, 27a, 28a form application sites 29a, 30a, 31a, 32a, 33a. Only at the application sites 29a, 30a, 31a, 32a, 33a is the application agent 10a applied to the hair.

[0050] The application gaps 24a, 25a, 26a, 27a, 28a have an application size, which is designed for separating the hair. The free bypass spaces 38a, 39a, 40a, 41a, which are provided for drawing hair that will not be treated past the application gaps 24a, 25a, 26a, 27a, 28a, have a bypass size that is at least 20 times greater than the bypass size of the application gaps 24a, 25a, 26a, 27a, 28a. The number of hairs to which the application agent 10a will be applied with a single passage through the separation unit 17a is therefore at least 20 times greater than the number of hairs that will remain untreated, i.e., for every treated hair there are at least 20 untreated hairs. The application gaps 24a, 25a, 26a, 27a, 28a have an opening width that is at least 10 times greater than an opening width of the free bypass spaces 38a, 39a, 40a, 41a.

[0051] The opening width of the free bypass spaces 38a, 39a, 40a, 41a is greatest in the region of the tip line 36a. At the tip line 36a, the opening width of the bypass spaces 38a, 39a, 40a, 41a is at least 10 times greater than the opening width of the application gaps 24a, 25a, 26a, 27a, 28a. The distance between the two tips of one of the separator elements 18a, 19a, 20a, 21a, 22a, 23a is therefore 5 or more times greater than the distance between the facing tips of adjacent separator elements 18a, 19a, 20a, 21a, 22a, 23a. The width of the bypass spaces 38a, 39a, 40a, 41a becomes successively smaller in the direction of the base line 37a.

[0052] At least in the region of the application sites 29a, 30a, 31a, 32a, 33a, the opening width of the bypass gaps 24a, 25a, 26a, 27a, 28a is smaller than a barrier width, beyond which the application agent 10a is prevented by adhesive forces and/or cohesive forces from escaping. The application agent 10a has a surface tension induced by the cohesive forces. In this gap, the opening width of the application gaps 24a, 25a, 26a, 27a, 28a is small enough, at least in the region of the application volume 13a, that particularly adhesive forces, but also other forces, for example, cohesive forces, prevent the application agent 10a from exiting the application volume 13a when it is not in use, i.e., particularly during storage.

[0053] The opening volume 13a above takes up only a part of a volume that is enclosed by the housing unit 11a. In addition to the application volume 13a, the applicator device comprises a depot volume 12a, which is connected to the application volume 13a. The depot volume 12a takes up a part of the housing unit 11a which is spaced from the separation unit 17a.

[0054] The part of the housing unit 11a that forms the depot volume 12a is embodied as a handle. The applicator device is provided for single-handed use. A user intending to pass the applicator device through hair will grasp the housing unit 11a in the region in which the depot volume 12a is located. The depot volume 12a has a substantially cylindrical basic shape. The housing unit 11a is made of a dimensionally stable plastic. The dimensionally stable housing unit 11a prevents application agent 10a from being squeezed out via the application gaps 24a, 25a, 26a, 27a, 28a during use, particularly when the user grasps the housing unit 11a. The housing unit 11a is therefore embodied as rigid.

[0055] The depot volume 12a and the application volume 13a are at least partially uncoupled from one another in terms of flow. Between the depot volume 12a and the application volume 13a, a divider unit 16a is arranged. In a region in which the depot volume 12a borders the application volume 13a, the inner contour 44a of the housing unit 11a has a narrowed region, through which the application agent 10a is able to flow independently only conditionally as a result of its adhesive forces. In the embodiment example illustrated, the inner contour 44a of the housing unit 11a has two facing sections 46a, 47a, which form the narrowed region. In this embodiment example, the two sections 46a, 47a are spaced a distance of approximately 4 millimeters from one another.

[0056] A through opening 48a formed by the divider unit 16a, through which the application agent 10a can flow from the depot volume 12a into the application volume 13a, has a slit-type shape. Perpendicular to the transverse direction of extension 35a, the through opening 48a has an extension that corresponds to the distance between the two sections 46a, 47a. Parallel to the transverse direction of extension 35a, the through opening 48a has an extension that is significantly greater than the extension perpendicular to the transverse direction of extension 35a. The extension of the through opening 48a parallel to the transverse direction of extension 35a is greater than 1 centimeter. In the embodiment example illustrated, this measurement is approximately 2.5 centimeters.

[0057] The applicator device further comprises a mixing unit 56a, which comprises a mixing element 57a that is introduced into the depot volume 12a. The mixing unit 56a is designed for generating a turbulent flow in the application agent 10a in order to thoroughly mix the application agent 10a. The mixing unit 56a is manually actuated. When a user moves the housing unit 11a with a shaking movement, the mixing element 57a is excited to move within the depot volume 12a. A mixing process, particularly of a multicomponent agent, can thereby be carried out within the housing unit 11a.

[0058] To conduct the application agent 10a from the depot volume 12a to the application volume 13a, or to at least support an automatic filling of the application volume 13a, the applicator device comprises a pump unit 14a. The pump unit 14a comprises a movable pump element 15a, which is designed for inducing a flow at least in the region of the divider unit 16a.

[0059] The pump element 15a is attached so as to be freely movable in the depot volume 12a. The pump element 15a is embodied as a ball. The pump element 15a has a diameter that is greater than the extension of the through opening 48a perpendicular to the transverse direction of extension 35a. The pump element 15a cannot move through the transverse direction of extension 48a from the depot volume 12a into the application volume 13a.

[0060] In the region of the application volume, the flow generated by the pump unit 14a is greater than in the region of the tip line. Due to the greater wall thickness in the region of
the base line 37a than in the region of the tip line 36a, the application gaps 24a, 25a, 26a, 27a, 28a place greater resistance against the application agent 10a in the region of the base line 37a than in the region of the tip line 36a.

[0062] The mixing unit 56a is embodied as integral with the pump unit 14a. The pump element 15a simultaneously forms the mixing element 57a. In principle, however, it is also conceivable for the mixing unit 56a to have an additional mixing element, the dimensions of which will preferably allow it to be introduced both into the application volume 13a and into the depot volume 12a.

[0063] For filling, the housing unit 11a has a refill opening 49a and the applicator device has a sealing element 50a that seals the refill opening 49a. The entire applicator device is recyclable. In principle, however, it is also conceivable for the applicator device to be designed partially or entirely as a single-use product.

[0064] The diameter of the refill opening 49a is greater than an extension of the pump element 15a. Therefore, in the production of the applicator device, the pump element 15a can be placed in the housing unit 11a through the refill opening 49a, once the housing unit 11a has been fully formed. The housing unit 11a is preferably produced in a single production step by the thermoplastic shaping of a blank. In principle, however, it is also conceivable for the housing unit 11a to first be embodied as having multiple parts, which are then joined by a suitable joining method to form a component. In this case, individual parts are preferably adhesively joined to one another, whereby the housing unit 11a is embodied as integral.

[0065] To apply the application agent 10a, the applicator device is passed through the hair. As a result of the design of the separation unit 17a, the application agent 10a is applied at most to one in 20 hairs. As the applicator device is passed through the hair, the separator elements 18a, 19a, 20a, 21a, 22a, 23a divide the hair. The first part of the hair is passed through the application gaps 24a, 25a, 26a, 27a, 28a. The second part comes to rest in the free bypass spaces 38a, 39a, 40a, 41a. If the applicator device is passed through more hair than the free bypass spaces 38a, 39a, 40a, 41a and the application gaps 24a, 25a, 26a, 27a, 28a can no longer accommodate part of the hair, the applicator device will pass under the applicator device or over the applicator device.

[0066] Part of the hair that is placed in the application gaps 24a, 25a, 26a, 27a, 28a penetrates into the application volume 13a, and is therefore in the region of the application sites 29a, 30a, 31a, 32a, 33a. Therefore, the application agent 10a is not applied to all the hairs located in the application gaps 24a, 25a, 26a, 27a, 28a. The application agent 10a is applied only to isolated hairs, i.e., following the use of the applicator device, only individual hairs of a strand comprising multiple hairs are provided with the application agent 10a. In addition, the hairs are not necessarily provided over their entire length with application agent 10a, and can also optionally be only partially colored.

[0067] For transport or for storage, the application device comprises a cover unit 51a. The cover unit 51a is designed to be placed on the separation unit 17a. The cover unit 51a placed on the separation unit 17a encloses the separator elements 18a, 19a, 20a, 21a, 22a, 23a. The width of the cover unit 51a is smaller at least in partial regions than the width of the separation unit 17a oriented along the transverse direction of extension 35a. When it has been replaced, the cover unit 51a exerts a force on the outer separator elements 18a, 23a that is oriented in the direction of the center separator elements 19a, 20a, 21a, 22a.

[0068] The separator elements 18a, 19a, 20a, 21a, 22a, 23a are embodied as partially flexible. With the emplaced cover unit 51a, the outer separator elements 18a, 23a and the adjoining center separator elements 19a, 20a, 21a, 22a are curved inward. Therefore, when the cover unit 51a has been emplaced, the application gaps 24a, 25a, 26a, 27a, 28a have a gap width that is nearly zero. The cover unit 51a prevents the application agent 10a from escaping either as a result of the compression of the separator elements 18a, 19a, 20a, 21a, 22a, 23a or as a result of the enclosure of the separation unit 17a.

[0069] The separator elements 18a, 19a, 20a, 21a, 22a, 23a have a flexibility which allows them to be deformed by force that acts on the separator elements 18a, 19a, 20a, 21a, 22a, 23a as the applicator device is passed through the hair. As the applicator device is passed through the hair, the individual application gaps 24a, 25a, 26a, 27a, 28a can therefore have different gap widths.

[0070] In the embodiment example shown, the application gaps 24a, 25a, 26a, 27a, 28a have a substantially constant gap width. In principle, it is conceivable for the separator elements 18a, 19a, 20a, 21a, 22a, 23a to also have a gap width that varies along the direction of use 34a. In particular, it can be advantageous for the application gap 24a, 25a, 26a, 27a, 28a to have a greater gap width in the region of the tip line 36a than in the region of the base line 37a.

[0071] FIGS. 3 and 4 show an additional embodiment example of the invention. The following descriptions are limited essentially to the differences between the embodiment examples, wherein with regard to components, features and functions that remain unchanged, reference may be made to the description of the other embodiment examples, particularly to FIGS. 1 and 2. To distinguish between the embodiment examples, the letter a in the reference signs for the embodiment examples of FIGS. 3 and 4. With respect to components having the same designation, particularly with respect to components having the same reference signs, reference can also be made in principle to the drawings and/or the description of the embodiment example of FIGS. 1 and 2.

[0072] FIGS. 3 and 4 show a further embodiment of an applicator device according to the invention. The applicator device is provided for applying an application agent 10b to hair. The applicator device comprises a separation unit 17b, which has a comb-like structure. The separation unit 17b comprises a plurality of application gaps 24b, 25b, 26b, 27b, 28b, which are designed to accommodate part of the hair for the application of the application agent 10b, and a plurality of free bypass spaces 38b, 39b, 40b, 41b, which are designed for drawing part of the hair past the application gaps 24b, 25b, 26b, 27b, 28b. The application gaps 24b, 25b, 26b, 27b, 28b have an application size that is at least 5 times smaller than a bypass size of the free bypass spaces 38b, 39b, 40b, 41b.

[0073] The separation unit 17b comprises a plurality of separator elements 18b, 19b, 20b, 21b, 22b, 23b. Between every two of the separator elements 18b, 19b, 20b, 21b, 22b, 23b, one of the application gaps 24b, 25b, 26b, 27b, 28b is arranged. The applicator device further comprises a housing unit 11b. The housing unit 11b encloses two depot volumes
In which different application agents 10b, 10b' are held, and two application volumes 13b, 13b'.

The housing unit 11b of the application device, which is embodied as integral with the separation unit 17b, is L-shaped. The housing unit 11b comprises one short leg, which forms the separation unit 17b, and one long leg, in which the depot volume 12b is arranged. The application volumes 13b, 13b' are arranged in the short leg.

The separation unit 17b comprises a plurality of application sites 29b, 30b, 31b, 32b, 33b. To apply the application agent 10b introduced into the depot volume 12b to the part of the hair that passes through the application gaps 24b, 25b, 26b, 27b, 28b, the applicator device comprises a guide unit 52b. The guide unit 52b is provided for conducting the application agent 10b out of the depot volume 12b to the application sites 29b, 30b, 31b, 32b, 33b.

The guide unit 52b comprises a plurality of channels 53b, 54b. The channels 53b, 54b connect the depot volumes 12b, 12b' to the application sites 29b, 30b, 31b, 32b, 33b. The application sites 29b, 30b, 31b, 32b, 33b are each arranged on a base line 37b of the separator elements 18b, 19b, 20b, 21b, 22b, 23b of the separation unit 17b. The average diameter of the channels 53b, 54b is greater than a barrier width. The application agent 10b therefore flows independently from the depot volume 12b, 12b' to the application sites 29b, 30b, 31b, 32b, 33b.

The application volumes 13b, 13b' form the application sites 29b, 30b, 31b, 32b, 33b. Each of the application volumes 13b, 13b' is assigned at least two of the application sites 29b, 30b, 31b, 32b, 33b. The guide unit 52b conducts the application agent 10b, 10b' from the corresponding depot volumes 12b, 12b' to the associated application volumes 13b, 13b'.

Because the application gaps 24b, 25b, 26b, 27b, 28b have a gap width that is smaller than the barrier width, the application agent 10b fills only the application volumes 13b, 13b'. The application gaps 24b, 25b, 26b, 27b, 28b are therefore provided with the application agent only in the region of the application sites 29b, 30b, 31b, 32b, 33b.

A porous material is placed in each of the application volumes 13b, 13b'. The porous material has a sponge structure. As soon as the application agents 10b, 10b' have been brought into contact with the porous material via the channels 53b, 54b, the porous material becomes fully saturated with the application agents 10b, 10b'. The porous material therefore exerts a suctioning effect, with which the application agents 10b, 10b' are conveyed from the depot volumes 12b, 12b' to the application volumes 13b, 13b'.

Various wicking materials, for example, fibrous materials, are conceivable as the porous material. Alternatively, however, a sintered material or another material deemed suitable by a person skilled in the art can also be used. The application sites 29b, 30b, 31b, 32b, 33b are also formed by means of the porous material.

The application sites 29b, 30b, 31b, 32b, 33b are embodied as contact sites, where hair can come into contact with the porous material. In this case, it is entirely conceivable for a part of the application agent 10b, 10b' to exit from the porous material and enter into the application gaps 24b, 25b, 26b, 27b, 28b. The application gaps 24b, 25b, 26b, 27b, 28b are therefore partially filled with the application agents 10b, 10b'. However, because the gap width of the application gaps 24b, 25b, 26b, 27b, 28b is smaller than the barrier width, the application agent 10b, 10b' is prevented from exiting the application gaps 24b, 25b, 26b, 27b, 28b.

When hair is passed through the applicator device, the hairs are isolated and placed in the different application gaps 24b, 25b, 26b, 27b, 28b, in which the application agent 10b is then applied to the hairs. The isolated hairs are then drawn past the porous material which fills the application volumes 13b, 13b'. The application agents 10b, 10b' are applied to the hair via the porous material.

In a further development that is not specified in greater detail, it is also conceivable in principle for the channels 53b, 54b of the guide unit to be filled with the porous material or for the separator elements 18b, 19b, 20b, 21b, 22b, 23b to be produced entirely or partially from a material that is capable of capillary effects.

The depot volume 12b of the application unit is refillable. The applicator device comprises a refill opening 49b and a sealing element 50b for the refill opening 49b.

In an alternative embodiment that is not specified in greater detail, the applicator device is essentially the same as the embodiment example illustrated in FIGS. 1 and 2. In contrast to the embodiment example illustrated in these figures, the applicator device comprises an application volume which is filled with a porous material. A further embodiment is similar to the embodiment example illustrated in FIGS. 1 and 2.

List of Reference Signs

<table>
<thead>
<tr>
<th>Reference Sign</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>Application agent</td>
</tr>
<tr>
<td>11</td>
<td>Housing unit</td>
</tr>
<tr>
<td>12</td>
<td>Depot volume</td>
</tr>
<tr>
<td>13</td>
<td>Application volume</td>
</tr>
<tr>
<td>14</td>
<td>Pump unit</td>
</tr>
<tr>
<td>15</td>
<td>Pump element</td>
</tr>
<tr>
<td>16</td>
<td>Divider unit</td>
</tr>
<tr>
<td>17</td>
<td>Separation unit</td>
</tr>
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<tr>
<td>50</td>
<td>Sealing element</td>
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</table>
1. An applicator device for applying at least one application agent (10a) to fibrous materials, particularly an applicator device for applying an application agent (10a) to hair, comprising a housing unit (11a) which encloses at least one depot volume (12a) for storing the at least one application agent (10a) and at least one application volume (13a) that is connected to the depot volume (12a).

2. The applicator device according to claim 1, characterized in that the size of the application volume (13a) is smaller than the size of the depot volume (12a).

3. The applicator device according to claim 1, characterized by a pump unit (14a), which is provided for at least supporting a filling of the application volume (13a) with the at least one application agent (10a).

4. The applicator device according to claim 3, characterized in that the pump unit (14a) has at least one pump element (15a) arranged in the depot volume (12a) and/or the application volume (13a), which is provided for achieving a pump effect.

5. The applicator device according to claim 4, characterized in that the pump element (15a) is arranged freely movable in the depot volume (12a) that is enclosed by the housing unit (11a).

6. The applicator device according to claim 4, characterized in that the at least one pump element (15a) is spherical.

7. The applicator device according to claim 3, characterized by a mixing unit (56a), which has at least one mixing element (57a) inserted into the depot volume (12a) and/or the application volume (13a), which is provided for thoroughly mixing the application agent (10a).

8. The applicator device at least according to claim 7, characterized in that the pump unit (14a) and the mixing unit (56a) are embodied as at least partially integral.

9. The applicator device according to claim 1, characterized by a divider unit (16a) which is provided for at least partially uncoupling the application volume (13a) from the depot volume (12a) in terms of flow.

10. The applicator device according to claim 9, characterized in that the divider unit (16a) is provided for at least partially preventing the application agent from flowing back from the application volume (13a) into the depot volume (12a).

11. The applicator device according to claim 1, characterized in that the housing unit (11a) is substantially dimensionally stable, in order to prevent a partial vacuum of the application agent (10a) at least during use.

12. An applicator device for applying at least one application agent (10a) to fibrous materials, particularly an applicator device for applying an application agent (10a) to hair, comprising a separation unit (17a) which has at least two separator elements (18a, 19a, 20a, 21a, 22a, 23a), which form at least one application gap (24a, 25a, 26a, 27a, 28a), which is provided for accommodating hairs for the application of the application agent (10a), characterized by at least one application volume (13a) at least partially enclosed by at least one of the separator elements (18a, 19a, 20a, 21a, 22a, 23a).

13. The applicator device according to claim 12, characterized in that the application volume (13a) and the at least one application gap (24a, 25a, 26a, 27a, 28a) merge with another in at least one partial region.

14. The applicator device according to claim 12, characterized by at least one additional separator element (18a, 19a, 20a, 21a, 22a, 23a) and at least one additional application gap (24a, 25a, 26a, 27a, 28a), which merges in at least one partial region into the application volume (13a).

15. The applicator device according to claim 12, characterized by a depot volume (12a), which is connected to the applicator volume (13a).

16. The applicator device according to claim 12, characterized by a porous material, which is placed at least partially in the at least one application volume.

17. An applicator device for applying at least one application agent (10a; 10b) to fibrous materials, particularly an applicator device for applying an application agent (10a; 10b) to hair, comprising a separation unit (17a; 17b) which has a comb-like structure with at least two separator elements (18a, 19a, 20a, 21a, 22a, 23a; 18b, 19b, 20b, 21b, 22b, 23b) and at least one application gap (24a, 25a, 26a, 27a, 28a; 24b, 25b, 26b, 27b, 28b) arranged between the separator elements (18a, 19a, 20a, 21a, 22a, 23a; 18b, 19b, 20b, 21b, 22b, 23b), with a housing unit (11a; 11b) which encloses at least one depot volume (12a; 12b), in which the application agent (10a; 10b) is inserted, and with at least one application site (29a, 30a, 31a, 32a, 33a; 29b, 30b, 31b, 32b, 33b), which is arranged in the region of the at least one application gap (24a, 25a, 26a, 27a, 28a; 24b, 25b, 26b, 27b, 28b), characterized in that the application gap (24a, 25a, 26a, 27a, 28a; 24b, 25b, 26b, 27b, 28b), at least in the region of the application site (29a, 30a, 31a, 32a, 33a; 29b, 30b, 31b, 32b, 33b), has a gap width that is smaller than a barrier width.