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Device for applying an additive to hair

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The invention relates to a device for applying an additive to hair, comprising a longitudinally extending base part for making contact with the hair during operation, which base part comprises a distribution system for additive, which distribution system has an entrance which is connected to an additive dispenser, and which has outlets for applying the additive to the hair during operation.

The invention further relates to an electrical hairstyler comprising power supply means and a handle, and comprising a device for applying an additive to hair, which device comprises a longitudinally extending base part for making contact with the hair during operation, which base part comprises a distribution system for additive, which distribution system has an entrance which is connected to an additive dispenser, and which has outlets for applying the additive to the hair during operation

A device for applying an additive to hair of the type defined in the opening paragraphs is known from EP 0 523 460 B1. The base part of this known device is formed by a comb body with comb teeth. The comb body and the comb teeth are hollow and thus form the distribution system for the distribution of additive, in this known device being foam for styling of the hair. The entrance is a discharging tube in the hollow comb body, which is connected to the additive dispenser comprising a jet operating portion and a container. The outlets of the distribution system through which the foam is applied to the hair during operation are formed by apertures in the ends of the hollow comb teeth. By activating a button during operation, foam is jetted from the dispenser through the foam discharging tube and the hollow comb body, through the hollow comb teeth to the apertures in said comb teeth, and thus directed to the hair. A disadvantage of the known device is, that additive, and especially foam, is not distributed evenly over the hair by the device. The even distribution of additive over the hair is important when a good hairstyling result is to be achieved with the device.

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It is an object of the invention to provide a device for applying an additive to hair of the type defined in the opening paragraphs that is improved with regard to its hairstyling performance.

To achieve this object, a device for applying an additive to hair according to the invention is characterized in that between the entrance and each outlet a flow path is present, which flow path comprises at least one ramification, said flow paths having, measured from the entrance to each outlet, a substantially identical flow resistance. Because of the fact that each flow path has a substantially identical flow resistance from the entrance to the relevant outlet, additive originating during operation from the entrance and following the flow paths to each outlet, experiences a substantially equal deceleration along each flow path. The additive thus reaches all outlets practically simultaneously, and the additive flow rate through each outlet is substantially identical. As a result of this the additive is distributed evenly over the hair, which benefits a good hairstyling result.

An embodiment of a device for applying an additive to hair according to the invention is characterized in that the flow paths each comprise an identical sequence of flow channels and flow channel ramifications, corresponding flow channels of said sequences having identical lengths and cross sections, and corresponding flow channel ramifications of said sequences having an identical number of branches. It is advantageous when the substantially identical flow resistance of the flow path from the entrance to each outlet is obtained in this way, since the flow resistances in the flow paths are identical to a high degree. The construction of the distribution system thus is comparatively simple, which benefits an easy and cost-effective manufacture.

An embodiment of a device for applying an additive to hair according to the invention is characterized in that the flow paths are provided as slots on a cylindrical carrier element which are covered by a cylindrical covering element, and which merge into openings in the covering element. The distribution system is thus composed of only two parts, which parts can be manufactured efficiently in mass production and are easy to assemble. The distribution system can thus be realized in a comparatively simple and cost-effective way. Next to that, the cylindrical covering element serves a double function. On the one hand its inner circumferential area covers the slots forming the flow paths in the distribution system, and on the other hand its outer circumferential area can accommodate additional hairstyling elements such as brush hairs or pins.

It is advantageous, when the carrier element and the covering element are detachably connected to each other. The use of an additive, and especially foam, in this

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device creates the possibility of obstruction of the flow paths or the outlets or both, because of additive that remains in the distribution system after operation. This remaining additive disturbs the flow resistances of the flow paths and the even distribution of additive over the hair by the device. By offering the possibility to detach the carrier element and the covering element from each other, both parts can be cleaned individually. Consequently the distribution system can be kept clean and a good hair styling performance of the device is secured.

An embodiment of a device for applying an additive to hair according to the invention is characterized in that the flow paths are provided as channels provided in a longitudinally extending flat support, which channels extend from the entrance to hollow protuberances, which hollow protuberances extend from a surface area of said support to the outlets. Since the flow paths are formed by channels, communicating with hollow protuberances, it is prevented that during operation additive leaks away from the flow paths while progressing from the entrance to each outlet. It is prevented in this way that additive leaks out of the distribution system into other parts of the device, which could damage the operation and the performance of the device.

An embodiment of a device for applying an additive to hair according to the invention is characterized in that the base part has a first end on which a handle is provided and a second end on which the additive dispenser is provided. When a user holds the device during operation by the handle at one end of the base part, and brings the base part into contact with the hair, the additive dispenser at the other end of the base part protrudes at least partly from the contacted hair locks. The additive dispenser can thus easily be activated by the user. Next to that, the additive dispenser is thus easily accessible so that it can be refilled or detached from the device in a simple manner.

According to the invention, an electrical hairstyler of the kind mentioned in the opening paragraphs is characterized in that the device for applying an additive is a device according to the invention. The advantages of styling the hair electrically, for example by means of heating elements or by air, are enhanced by the advantage of applying additive evenly over the hair. An effective styling and setting of the hair can thus be achieved with a hairstyler according to the invention.

In an electrical hairstyler according to the invention, comprising a carrier element and a covering element detachably connected to each other, it is advantageous when the carrier element and the covering element are connected to the handle during operation, and are detachable from the handle only in attachment to each other. A possibly dangerous

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situation arises when one of the respective elements should stay attached to the handle after the other part has been detached. A user, wanting to clean both elements after use of the hairstyler with additive, can clean the one loose part safely with for example water. The handle with the power supply means, to which the other part is still attached, should not come
5 into contact with liquids because it accidentally could still be plugged in. When the carrier element and the covering element can only be detached from the handle when they are attached to each other, the elements can both be cleaned individually only after detaching them from the handle with electric components. This benefits the safety of use of the device.

It is advantageous, when the covering element comprises a tongue, which fits
10 in a slot in the carrier element and which is fastened in said slot by the handle as long as the carrier element is connected with the handle. Only after detaching both the carrier element and the covering element from the handle, the tongue of the covering element is no longer fixed in the slot in the carrier element by the handle, and can be disengaged from the carrier element.

15 An embodiment of an electrical hairstyler according to the invention is characterized in that the handle comprises a fan unit and the base part comprises air transport channels extending from the handle to air outlets provided in the base part. The styling of hair by means of air, such as blowing hot or cold air or both, is thus combined with the even distribution of additive over the hair into a hairstyler, which offers a good hair styling
20 performance.

The invention will be described in more detail hereinafter with reference to the drawings, in which

25 Figure 1 shows a schematic side view of an electrical hairstyler according to the invention comprising a first embodiment of a device for applying an additive to hair according to the invention,

Figure 2 shows a schematic view of a cross section of the electrical hairstyler taken on the line II-II in Figure 1,

30 Figure 3 shows a schematic view of a cross section of the electrical hairstyler taken on the line III-III in Figure 1,

Figure 4a shows a perspective view of a carrier element and a covering element of a second embodiment of a device for applying an additive to hair according to the invention,

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Figure 4b schematically shows a part of the carrier element of Figure 4a,

Figure 5 shows an exploded view of a carrier element and a covering element of a third embodiment of a device for applying an additive to hair according to the invention,

Figure 6a shows a schematic view of a detachable connection of a carrier element and a covering element of a fourth embodiment of a device for applying an additive to hair according to the invention with a handle of an electrical hairstyler according to the invention,

Figure 6b shows a part of the connection of Figure 6a in detail.

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Figure 1, 2 and 3 show a first embodiment of a device 1 for applying an additive to hair according to the invention, provided in an electrical hairstyler 41 according to the invention. The device 1 comprises a longitudinally extending base part 2 for making contact with the hair during operation, the base part 2 comprising a distribution system 3 for additive. In this embodiment, the base part 2 is provided with brush pins 62 on its entire outer circumferential surface. However, variations in elements and areas on the base part where these elements are provided are possible. Brush pins can also be provided on for example only one half of the outer circumferential surface of the base part 2, or in stead of pins, brush hairs can be provided. The distribution system 3 has an entrance 4 which is connected to an additive dispenser 5. The additive dispenser 5 in this embodiment contains a foam pump 51 and an additive container 52, which are schematically shown in Figure 2. The additive dispenser 5 can be of a type which is known per se, depending on the additive to be used. The distribution system 3 further has outlets 6 for applying the additive to the hair during operation. Between said entrance 4 and each outlet 6 a flow path 7, 7' is present, which flow path comprises at least one ramification 8. Said flow paths 7, 7' have, measured from the entrance 4 to each outlet 6, a substantially identical flow resistance. When during operation a user activates the device by pressing on a button 53 on the additive dispenser 5, foam is created by the foam pump 51 within the additive dispenser 5 and is directed to the entrance 4. From the entrance 4, foam flows through a central tube 33 which ends in the ramification 8. From this ramification 8, foam flows along the branches 27, 27' of the flow paths 7 and 7' to each outlet 6. The foam experiences a substantially identical flow resistance when flowing along these flow paths 7, 7' from the entrance 4 to each outlet 6. The foam thus reaches all outlets 6 practically simultaneously, and leaves said outlets 6 at a substantially equal flow rate. This results in an even distribution of the foam over the hair, which benefits a good

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hairstyling result. The base part 2 furthermore has a first end 23 on which a handle 24 is provided and a second end 25 on which the additive dispenser 5 is provided. A user can hold the hairstyler by the handle 24 with one hand, and bring the base part 2 easily into contact with the hair. Since the additive dispenser 5 is provided on the other end of the base part 2, the user still has easy access to the dispenser 5 for activating it by pressing on the button 53 with the other hand. The additive dispenser 5 can thus also easily be detached from the base part 2 for example to replace or to refill it.

The electrical hairstyler 41 further comprises power supply means 42. As can be seen in Figure 2 and 3, in this embodiment the handle 24 comprises a fan unit 43 and the base part 2 comprises air transport channels 44 extending from the handle 24 to air outlets 46 provided in the base part 2. The power supply means 42 and the fan unit 43 are of a type which is known per se, and are shown schematically here. The hair can thus be treated by means of hot or cold air, which is distributed from the fan unit 43 through the air transport channels 44 to the air outlets 46 and thus directed to the hair, as indicated in Figure 3 by the dotted arrows, as well as the hair can be treated by means of the foam. This foam, as indicated by the wrinkled arrows in Figure 3, is evenly distributed over the hair. A good hairstyling result can be achieved in this manner. The order in which air and foam are applied can be varied, and the foam applying function and the air applying function can also be used individually with the electrical hairstyler 41.

As can be seen in Figure 4a, in a second embodiment of a device 1' for applying an additive to hair according to the invention, the flow paths 7, 7' are provided as slots 9 on a cylindrical carrier element 10 which are covered by a cylindrical covering element 11. These slots 9 merge into openings 16, forming the outlets of the distribution system, in the covering element 11. The covering element 11 and the carrier element 10 are detachably connected to one another, which is further illustrated in Figure 6 and its description. The covering element 11 thus can be detached from the carrier element 10 after use, and the parts can be cleaned to remove possible residue of foam. This benefits a proper flow of foam through the distribution system 3 during a next use of the device 1. Figure 4b schematically shows a part of the carrier element 10 with the flow paths 7, 7', in a folded out view. As can be seen, the flow paths 7 and 7', indicated respectively with a dotted line and a continuous line, and each other flow path between the entrance 4 and one of the respective openings 16 comprise an identical sequence of flow channels 17 and 17', and flow channel ramifications 18, 28, and 18', 28'. Corresponding flow channels 17 and 17' of said sequences have identical lengths a,b,c,d,e and cross sections A,B,C,D,E, and corresponding flow

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channel ramifications 18 and 18', and 28 and 28', of said sequences have an identical number of branches. By applying this measure the flow resistance of the flow paths 7, 7' is kept substantially identical in a comparatively simple and reliable manner, while many variants can be created in an easy and cost-effective manufacture. The construction can thus be adapted to for instance the wanted number and position of outlets. As can be seen in Figure 4a, in this embodiment only one half of the circumferential area of the carrier element 10 is provided with slots 9, which merge into openings 16 correspondingly positioned on the covering element 11. It is noted that the additive dispenser 5 in this embodiment is provided in the same way as in the aforementioned embodiment, and is not further shown here.

Figure 5 shows a carrier element 20 and a covering element 11' of a third embodiment of a device 1" for applying an additive to hair according to the invention. In this embodiment the flow paths are provided as channels 19 provided in a longitudinally extending flat support 20. The channels 19 extend from the entrance 4 to hollow protuberances 21, which hollow protuberances 21 extend from a surface area 22 of said support 20 to the outlets 6, which are formed by openings 16 in the covering element 11'. The covering element 11' in this embodiment also serves to accommodate hairstyle elements such as pins, and to provide air outlets to the hair, so that the device is suitable for use in an electrical hairstyler with a fan unit. In this embodiment the covering element 11' and the carrier element 20 are also detachably connected to one another.

It is noted, that the second and third embodiment of the device 1 for applying an additive to hair according to the invention, provided with the additive dispenser 5 as described hereinbefore, can be used per se, or in combination with an electrical hairstyler. When the carrier element 10, 20 and the covering element 11, 11' are provided in an electrical hairstyler, the carrier element and the covering element are connected to the handle during operation. It is advantageous when these parts are detachable from the handle only in attachment to each other.

Figure 6a shows a schematic view of a detachable connection 90 of a carrier element 10' and a covering element 11" of a fourth embodiment of a device 1''' for applying an additive according to the invention, with the handle 24 of the electrical hairstyler 41 according to the invention. The parts of the carrier element 10' and the covering element 11" that are related to the distribution of additive are shown schematically. Figure 6b shows a detail of the connection 90 as enclosed in the dotted rectangular of Figure 6a. The covering element 11" comprises a tongue 91, which fits in a slot 92 in the carrier element 10' and which is fastened in said slot 92 as long as the carrier element 10' is connected with the

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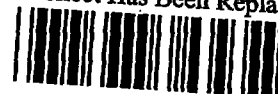
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handle 24. Only after the handle 24 and the assembly of the carrier element 10' and the covering element 11" are separated, as indicated with arrow 1, the covering element 11" can be detached from the carrier element 10', as indicated with arrow 2. When after use one of the elements should stay attached to the handle, which accommodates the electrical components, the element connected to the handle could be exposed to liquid during cleaning with the handle still being plugged in. This would lead to a dangerous situation for the user. Since in this preferred embodiment, these elements are detachable from one another only after detachment of both elements from the handle, both elements can be cleaned separately only after being detached from the handle and thus, also after operation, a safe handling of the device is secured.

It is observed, that because of the fact that each flow path has a substantially identical flow resistance from the entrance to each outlet in a device for applying an additive to hair according to the invention, additive originating during operation from the entrance and following the flow paths to each outlet, reaches all outlets practically simultaneously, and with an equal flow rate. As a result of this the additive is distributed evenly over the hair by the device, which benefits a good hairstyling result. It is noted that the substantially identical flow resistance of the flow paths can be obtained in varying ways. The flow paths can be given mutually differing lengths, cross sections and numbers of ramifications, as long as the resulting flow resistance of the flow paths from the entrance to each outlet stays substantially identical.

It is furthermore observed that the device for applying an additive to hair according to the invention is especially suitable for the even distribution of foam over the hair. However, said device is also suitable for an even distribution of other additives over the hair, for example hair lotion, hair tonic or hair conditioner. Also hair dyes, for which an even distribution over the hair is essential to have an optimal coloring effect on the hair, can be distributed advantageously over the hair with the device for applying an additive to hair according to the invention.

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CLAIMS:



1. A device (1) for applying an additive to hair, comprising
a longitudinally extending base part (2) for making contact with the hair
during operation, which base part (2) comprises a distribution system (3) for additive;
which distribution system (3) has an entrance (4) which is connected to an
5 additive dispenser (5), and which has outlets (6) for applying the additive to the hair during
operation;
characterized in that between the entrance (4) and each outlet (6) a flow path (7,7') is present,
which flow path comprises at least one ramification (8), said flow paths (7,7') having,
measured from the entrance (4) to each outlet (6), a substantially identical flow resistance.
- 10 2. A device for applying an additive to hair as claimed in Claim 1, characterized
in that the flow paths (7,7') each comprise an identical sequence of flow channels (17, 17')
and flow channel ramifications (18, 18', 28, 28'), corresponding flow channels (17, 17') of
said sequences having identical lengths (a,b,c,d,e) and cross sections (A,B,C,D,E) and
15 corresponding flow channel ramifications (18, 18', 28, 28') of said sequences having an
identical number of branches.
3. A device for applying an additive to hair as claimed in Claim 1, characterized
in that the flow paths (7,7') are provided as slots (9) on a cylindrical carrier element (10)
20 which are covered by a cylindrical covering element (11), and which merge into openings
(16) in the covering element (11).
4. A device for applying an additive to hair as claimed in Claim 3, characterized
in that the carrier element (10) and the covering element (11) are detachably connected to
25 each other.
5. A device for applying an additive to hair as claimed in Claim 1, characterized
in that the flow paths (7,7') are provided as channels (19) provided in a longitudinally
extending flat support (20), which channels (19) extend from the entrance (4) to hollow

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protuberances (21), which hollow protuberances (21) extend from a surface area (22) of said support (20) to the outlets (6).

6. A device for applying an additive to hair as claimed in Claim 1, characterized in that the base part (2) has a first end (23) on which a handle (24) is provided and a second end (25) on which the additive dispenser (5) is provided.

7. An electrical hairstyler 41 comprising means for power supply (42) and a handle (24'), and comprising a device (1) for applying an additive to hair, which device (1) comprises a longitudinally extending base part (2) for making contact with the hair during operation, which base part (2) comprises a distribution system (3) for additive, which distribution system (3) has an entrance (4) which is connected to an additive dispenser (5), and which has outlets (6) for applying the additive to the hair during operation, characterized in that said device (1) for applying an additive to hair is a device as claimed in any of the Claims 1 to 6.

8. An electrical hairstyler as claimed in Claim 7, comprising a device for applying an additive to hair as claimed in Claim 4, characterized in that the carrier element (10') and the covering element (11'') are connected to the handle (24) during operation, and are detachable from the handle (24) only in attachment to each other.

9. An electrical hairstyler as claimed in Claim 8, characterized in that the covering element (11'') comprises a tongue (91), which fits in a slot (92) in the carrier element (10') and which is fastened in said slot (92) as long as the carrier element (10') is connected with the handle (24).

10. An electrical hairstyler as claimed in Claim 7, characterized in that the handle (24') comprises a fan unit (43) and the base part (2) comprises air transport channels (44) extending from the handle (24') to air outlets (46) provided in the base part (2).



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