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(54) Hair styling electrical apparatus

(57) The invention relates to a hair styling apparatus (1) comprising two handles (10, 20) and two styling elements (30, 40), respectively coupled with the two handles (10, 20), at least one of the two styling elements (30, 40) comprising a heating element, wherein the hair styling apparatus (1) comprises at least one mobile element (44, 46) hinged to at least one of the two styling elements (30, 40) and a mechanism (47) adapted to move said mobile element (44, 46) along a transversal direction, perpendicular to a longitudinal axis of said at least one of the two styling elements (30, 40).

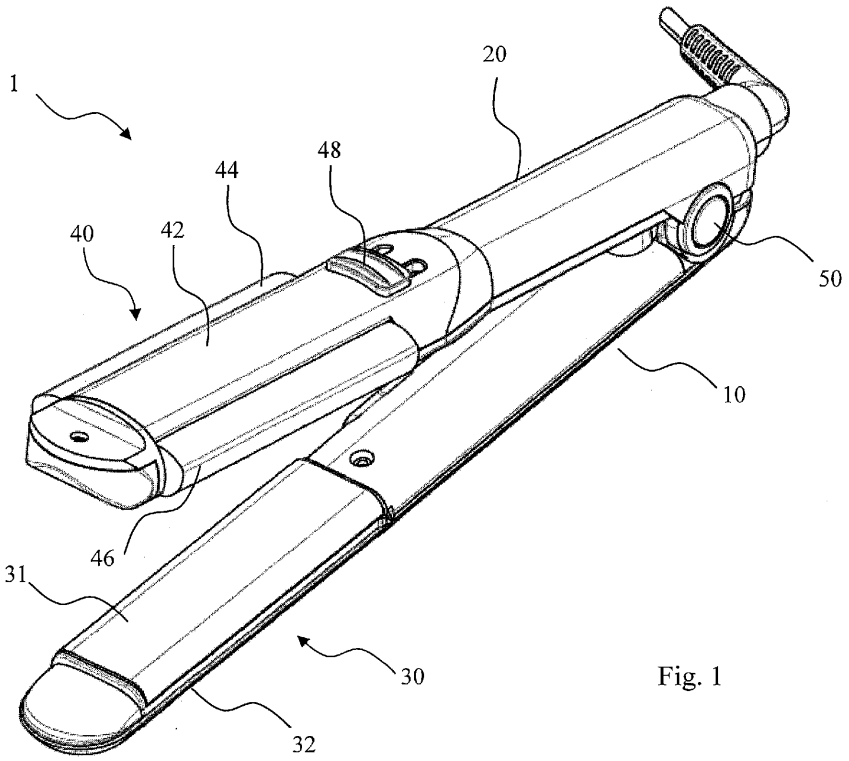

Fig. 1

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Description

[0001] The present invention relates to a hair styling electrical apparatus.

[0002] In particular, the present invention refers to an electrical apparatus for straightening, curling, waving, volumizing hair, or the like.

[0003] EP 2 165 620 describes a hair iron comprising two arms with two heating elements. Each heating element has one flat surface and a rear surface with a styling curved part. The hair iron also comprises an auxiliary element that can be attached or detached to/from the styling curved part so as to change the degree of curvature with which the hair is styled.

[0004] CN 2667947 describes a multifunctional device for styling hair having comb sleeves of different types which are interchangeable so as to straighten or curl hair.

[0005] The Applicant has faced the technical problem of making an improved hair styling apparatus with respect to known apparatuses.

[0006] In a first aspect the present invention thus relates to a hair styling apparatus comprising:

- two handles that are connected together so as to allow the apparatus to be opened and closed by respectively bringing said handles away and closer to each other,

- two styling elements, respectively coupled with the two handles, at least one of the two styling elements comprising a heating element,

wherein the hair styling apparatus comprises at least one mobile element that is hinged to at least one of the two styling elements and a mechanism that is adapted to move said mobile element along a transversal direction, which is perpendicular to a longitudinal axis of said at least one of the two styling elements.

[0007] The Applicant has found that such a solution allows the hair styling apparatus to style hair in different operation conditions, corresponding to different operation positions of said mobile element along said transversal direction, which enable to obtain different styling effects (such as, straight, wavy, soft curls, thick curls, volume at the roots and the like). This without requiring the use of additional accessory elements.

[0008] In the present description and claims, by operation position it is meant a position in which the mobile element is adapted to interact with the hair when the apparatus is in operation.

[0009] The dependent claims refer to particularly advantageous embodiments of the apparatus of the invention.

[0010] Advantageously, said mechanism is a control mechanism that is configured so as to move said mobile element along said transversal direction.

[0011] Preferably, said mechanism is configured so as to move said mobile element along said transversal direction between a first operative position in which the styling element has a transverse extension L1 and a second operative position in which the styling element has a transverse extension L2, where L2 > L1.

[0012] Advantageously, said mechanism is adapted to move said mobile element along said transversal direction in two opposite directions respectively towards and away from said at least one of the two styling elements.

[0013] Advantageously, said at least one mobile element is hinged to said at least one of the two styling elements at two ends of said at least one mobile element.

[0014] Advantageously, said at least one mobile element has an elongated shape.

[0015] Advantageously, said at least one mobile element extends longitudinally in said apparatus according to a direction that is parallel to said longitudinal axis of said at least one of the two styling elements.

[0016] Preferably, said at least one mobile element has a longitudinal axis. Preferably said longitudinal axis is parallel to the longitudinal axis of said at least one of the two styling elements. Preferably, said at least one mobile element is hinged to said at least one of the two styling elements along a hinging axis that is eccentric with respect to the longitudinal axis of the mobile element. Preferably, the hinging axis is parallel to the longitudinal axis of the mobile element. Preferably, the hinging axis is parallel to the longitudinal axis of said at least one of the two styling elements. Preferably, the hinging axis is eccentric with respect to the longitudinal axis of said at least one of the two styling elements.

[0017] Said at least one mobile element can have an outer surface which is smooth or toothed or wavy.

[0018] In one embodiment, said at least one mobile element has a rounded outer side surface.

[0019] Said at least one mobile element can have a substantially curved cross section, like for example circular, elliptical or helicoidal.

[0020] In one embodiment, a longitudinal side portion of said at least one of the two styling elements to which the mobile element is coupled has a longitudinal opening. Advantageously, said at least one mobile element is coupled to said at least one of the two styling elements at said at least one longitudinal opening. In one preferred embodiment, said at least one mobile element is housed in said at least one of the two styling elements so as to have a portion of outer surface that comes out from said at least one longitudinal side opening.

[0021] Advantageously, the aforementioned mechanism is housed in said at least one of the two styling elements. Preferably, said mechanism is mobile along a longitudinal direction, which is parallel to said longitudinal axis of said at least one of the two styling elements. In one preferred embodiment, said mechanism is a slide mechanism.

[0022] Preferably, the apparatus comprises an actuator that is adapted to move said mechanism along said longitudinal direction, in the two opposite directions. Advantageously, said actuator is adapted to be moved by

a user. Advantageously, said actuator is arranged outside the apparatus.

[0023] Advantageously, said actuator is also adapted to lock said mechanism in different operation positions along said longitudinal direction, corresponding to different operation positions of said at least one mobile element, along said transversal direction.

[0024] In one preferred embodiment, the hair styling apparatus comprises two mobile elements that are hinged to said at least one of the two styling elements. In this case, said mechanism is adapted to move both the mobile elements along said transversal direction. Advantageously, the two mobile elements are hinged to said at least one of the two styling elements, at two opposite side portions.

[0025] In another embodiment, the hair styling apparatus comprises a pair of mobile elements for each of the two styling elements.

[0026] Advantageously, the apparatus is electrical.

[0027] Advantageously, said heating element is connected to an electrical power supply that is located in the respective handle.

[0028] Further characteristics and advantages of the apparatus of the present invention shall become clearer from the following detailed description of some preferred embodiments thereof, given only as an example and not for limiting purposes with reference to the attached drawings. In such drawings,

- figure 1 is a perspective view of a hair styling apparatus according to a first embodiment of the present invention;
- figure 2 is a perspective view of the upper arm of the apparatus of figure 1, without mobile elements;
- figure 3 is a perspective view of two mobile elements and of a mechanism for moving the apparatus of figure 1;
- figure 4 is a perspective view of the upper arm of the apparatus of figure 1, without the upper portion of the styling element;
- figure 5a is a perspective view of the upper arm of the apparatus of figure 1, with the mobile elements in a first operative position;
- figure 5b shows a cross section of the arm of figure 5a;
- figure 6a is a perspective view of the upper arm of the apparatus of figure 1, with the mobile elements in a second operative position;
- figure 6b shows a cross section of the arm of figure 6a;
- figure 7 is a perspective view of an arm, without the upper portion of the styling element, of a second embodiment of the apparatus of the invention;
- figure 8a shows a perspective view of the arm of the second embodiment of the apparatus of the invention of figure 7, with the mobile elements in a first operative position;
- figure 8b shows a cross section of the arm of figure 8a;
- figure 9a shows a perspective view of the arm of figure 8a, with the mobile elements in a second operative position;
- figure 9b shows a cross section of the arm of figure 9a.

[0029] Figure 1 shows an embodiment of an apparatus 1 for styling hair according to the invention.

[0030] The apparatus 1 comprises two arms comprising two handles 10, 20 (shown in figure 1 in the open position) and two styling elements 30, 40.

[0031] The two handles 10,20 are connected together at one end by a hinge 50. The hinge 50 allows the two handles 10, 20 to rotate around a hinging axis (not shown), from an open position to a closed position of the apparatus 1.

[0032] The two handles 10, 20 and the two styling elements 30, 40 can be made in two respective single pieces or they can be fixed to one another (for example through screws, welding or the like).

[0033] At least one of the styling elements 30, 40, preferably both of them, comprises a heating element (not shown) inside it.

[0034] The two styling elements 30, 40 each comprise a lower portion 31, 41, with an outer surface that is substantially flat, on the inside of the apparatus 1, and an upper portion 32, 42 with an outer surface that is substantially curved, on the outside of the apparatus 1.

[0035] The substantially flat outer surfaces of the lower portions 31, 41 are advantageously adapted to cooperate with one another for holding the hair during styling, when the handles 10, 20 are in the closed position.

[0036] The lower portions 31, 41 are advantageously made from thermally conductive material so as to optimise the transfer of heat from the heating element to the hair to be styled.

[0037] The upper portions 32, 42 are preferably made from insulating material so as to avoid accidentally burning the user.

[0038] In the illustrated embodiment, the upper portions 32, 42 have a smooth outer surface. However, they could also have a wavy outer surface or an outer surface that is provided with ribs or protuberances, so as to better guide the hair during styling.

[0039] The heating element can be of the resistive

type, PTC (positive temperature coefficient heater), of the ceramic resistance type (ceramic heater), of the wire type, of the infrared type or the like.

[0040] The heating element is adapted to be connected to electric wires (not shown in the figures), present in the handle 10 and/or 20.

[0041] Although it is not shown in the figures, the apparatus 1 is advantageously adapted to be connected to a supply lead for connecting to the electric mains and for providing electrical energy to the heating element through the aforementioned electric wires inside the handle 10 and/or 20.

[0042] The apparatus 1 also advantageously comprises adjustment means (not shown) for adjusting the temperature of the heating element/s. Such adjustment means can be made according to techniques well known in the art.

[0043] In the embodiment of figure 1, the apparatus 1 also comprises two mobile elements 44, 46 at one of the two styling elements 40.

[0044] It should be noted that even if in the figures the mobile elements 44, 46 are associated with the upper styling element 40, they could also be associated with the lower styling element 30.

[0045] The styling element 40 has two opposite longitudinal side openings 43 (of which one is visible in figure 2).

[0046] As shown in figures 4-6, the mobile elements 44, 46 are housed inside the styling element 40 and come out from it at the two opposite longitudinal side openings 43.

[0047] The surface portion of the mobile elements 44, 46 which projects from the two opposite longitudinal side openings 43 completes the outer surface of the upper portion 42 of the styling element 40. In the embodiment illustrated in figures 1-6, the mobile elements 44, 46 have a curved shape the section of which defines an even and continuous joint between the lower portion 41 and the upper portion 42, obtaining the best possible compromise in the various operation positions in which the mobile elements 44, 46 can be moved.

[0048] All the operation positions ensure a compact apparatus, which facilitates hair styling operations.

[0049] The mobile elements 44, 46 can be made from different materials, plastic, aluminium, plastic coated in aluminium or the like.

[0050] As shown in figure 3, the two mobile elements 44, 46 have two ends that are equipped with pins 45 that are hinged to the styling element 40. Advantageously, the two mobile elements 44, 46 are hinged to the styling element 40 along a respective hinging axis I-I which is eccentric with respect to the longitudinal axis L-L of the mobile element 44, 46 (for the sake of clarity of illustration, only the hinging axis I-I and the longitudinal axis L-L of the mobile element 46 are shown in figure 3).

[0051] As shown in figures 3 and 4, the apparatus 1 also comprises a movement control mechanism 47 at the styling element 40 to which the two mobile elements 44, 46 are associated.

[0052] Said mechanism 47 is operatively coupled to the two mobile elements 44, 46 so as to move them along a transversal direction T-T, that is perpendicular to the longitudinal axis Y-Y of the styling element 40.

[0053] Advantageously, said mechanism 47 is a mechanism of the slide type that is adapted to move forwards and backwards, according to a rectilinear movement along a direction that is parallel to the longitudinal axis Y-Y of the styling element 40.

[0054] In the illustrated embodiment, the slide mechanism 47 is housed inside the styling element 40, between the two mobile elements 44, 46.

[0055] In virtue of the fact that the two mobile elements 44, 46 are forced to rotate through hinging to the styling element 40, during the forward and backward movement of the mechanism 47, the mobile elements carry out rotations in opposite directions around their hinging axis I-I.

[0056] As visible in figure 3, the slide mechanism comprises shaped tracks 49 that are adapted to cooperate with anchoring pins 49' that are located on the mobile elements 44, 46. In particular, the forward and backward movement of the mechanism 47 make the anchoring pin 49' slide along the shaped tracks 49.

[0057] Although it is not illustrated, the slide mechanism 47 can be made according to alternative embodiments that exploit known principles of the state of the art such as worm screws or cam systems, wedge systems, or levers in general.

[0058] Advantageously, the mechanism 47 is adapted to move forwards and backwards along a predetermined stroke. At the start of the stroke, the mechanism 47 interacts with the mobile elements 44, 46, so that they are in a first operative position; at the end of the stroke, the mechanism 47 interacts with the mobile elements 44, 46 so that they are in a second operative position; in intermediate positions between the stroke limits, the mechanism 47 interacts with the mobile elements 44, 46 so that they are in intermediate operative positions (not shown) between the first and the second position.

[0059] As shown in figure 5b, in the first operative position, the mobile elements 44, 46 are in abutment against the portion of upper inner surface 41a of the lower portion 41 of the styling element, which substantially projects along a longitudinal plane, that is parallel to the longitudinal axis Y-Y of the styling element. As shown in figure 6b, in the second operative position, the mobile elements are rotated, with respect to the first operative position, around the respective hinging axis I-I, until they abut against the inner side surface portion 42b of the upper portion 42 of the styling element.

[0060] As shown in figures 5a, 5b, 6a, 6b, when the mobile elements 44, 46 are in the first operative position, the styling element 40 has a transverse extension L1, along the axis T-T, that is shorter than the transverse extension L2 it has when the mobile elements 44, 46 are in the second operative position. When the mobile elements 44, 46 are in an intermediate operative position,

the styling element 40 has a transverse extension that is comprised between 11 and L2.

[0061] In the illustrated embodiments, the transverse extension L2 is longer than the transverse extension of the outer shape of the upper portion 42 of the styling element 40.

[0062] In the preferred embodiments illustrated, the axis T-T is, as an example, perpendicular to the longitudinal middle plane containing the longitudinal axis Y-Y of the styling element.

[0063] The mechanism 47 can be moved by a user by means of an actuator 48 (for example a slider) of the apparatus 1. For example, the actuator 48 can be positioned on the upper portion 42 of the styling element 40 or in any other useful position.

[0064] Advantageously, the actuator 48 is operatively coupled with said mechanism 47 so as to allow, according to known methods (for example through special knurling), the mechanism 47 to be locked in different operative positions, corresponding to the different operative positions of the two mobile elements 44, 46.

[0065] By acting on the actuator 48, a user can move the mobile elements 44, 46 according to the desired hair style. For example, in the case in which the hair is straightened, the user can use the apparatus 1 in the first operative position. In order to make the hair curled or wavy, the user can use the apparatus 1 in one between the first and the second operative position or in an intermediate operative position so as to obtain smaller or wider curls or waves.

[0066] With a single apparatus, the user can thus obtain different styling effects by simply moving the mobile elements 44, 46 in different operative positions, without requiring the use of auxiliary accessory elements.

[0067] As shown in figures 5a, 6a, 5b and 6b, thanks to the use of the two mobile elements 44, 46 that are hinged to the styling element 40, the apparatus 1 according to the invention ensures that the working surface of the styling element 40, intended to come into contact with the hair (formed by the outer substantially curved surface of the upper portion 42, by the outer substantially flat surface of the lower portion 41 and by the surface exposed to the outside of the mobile elements 44, 46), -in the various operative positions of the mobile elements 44, 46- maintains a continuous profile, without sharp edges or gaps which could otherwise mark or ruin the hair during use. Moreover, the configuration described above of the apparatus 1 according to the invention enables to maintain a compact size so as to be easy to use in every operation position.

[0068] Although in the embodiment illustrated in figures 1-6, the mobile elements 44, 46 have an elongated shape with a substantially curved section, they can also have a different shape.

[0069] For example, figures 7-9 show an embodiment of the apparatus 1 which is completely similar to the one described above except for the fact that the mobile elements 44, 46 are comb-shaped.

[0070] Figures 8a and 8b show a situation in which the mobile elements 44, 46 are in a first operative position whereas figures 9a and 9b show a situation in which the mobile elements 44, 46 are in a second operative position.

[0071] When the mobile elements 44, 46 are in the second operative position or in an intermediate operative position, the teeth of the comb project from the styling element 40. The projection thus created enables to raise the hair at the root and, after having rotated the apparatus by a certain number of degrees, enables to come down in an even way on the hair creating a more voluminous smooth effect.

[0072] Although it is not illustrated in detail, the invention also comprises the case in which the apparatus 1 comprises a single mobile element that is associated with one of the two styling elements 30, 40; the case in which there are two mobile elements respectively associated with the two styling elements 30, 40; or the case in which there are two pairs of mobile elements that are associated with the two styling elements 30, 40; wherein the mobile elements can be the same as or different from one another.

[0073] From the above description, it will be clear that the invention in its various aspects enables to obtain an apparatus that is compact, practical to use and versatile.

[0074] In particular, with respect to known apparatuses equipped with auxiliary accessory elements, the apparatus of the invention enables to obtain many hairstyles with a single apparatus.

[0075] Moreover, in the apparatus of the invention, since the mobile elements are housed directly inside the styling element, they are heated in a better way with respect to the auxiliary accessory elements of known apparatuses which are applied outside. This ensures that the heat is better transferred to the hair and that there is a more effective end result.

Claims

1. Hair styling apparatus (1) comprising:

- two handles (10, 20) connected together so as to allow the apparatus (1) to be opened and closed by respectively bringing said handles (10, 20) away and close to each other,
- two styling elements (30, 40), respectively coupled with the two handles (10, 20), at least one of the two styling elements (30, 40) comprising a heating element,

wherein the hair styling apparatus (1) comprises at least one mobile element (44, 46) hinged to at least one of the two styling elements (30, 40) and a mechanism (47) adapted to move said mobile element (44, 46) along a transversal direction (T-T), perpendicular to a longitudinal axis (Y-Y) of said at least

one of the two styling elements (30, 40).

2. Apparatus (1) according to claim 1, wherein said mechanism (47) is adapted to move said at least one mobile element (44, 46) along said transversal direction (T-T) in two opposite directions, respectively towards and away from said at least one of the two styling elements (30, 40).

3. Apparatus (1) according to claim 1 or 2, wherein said at least one mobile element (44, 46) is hinged to said at least one of the two styling elements (30, 40) at two ends of said at least one mobile element (44, 46).

4. Apparatus (1) according to claim 3, wherein said at least one mobile element (44, 46) is hinged to said at least one of the two styling elements (30, 40) along a hinging axis (I-I) that is eccentric with respect to a longitudinal axis (L-L) of said at least one mobile element (44, 46).

5. Apparatus (1) according to any one of claims 1 to 4, wherein said at least one mobile element (44, 46) has an outer surface which is smooth or toothed or wavy.

6. Apparatus (1) according to any one of claims 1 to 5, wherein said at least one mobile element (44, 46) has a substantially curved cross section.

7. Apparatus (1) according to any one of claims 1 to 6, wherein a longitudinal side portion of said at least one of the two styling elements (30, 40) with which said at least one mobile element (44, 46) is coupled has a longitudinal opening (43).

8. Apparatus (1) according to claim 7, wherein said at least one mobile element (44, 46) is housed in said at least one of the two styling elements (30, 40) at said at least one longitudinal opening (43), so as to have a portion of outer surface protruding from said at least one longitudinal opening (43).

9. Apparatus (1) according to any one of claims 1 to 8, wherein said mechanism (47) is mobile along a longitudinal direction, parallel to the longitudinal axis (Y-Y) of said at least one of the two styling elements (30, 40).

10. Apparatus (1) according to any one of claims 1 to 9, comprising two mobile elements (44, 46) hinged to said at least one of the two styling elements (30, 40).

11. Apparatus (1) according to any one of claims 1 to 10, wherein the mechanism (47) is configured so as to move said mobile element (44, 46) along said transversal direction (T-T) between a first operative position wherein said at least one of the two styling elements (30, 40) has a transverse extension L1 and a second operative position wherein said at least one of the two styling elements (30, 40) has a transverse extension L2, where L2 > L1.

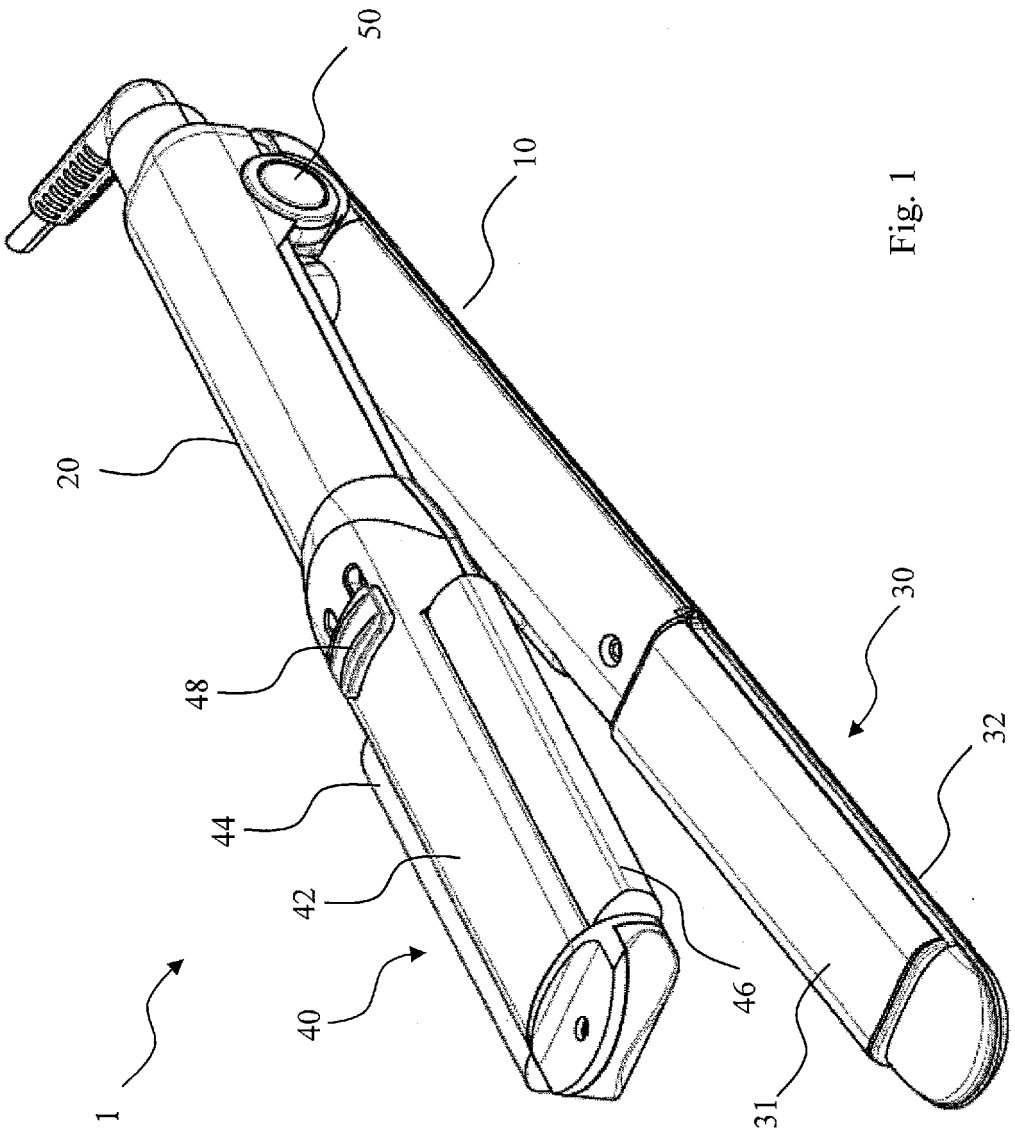

Fig. 1

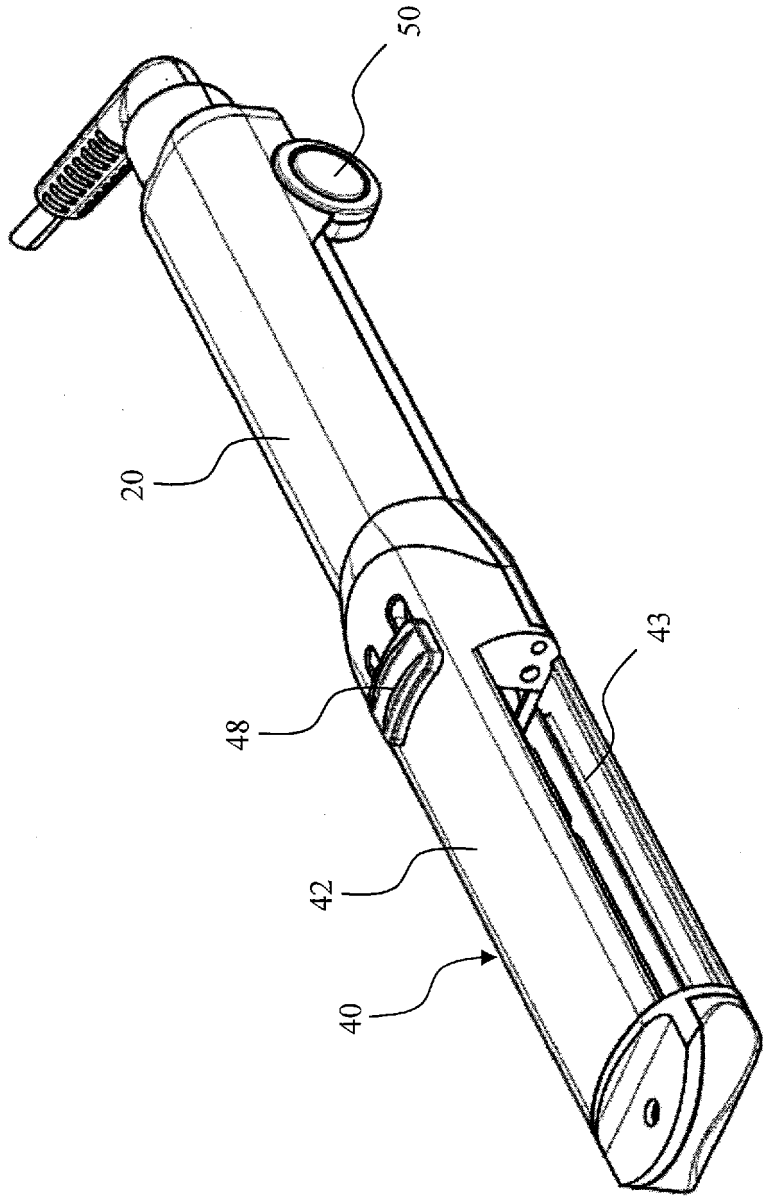

Fig. 2

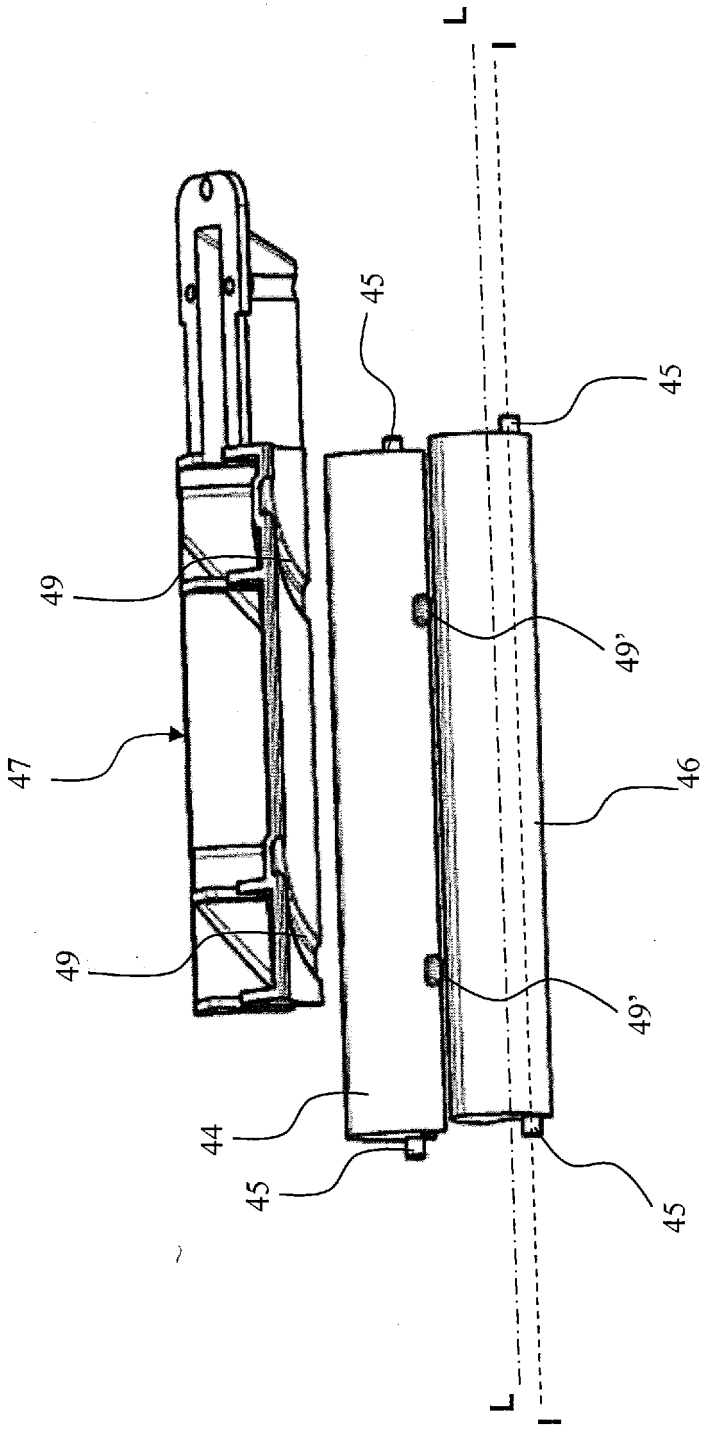

Fig. 3

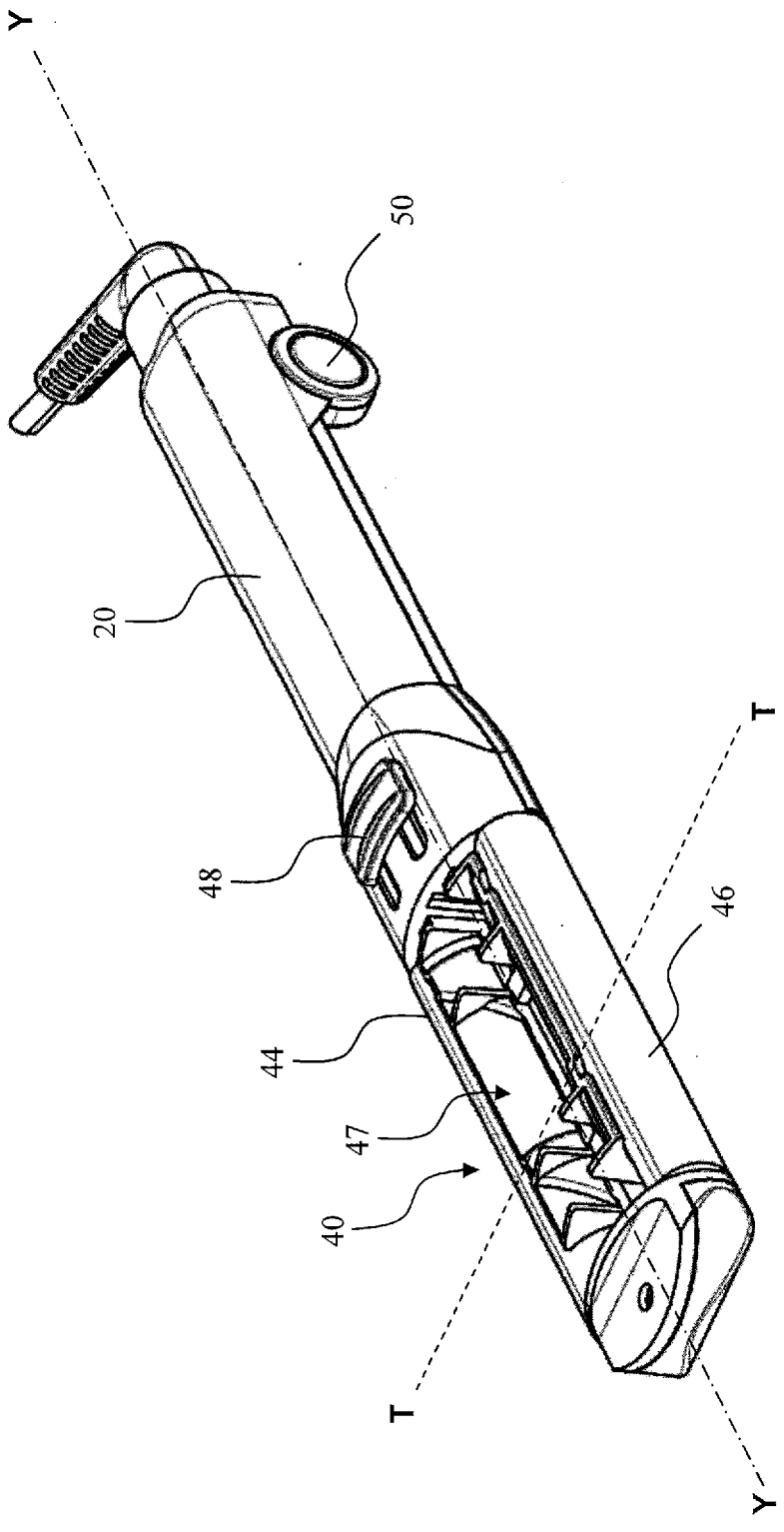

Fig. 4

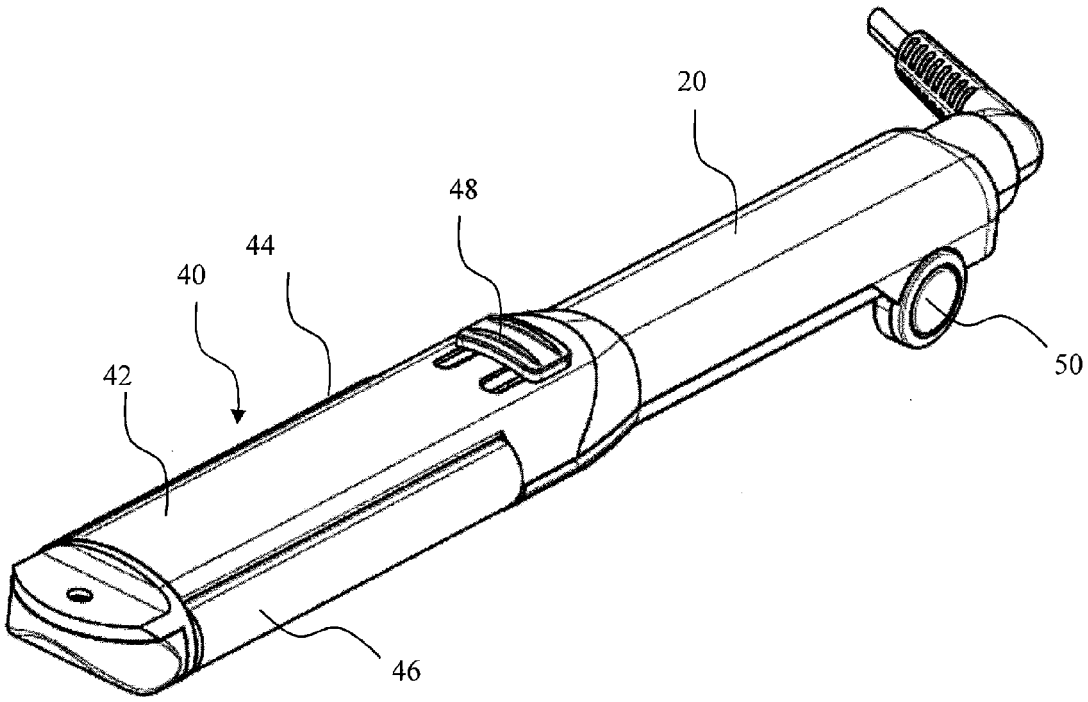

Fig. 5a

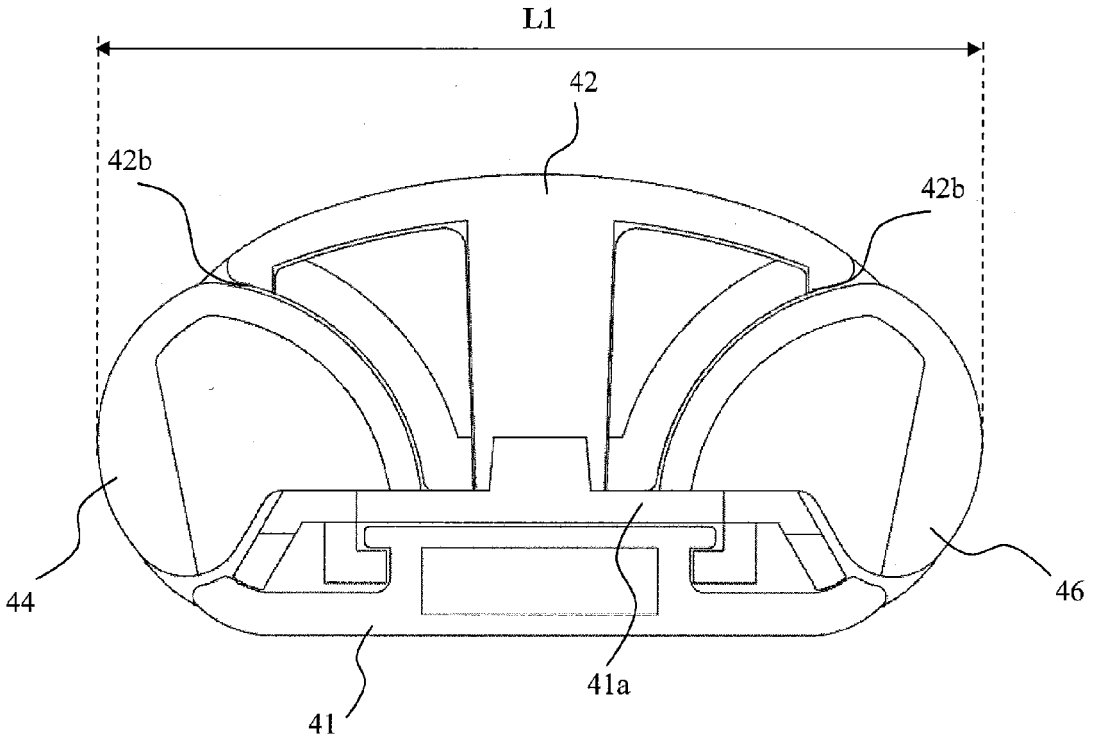

Fig. 5b

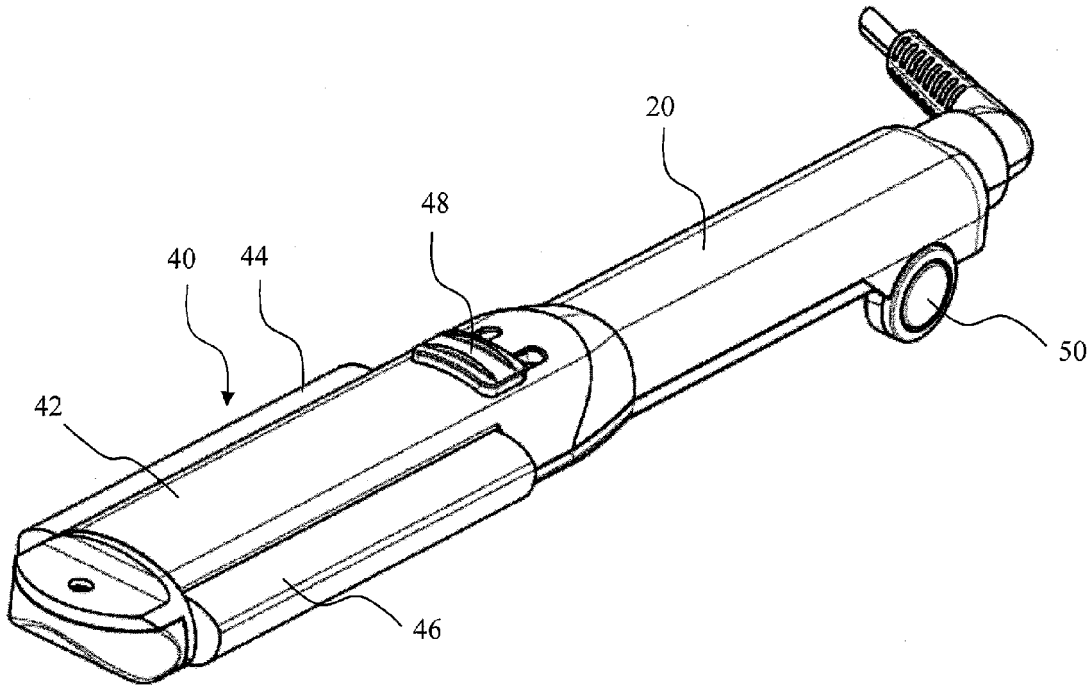

Fig. 6a

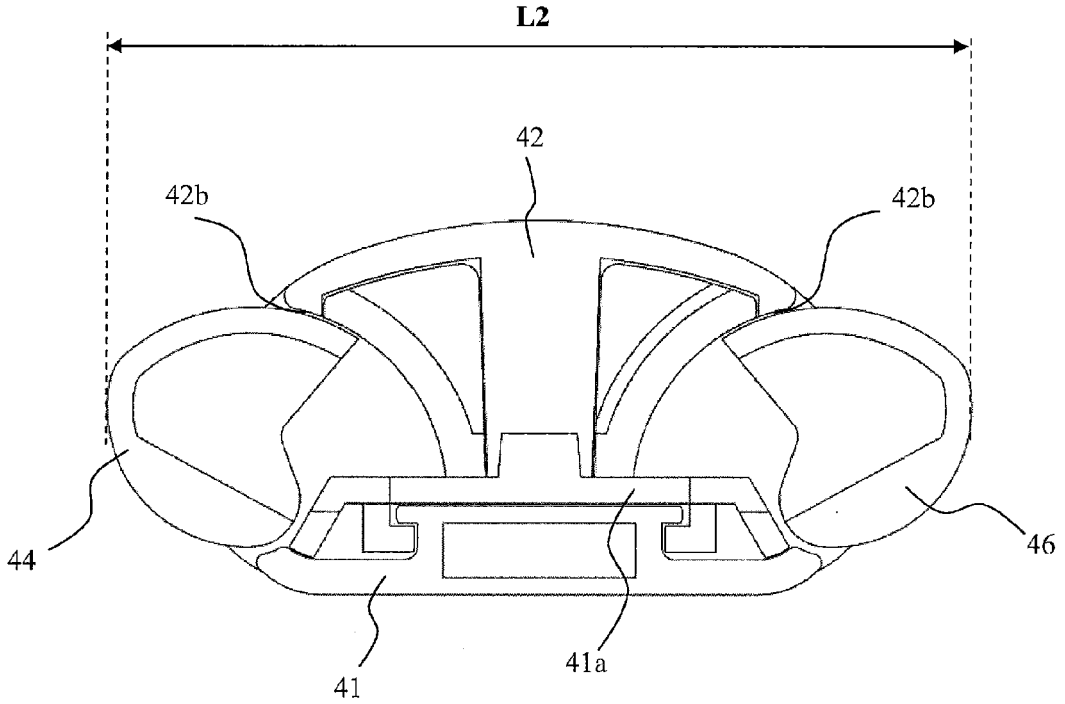

Fig 6b

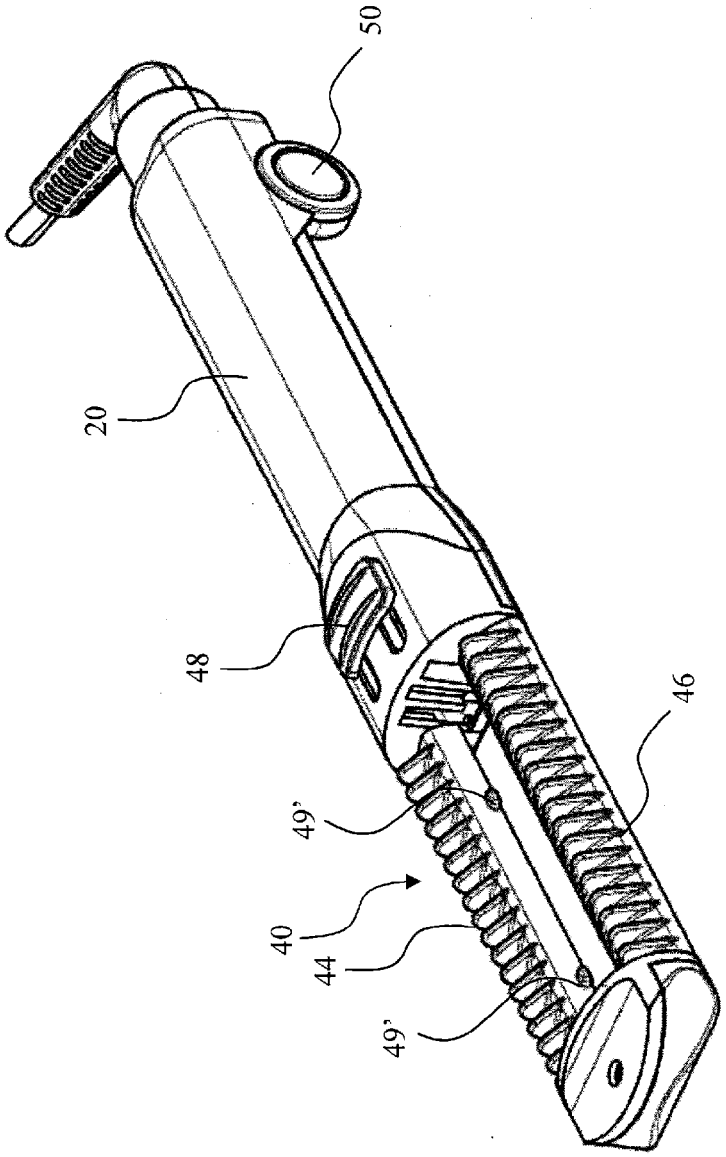

Fig. 7

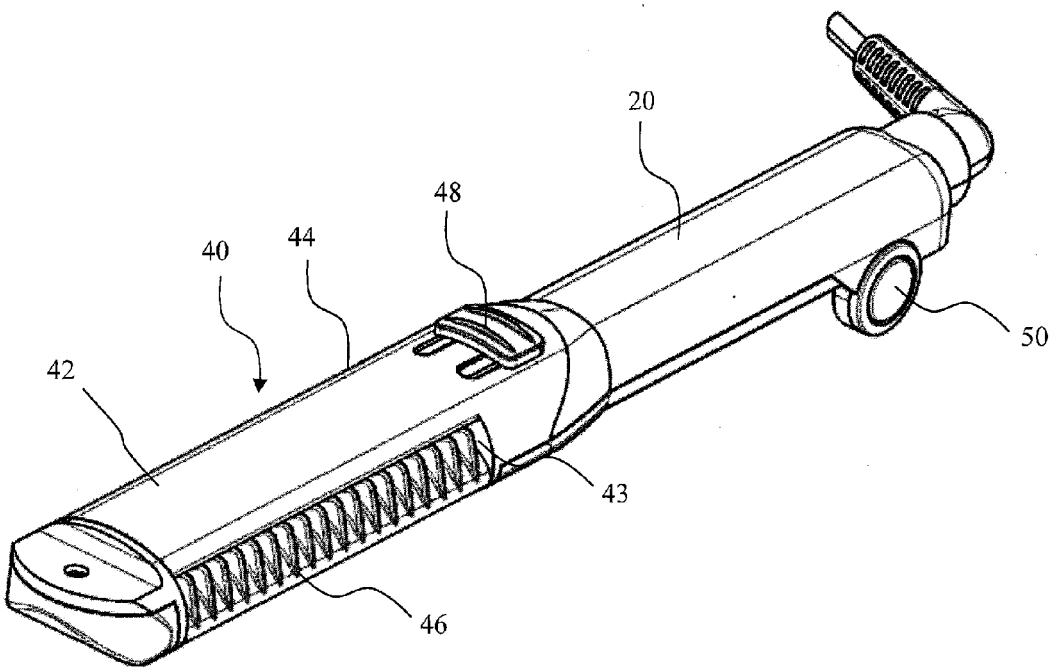

Fig. 8a

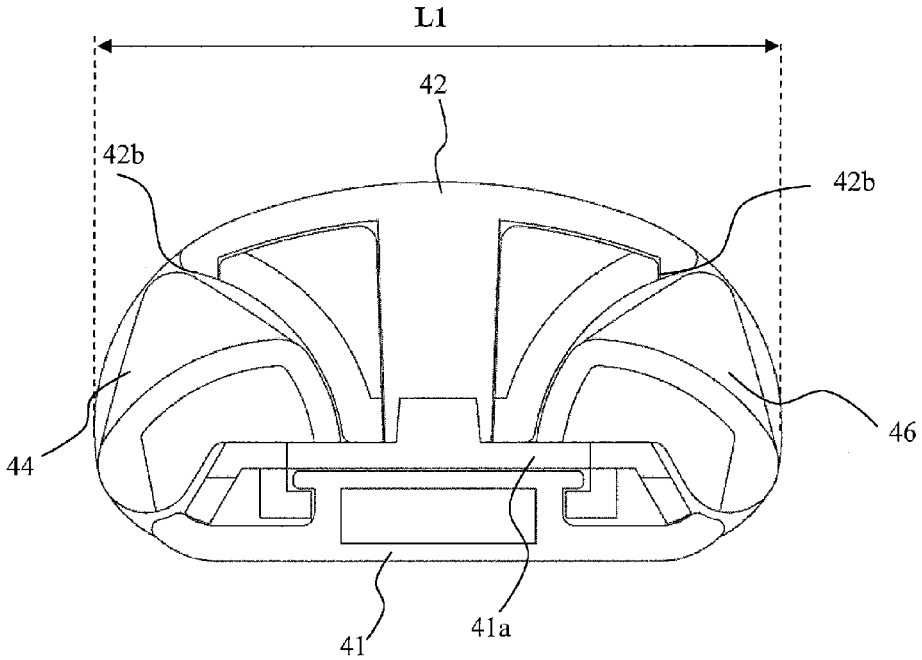

Fig 8b

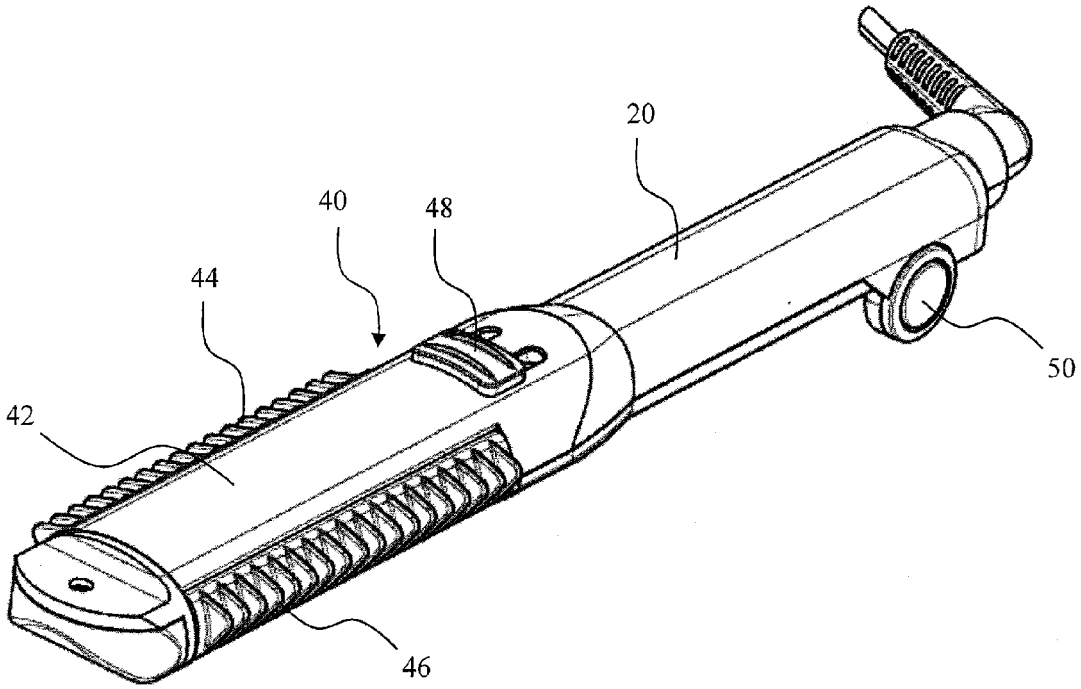

Fig. 9a

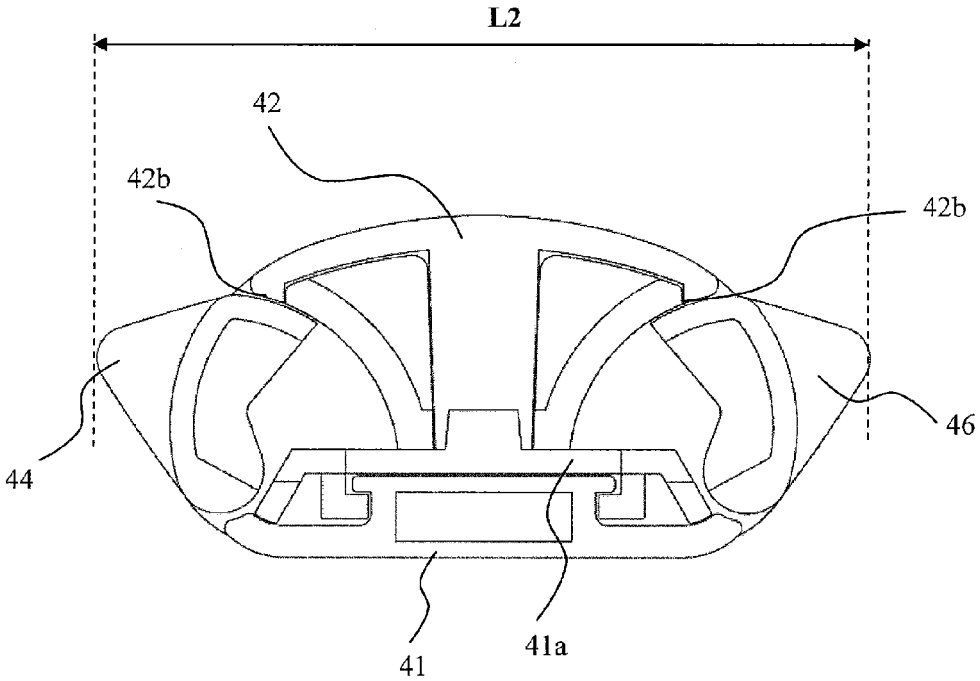

Fig. 9b

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EUROPEAN SEARCH REPORT

Application Number
EP 13 15 5176

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	WO 2006/099522 A2 (DICKSON INDUSTRIAL CO LTD) 21 September 2006 (2006-09-21) * page 7, lines 10-19 * * figures 5,5A,5B * -----	1-8,10, 11	INV. A45D1/04 A45D2/00 A45D1/06
A	WO 2011/055116 A2 (JEMELLA LTD) 12 May 2011 (2011-05-12) * page 4, line 10 - page 5, line 10 * * figures 3a,c * -----	1	

TECHNICAL FIELDS SEARCHED (IPC)

A45D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	20 June 2013	Witkowska-Piela, A

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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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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20-06-2013

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2006099522 A2	21-09-2006	CN 101141896 A	12-03-2008
		EP 1858364 A2	28-11-2007
		US 2006207625 A1	21-09-2006
		US 2008216859 A1	11-09-2008
		WO 2006099522 A2	21-09-2006
WO 2011055116 A2	12-05-2011	EP 2496110 A2	12-09-2012
		GB 2476450 A	29-06-2011
		US 2012272994 A1	01-11-2012
		WO 2011055116 A2	12-05-2011

EPO FORM P0459

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Patent documents cited in the description

- EP 2165620 A **[0003]**
- CN 2667947 **[0004]**