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(54) **ARRANGEMENT FOR PROVIDING SELF OPENING AND CLOSING OF FRAMES OF A DEVICE FOR HAIRSTYLING**

(57) An arrangement (1) for self-opening or closing of a pair of frames (2) of a device (3) for hairstyling, the pair of frames (2) are physically coupled to each other to be either in a first position (4) or a second position (5), wherein the frames (2) are adapted to press against each other in the first position (4), and to be placed at a distance from each other in the second position (5), at least one of the frames (2) comprising a heating plate (6), such that whenever any object (7) is in contact to the heating plate (6) and the frames (2) are in the first position (4), the

object (7) gets heated and pressed. The arrangement (1) comprises a sensing unit (8) adapted to sense presence of the object (7) between the pair of the frames (2), and to generate a presence data (9), a processor (10) adapted to receive and process the presence data (9), and to generate a first position signal (11), and an automation means (12) coupled to the pair of frames (2), adapted to receive the first position signal (11), and to move the pair of frames (2) to be in the first position (4).

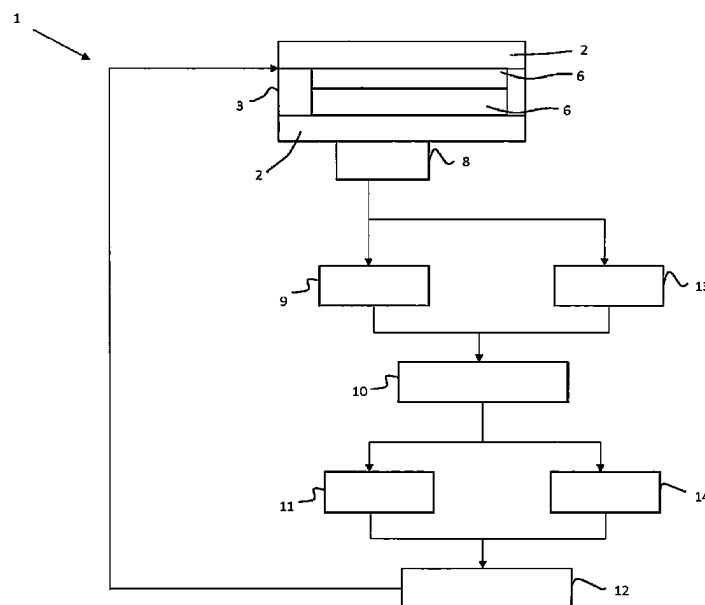


Fig 1

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Description

[0001] This invention refers to an arrangement for self-opening or closing of a pair of frames of a device for hairstyling according to claim 1, a device for hairstyling according to claim 10, and a method for making an arrangement for self-opening or closing of the pair of frames of a device for hairstyling according to claim 11.

Background of the Invention

[0002] Hair styling devices such as a hair straightener requires regular closing and opening of frames of the hairstyling device, so that different sections of hair can be pressed within one or more heating plates provided with the frames. For this opening and closing of the frames, a user of the device has to make substantial physical efforts for opening and closing of the frames. This repeatedly opening and closing is tiring specially for the people with long hair or hair with substantial density. It is even tiring for professional hair dressers, who have to regularly use the hairstyling device for styling hair of a plurality of customers throughout the day.

[0003] To help the user of the device, in some of the devices springs can be provided to adjust clamping force, so that user is required to use less physical force by himself/herself. Another way is a reduction of weight and volume of the device, so that it becomes easier to handle the device while in use, and thus the user has to put less effort while holding the device due to reduced weight. However, in both cases the user still has to put substantial efforts for opening and closing of the frames of the hairstyling device.

Object of the Invention

[0004] It is therefore the object of the present invention is to provide a mechanism to improve the opening and closing of frames of a device for hairstyling.

Description of the Invention

[0005] The before mentioned object is solved by an arrangement for self-opening or closing of a pair of frames of a device for hairstyling according to claim 1.

[0006] According to the invention, the arrangement for self-opening or closing of a pair of frames of a device for hairstyling in an automatic fashion is provided, wherein the pair of frames are physically coupled to each other to be either in a first position or a second position, wherein the frames are adapted to be pressed against each other in the first position, and to be placed at a distance from each other in the second position, at least one of the frames comprising a heating plate, such that whenever any object, in particular hair, is in contact with the heating plate and the frames are in the first position, the object gets heated and pressed. The arrangement comprises a sensing unit adapted to sense presence of the object

between the pair of the frames, and to generate a presence data, a processor adapted to receive and process the presence data, and to generate a first position signal, and an automation means coupled to the pair of frames, adapted to receive the first position signal, and to move the pair of frames to be in the first position.

[0007] This embodiment is helpful, as it provides for an automatic mechanism for sensing presence of the object between the frames, and accordingly automates closing of the frames of the device for pressing and heating of the object. The object can be hair.

[0008] Further preferred embodiments are subject-matter of dependent claims and/or of the following specification parts.

[0009] According to a preferred embodiment of the arrangement, the sensing unit is adapted to sense absence of the object between the pair of the frames, and to generate an absence data, the processor is adapted to receive and process the absence data, and to generate a second position signal, and the automation means is adapted to receive the second position signal, and to move the pair of frames to be in the second position.

[0010] This embodiment is beneficial as it provides for automatic mechanism for absence of the object between the frames, and accordingly automates opening of the frames.

[0011] According to a further preferred embodiment of the arrangement, the sensing unit is adapted to sense the presence of the object and to generate the presence data, when the pair of the frames are in the second position, or the sensing unit is adapted to sense the absence of the object and to generate the absence data, when the pair of the frames are in the first position.

[0012] This embodiment is helpful, as it provides enabling the sensing unit to change modes to sense absence or presence of the object based on which position the frames are in. This makes automation process of closing and opening of the frames efficient.

[0013] According to another embodiment of the arrangement, the sensing unit is adapted to detect presence or absence of the hair between the pair of the frames.

[0014] This embodiment is helpful, as it provides sensing only of the hair and not other objects for generating presence data or absence data, thus making the automation process efficient with no false positives. As it shall avoid closing of the frames when any other object gets mistakenly placed between the frames.

[0015] According to a further embodiment of the arrangement, the sensing unit is adapted to detect presence of the object between the pair of the frames, when the object is in proximity of either of the frames or touching either of the frames, or the sensing unit is adapted to detect absence of the object between the pair of the frames, when the object leaves out from between the frames or stops touching either of the frames.

[0016] This embodiment is helpful, as it further improves efficiency of the automation by reducing false pos-

itives, specially in the scenario when the objects are mistakenly or accidentally get through or pass through the frames.

[0017] According to another embodiment of the arrangement, the sensing unit is adapted to detect presence of the object between the pair of the frames, when the object is in proximity of the heating plate or touches the plate, or the sensing unit is adapted to detect absence of the object between the pair of the frames, when the object stops touching the heating plate.

[0018] This embodiment is helpful, as it enables closing and opening of the frames only in the scenario when the object is near to the heating plate or gets in/off contact to the heating plate. This mechanism further makes the automation mechanism efficient, as it captures the users mindset efficiently, as if the object is near to the heating plate there are more chances that the user would like to close the frames.

[0019] According to a further preferred embodiment of the arrangement, the sensing unit comprises at least one sensor placed in proximity to the heating plate.

[0020] This embodiment is beneficial, as it provides for efficient and effective placement of the sensing unit.

[0021] According to a further embodiment of the arrangement, the sensors are placed on one or more of the edges of the heating plate or in proximity to one of the edges of the heating plate.

[0022] This embodiment is beneficial, as placement at the edges provides for easy way to place the sensors for efficient sensing of the objects.

[0023] According to another embodiment of the arrangement, the sensing unit comprises two sensors, a first sensor and a second sensor, wherein the sensors are placed in proximity or onto the edges with shortest measurement for distance.

[0024] This embodiment is beneficial, as placement of the sensors in this way helps to cover up the entire range of the heating plate for efficient detection and sensing of absence or presence of the object.

[0025] The before mentioned object is also solved by a device for hairstyling according to the claim 10.

[0026] The before mentioned object is also solved by a method for making an arrangement for self-opening or closing of the pair of frames of a device for hairstyling according to the claim 11.

[0027] According to the invention, a method for making an arrangement for self-opening or closing of the pair of frames of a device for hairstyling is provided, the pair of frames are physically coupled to each other to be either in a first position or a second position, wherein the frames are adapted to be pressed against each other in the first position, and to be placed at a distance from each other in the second position, at least one of the frames comprising a heating plate, such that whenever any object is in contact to the heating plate and the frames are in the first position, the object gets heated and pressed, the method comprising:

- providing a sensing unit onto at least one of the frames of the device onto sides of the frames facing each other, the sensing unit is adapted to sense presence or absence of the object between the pair of the frames, and to generate a presence data on sensing presence of the object or the absence data on sensing absence of the object;
- coupling the sensing unit to a processor for enabling data transfer, the processor is adapted to receive and process the presence data or the absence data, and to generate a first position signal based on the presence data or the second position signal based on the absence data;
- coupling the processor to an automation means for transfer signals, the automation means is adapted to receive the first position signal or the second position from the processor; and
- coupling the automation means to the pair of frames for moving the frames to be in the first position on receiving of the first position signal, or in the second position on receiving the second position signal.

[0028] According to a further embodiment of the invention, the method comprises enabling the sensing unit to:

- sense the presence of the object and to generate the presence data, when the pair of the frames are in the second position, or
- sense the absence of the object and to generate the absence data, when the pair of the frames are in the first position.

[0029] According to another embodiment of the method, the sensing unit comprises more than one sensors, the method comprising placing the sensors on one or more of the edges of the heating plate or in proximity to one of the edges of the heating plate.

[0030] According to a further preferred embodiment of the method, the sensing unit comprises two sensors, a first sensor and a second sensor, the method comprising placing the sensors in proximity or onto the edges with shortest measurement.

[0031] Further benefits, goals and features of the present invention will be described by the following specification of the attached figures, in which components of the invention are exemplarily illustrated. Components of the devices and method according to the inventions, which match at least essentially with respect to their function, can be marked with the same reference sign, wherein such components do not have to be marked or described in all figures.

[0032] The invention is just exemplarily described with respect to the attached figure in the following.

Brief Description of the Drawings

[0033]

Fig. 1 illustrates a schematic diagram for self-opening or closing of a pair of frames of a device for hairstyling, according to an embodiment of the invention.

Fig. 2a illustrates a hairstyling device in a first position, according to an embodiment of the invention.

Fig. 2b illustrates the hairstyling device in a second position, according to an embodiment of the invention.

Fig 3, illustrates a flow chart explaining functioning of a device for hairstyling whose frames opens and closes automatically, according to an embodiment of the invention.

Detailed Description of the Drawings

[0034] The present invention focuses on an efficient use of hairstyling devices. Most of the times, using these hairstyling device is stressful to the hands of a user, as the user needs to regularly open and close frames of the hairstyling device for heating and pressing the hair. Such operation requires substantial physical strength, which becomes really stressful for a service provider of hairstyling. With an automation of opening and closing of frames of the hairstyling device, the device not only becomes user friendly, but also saves substantial human efforts applied while handling the device.

[0035] Fig. 1 shows a schematic diagram for self-opening or closing of a pair of frames 2 of a device 3 for hairstyling. The device has heating plates 6 attached to both of the frames 2, such that the heating plates 6 faces each other. This enables pressing and heating of the hair/ objects. In another embodiment, there can be only one of the frames 2 provided with the heating plate 6, and in such scenario, the other frame should have another heat-resistant material layer of the same size of the heating plate 6 placed facing to the heating plate 6, so that the frames 2 shall not be damaged or deformed due to the heating plate 6 when both the frames are closed to each other. In case that the frames 2 are made of heat resistant material, then a separate layer of a heat-resistant material is not required.

[0036] The frames 2 are physically coupled to each other, so that they can be in a first position and a second position. The frames 2 are placed in close proximity to each other, so as to press against each other in the first position. In the first position, the hair, which is placed between the frames 2 is heated and pressed for styling the hair. This happens because, the hair gets pressed and heated by the heating plate 6 placed at the frames 2, due to pressing of the frames 2, which reforms the hair. And, in the second position, the frames 2 are placed

at a distance to each other so as to maintain a gap between each other, which allows replacement of hair between the frames 2.

[0037] The arrangement 1 has a sensing unit 8, which is enabled to sense presence and absence of the hair or any object between the frames 2 of the device 3. When the object/hair gets between the frames 3, the sensing unit 8 detects the presence of the hair/object, and generates a presence data 9, which refers to presence of the hair/object between the frames. The arrangement 1 also includes a processor 10 which receives and processes the presence data 9, and generates a first position signal 11 based on the processing of the presence data 9. The arrangement 1 also includes an automation means 12 which is coupled to the frames 2. The automation means 12 receives the first position signal 11, and accordingly moves the frames 2 into the first position 4.

[0038] For pressing and heating the hair, the hair is firstly divided into sections, and further each section of the hair is placed between the frames 2 of the hairstyling device 3. Thereafter, the device 3 is run through the whole length of the sectioned hair. Once, the hair moves out from between of the frames 2, the sensing unit 8 detects absence of the hair between the frames 2. Once the absence of the hair is detected, the sensing unit 8 generates an absence data 13, which is further received by the processor 10. Further, the processor 10 generates a second position signal 14 based on the processing of the absence data 13, which is further received by the automation means 12. Based on the second position signal 14, the automation means 12 moves the frames 2 into the second position 5.

[0039] Generally, the sensing unit 8 is enabled to detect the presence of the hair/object when the frames 2 are in the second position 5, and to detect the absence of the hair/object when the frames 2 are in the first position 4. However, in one embodiment, the sensing unit 8 is enabled to detect both presence and absence of the hair/object between the frames 2 at the same time. However, in such scenario, if the frames 2 are already in the first position 4, and the sensing unit 8 senses the presence of the hair/object, then the processor will not take further action to generate the first position signal 11, and if the frames 2 are already in the second position 5, and the sensing unit 8 senses the absence of the hair/object, then the processor will not take further action to generate the second position signal 14.

[0040] In one embodiment, the sensing unit 8 only detects presence of hair between the frames 2 of the device 3, and does not detect absence of the hair/objects between the frames 2. In such scenario, a user of the device 3 has to manually move the frames 2 into the second position.

[0041] In another embodiment, the sensing unit 8 detects only the hair and not any other object, which makes the arrangement 1 efficient, and reduce false positives might occur in generalized scenario of any object detec-

tion. These false positives may occur because during device handling, many times clothes or other environmental elements which are also used during hairstyling process may accidentally get in between the frames 2.

[0042] In one embodiment, the sensing unit 8 detects presence of the object/hair between the pair of the frames 2 only when the object is in proximity of either of the frames 2 or touching either of the frames 2. In the same way, in another similar embodiment, the sensing unit 8 detects absence of the object/hair between the pair of the frames only when the object/hair leave out from between the frames 2 or stops touching either of the frames 2.

[0043] In a further embodiment, the sensing unit 8 detects presence of the object/hair between the pair of the frames 2 only when the object/hair is in proximity of the heating plate 6 or touches the heating plate 6. In a similar embodiment, the sensing unit 8 detects absence of the object/hair between the pair of the frames 2 only when the object/hair stops touching the heating plate 6.

[0044] It is to be noted for moving the frames 2 to be in the first position 4 or the second position 5, the frames can be moved rotationally with respect to each other, like two needles of a clock, or the frames 2 can also move laterally with respect to each other.

[0045] Fig. 2a shows a hairstyling device 3 of the invention in a first position 4. The frames 2 are attached to each other at one of their ends through a hinge 16, so that the frames 2 can rotate with respect to each other to be in the first position 4 and a second position. The hair 7 is shown to be between the heating plates 6 of each of the frames 2. The sensing unit 8 includes two sensors 8', 8" here. The first sensor 8' is placed in proximity to one of the edges 15 of the heating plate 6, and the second sensor 8" is placed in proximity to another edge 15 of the heating plate 6, which is opposite to the edge 15 in whose proximity the first sensor 8' is placed. It is to be noted that these two edges 6 are the smallest two edges of the heating plate 6. In this embodiment, the sensors 8', 8" are placed at two shortest edges 15 of the heating plate 6, however, the sensors 8', 8" can be placed on other two edges 15 too which are the longest edges 15 of the heating plates 6, or at any other location on the device 3, or in proximity to the device 3. When the sensor 8', 8" detects the presence of the hair 7 between the heating plates 6, they are moved into the first position 4 by rotating the frames 2, so to press the hair 7 between the heating plates 6.

[0046] Fig. 2b shows the hairstyling device 3 of Fig. 2a in the second position 5. As soon as the hair leaves the heating plates, and the sensors 8', 8" detects absence of the hair 7 between the heating plates 6, the frames 2 are moves to be in the second position 5, according to an embodiment of the invention.

[0047] Fig 3, shows a flow chart explaining functioning of a device for hairstyling whose frames opens and closes automatically. In step 101, the device is switched on, so that the power supply to the device can be established.

In step 102, the hair is sectioned, and one the section of the hair is placed between the heating plates of the device. Further in step 103, the sensing unit of the device detects presence of the hair between the frames of the device and generates the presence data. In step 104, the processor receives the presence data and generates a first position signal based on processing of the presence data. This first position signal is received by an automation means, which is coupled to the frames, and the automation means moves the frames to the first position to press the hair between the plates. Thereafter, the user of the device moves the device through the complete length of the section of the hair, and finally the hair leaves out from between of the frames in step 105. In step 106, the sensing unit detects absence of the hair between of the frames and generates an absence data. In step 107, the processor receives and processes the absence data and generates a second position signal which is further received by the automation means, and the automation means moves the frames of the device into the second position. Steps 102 to 107 are repeated, if there are more sections of hair to be styled. In step 108, the power to the device is switched off to stop functioning of the device.

[0048] Thus, the present invention provides an arrangement 1 for self-opening or closing of a pair of frames 2 of a device 3 for hairstyling, the pair of frames 2 are physically coupled to each other to be either in a first position 4 or a second position 5, wherein the frames 2 are pressed against each other in the first position 4, and placed at a distance from each other in the second position 5, at least one of the frames 2 has a heating plate 6, such that whenever any object 7 is in contact to the heating plate 6 and the frames 2 are in the first position 4, the object 7 gets heated and pressed. The arrangement 1 comprises a sensing unit 8 which senses the presence of the object 7 between the pair of the frames 2, and generates a presence data 9, a processor 10 receives and processes the presence data 9, and generates a first position signal 11, and an automation means 12 coupled to the pair of frames 2, which receives the first position signal 11 and moves the pair of frames 2 to be in the first position 4.

List of reference numbers

[0049]

1	arrangement
2	frames
3	device
4	first position
5	second position
6	heating plate
7	object/hair
8	sensing unit
8'	first sensor
8"	second sensor
9	presence data

10 processor
 11 first position signal
 12 automation means
 13 absence data
 14 second position signal 5
 15 edge of the heating plate
 16 hinge of the device
 101 Step of switching on the device
 102 Step of placement of the hair within the frames of the device 10
 103 Step of detection of hair by the sensors
 104 Step of movement of frames in the first position
 105 Step of leaving of the hair out of the frame
 106 Step of detection of absence of hair by the sensor
 107 Step of movement of frames to the second position 15
 108 Step of switching of the device

Claims

1. An arrangement (1) for self-opening or closing of a pair of frames (2) of a device (3) for hairstyling, the pair of frames (2) are physically coupled to each other to be either in a first position (4) or a second position (5), wherein the frames (2) are adapted to be pressed against each other in the first position (4) and to be placed at a distance from each other in the second position (5), wherein at least one of the frames (2) comprises a heating plate (6), such that whenever any object (7) is in contact to the heating plate (6) and the frames (2) are in the first position (4), the object (7) gets heated and pressed, the arrangement (1) further comprises:

- a sensing unit (8) adapted to sense presence of the object (7) between the pair of the frames (2), and to generate a presence data (9),
- a processor (10) adapted to receive and process the presence data (9), and to generate a first position signal (11), and
- an automation means (12) coupled to the pair of frames (2), adapted to receive the first position signal (11), and to move the pair of frames (2) to be in the first position (4).

2. The arrangement (1) according to the claim 1, wherein the sensing unit (8) is adapted to sense absence of the object (7) between the pair of the frames (2), and to generate an absence data (13), the processor (10) is adapted to receive and process the absence data (13), and to generate a second position signal (14), and the automation means (12) is adapted to receive the second position signal (14), and to move the pair of frames (2) to be in the second position (5).

3. The arrangement (1) according to any of the claims 1 or 2, wherein

- the sensing unit (8) is adapted to sense the presence of the object (7) and to generate the presence data (9), when the pair of the frames (2) are in the second position (5), or
- the sensing unit (8) is adapted to sense the absence of the object (7) and to generate the absence data (13), when the pair of the frames (2) are in the first position (4).

4. The arrangement (1) according to any of the claims 1 to 3, wherein the sensing unit (8) is adapted to detect presence or absence of the hair (7) between the pair of the frames (2).

5. The arrangement (1) according to any of the claims 1 to 4, wherein

- the sensing unit (8) is adapted to detect presence of the object (7) between the pair of the frames (2), when the object is in proximity of either of the frames (2) or touching either of the frames (2), or
- the sensing unit (8) is adapted to detect absence of the object (7) between the pair of the frames (2), when the object (7) leaves out from between the frames (2) or stops touching either of the frames (2).

6. The arrangement (1) according to any of the claims 1 to 5, wherein

- the sensing unit (8) is adapted to detect presence of the object (7) between the pair of the frames (2), when the object (7) is in proximity of the heating plate (6) or touches the heating plate (6), or
- the sensing unit (8) is adapted to detect absence of the object (7) between the pair of the frames (2), when the object (7) stops touching the heating plate (6).

7. The arrangement (1) according to any of the claims 1 to 6, wherein the sensing unit (8) comprises at least one sensor (8', 8'') placed in proximity to the heating plate (6).

8. The arrangement (1) according to the claim 7, wherein the sensors (8', 8'') are placed on one or more of edges (15) of the heating plate (6) or in proximity to one of the edges (15) of the heating plate (6).

9. The arrangement (1) according to claim 8, wherein the sensing unit (8) comprises two sensors (8', 8''), a first sensor (8') and a second sensor (8''), wherein the sensors (8', 8'') are placed in proximity or onto the edges (15) with the shortest measurement.

10. A device (3) for hairstyling comprising:

- a pair of frames (2) physically coupled to each other to be either in a first position (4) or a second position (5), wherein the frames (2) are adapted to press against each other in the first position (4), and to be placed at a distance from each other in the second position (5), at least one of the frames (2) comprising a heating plate (6), such that whenever any object (7) is in contact with the heating plate (6) and the frames (2) are in the first position (4), the object (7) gets heated and pressed, the device (3) further comprising the arrangement (1) for self-opening or closing of the pair of frames (2) according to any of the claims 1 to 9.
11. A method for making an arrangement (1) for self-opening or closing of a pair of frames (2) of a device (3) for hairstyling, the pair of frames (2) are physically coupled to each other to be either in a first position (4) or a second position (5), wherein the frames (2) are adapted to press against each other in the first position (4), and to be placed at a distance from each other in the second position (5), at least one of the frames (2) comprising a heating plate (6), such that whenever any object (7) is in contact with the heating plate (6) and the frames (2) are in the first position (4), the object gets heated and pressed, the method comprising:
- providing a sensing unit (8) onto at least one of the frames (2) of the device (3) onto sides of the frames (2) facing each other, the sensing unit (8) is adapted to sense presence or absence of the object (7) between the pair of the frames (2), and to generate a presence data (9) on sensing presence of the object (7) or the absence data (13) on sensing absence of the object (7),
 - coupling the sensing unit (8) to a processor (10) for enabling data transfer, the processor (10) is adapted to receive and process the presence data (9) or the absence data (13), and to generate a first position signal (11) based on the presence data (9) or the second position signal (14) based on the absence data (13),
 - coupling the processor (10) to an automation means (12) for transfer signals (11, 14), the automation means (12) is adapted to receive the first position signal (11) or the second position signal (14) from the processor (10), and
 - coupling the automation means (12) to the pair of frames (2) for moving the frames to be in the first position (4) on receiving of the first position signal (11), or in the second position (5) on receiving the second position signal (14).
12. The method according to the claim 11 comprising enabling the sensing unit (8) to:
- sense the presence of the object (7) and to generate the presence data (9), when the pair of the frames (2) are in the second position (5), or
 - sense the absence of the object and to generate the absence data (13), when the pair of the frames (2) are in the first position (4).
13. The method according to any of the claims 11 or 12, wherein the sensing unit (8) comprises more than one sensors (8', 8''), the method further comprises placing the sensors (8', 8'') on one or more of edges (15) of the heating plate (6) or in proximity to one of the edges (15) of the heating plate (6).
14. The method according to claim 13, wherein the sensing unit (8) comprises two sensors (8', 8''), a first sensor (8') and a second sensor (8''), the method comprising placing the sensors (8', 8'') in proximity or onto the edges (15) with the shortest measurement.

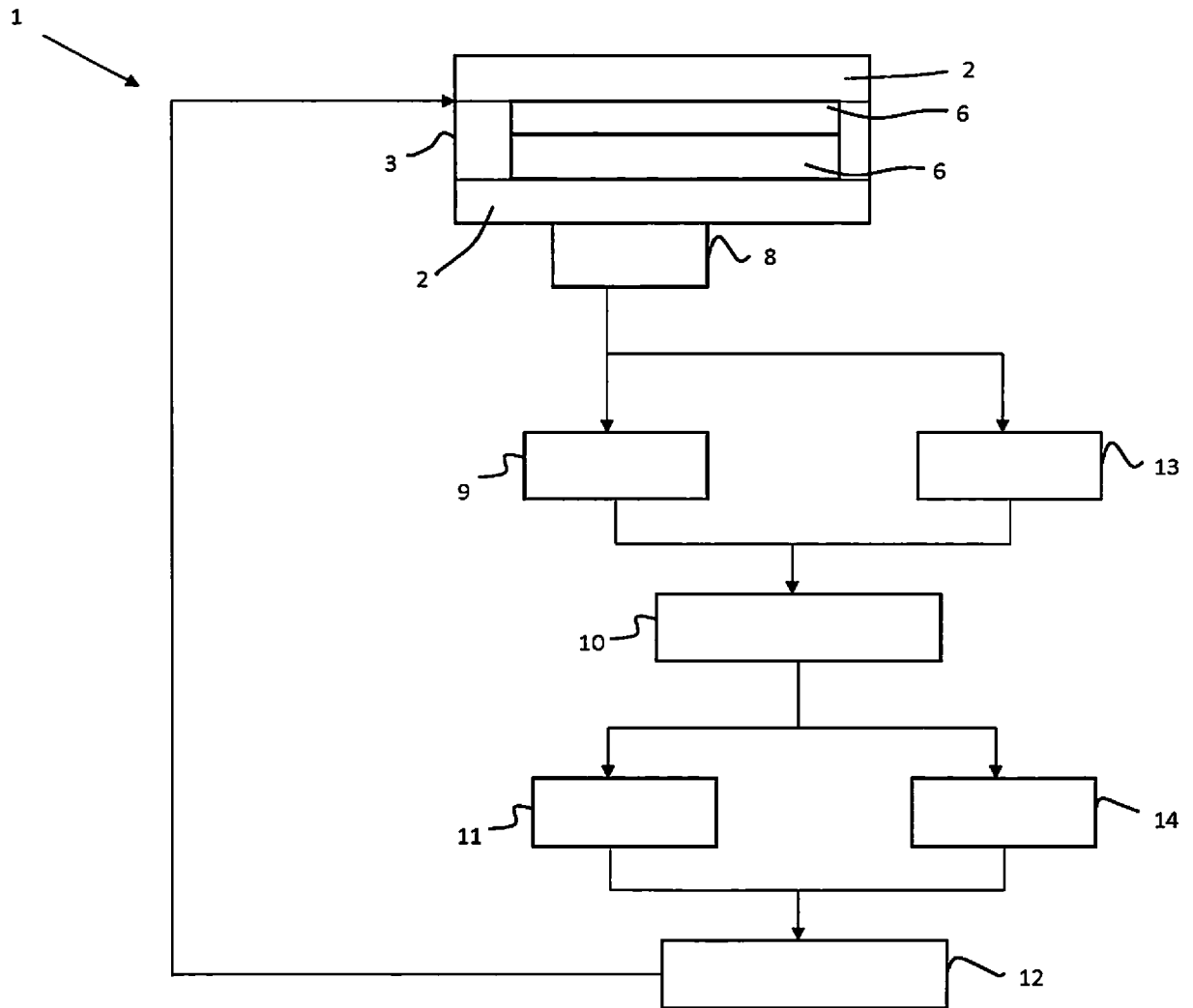


Fig 1

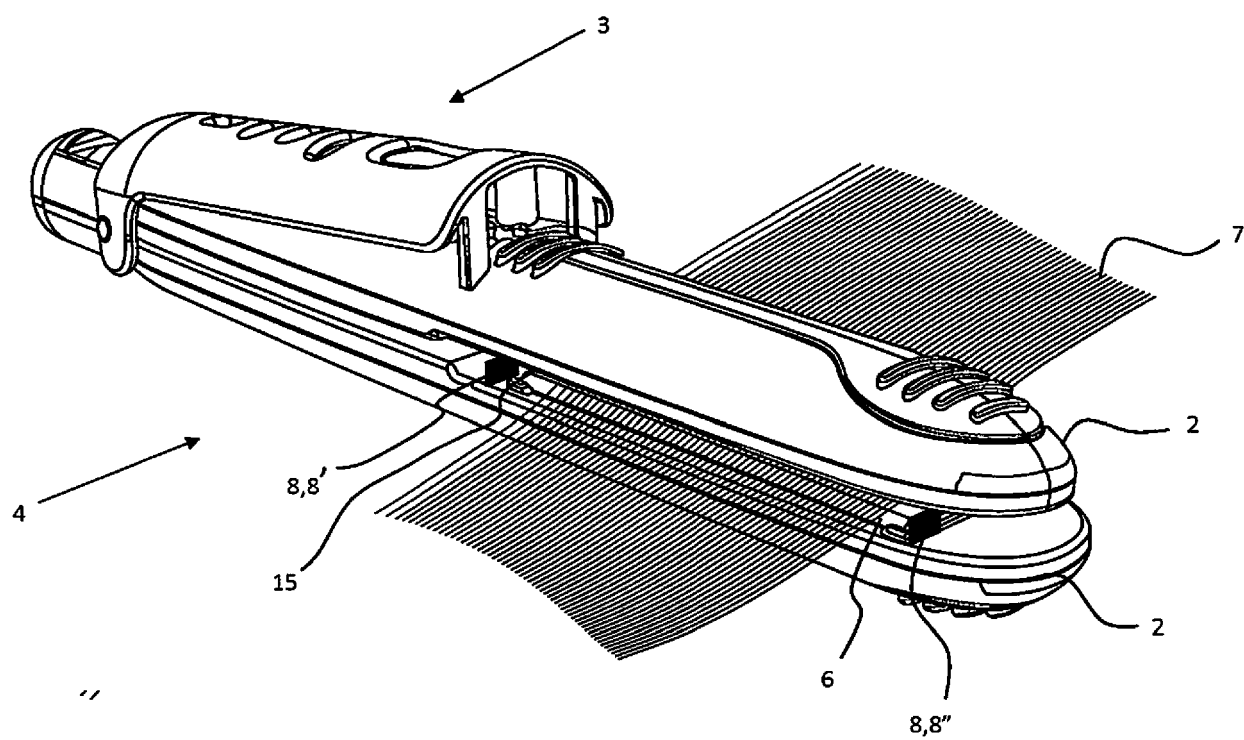


Fig 2a

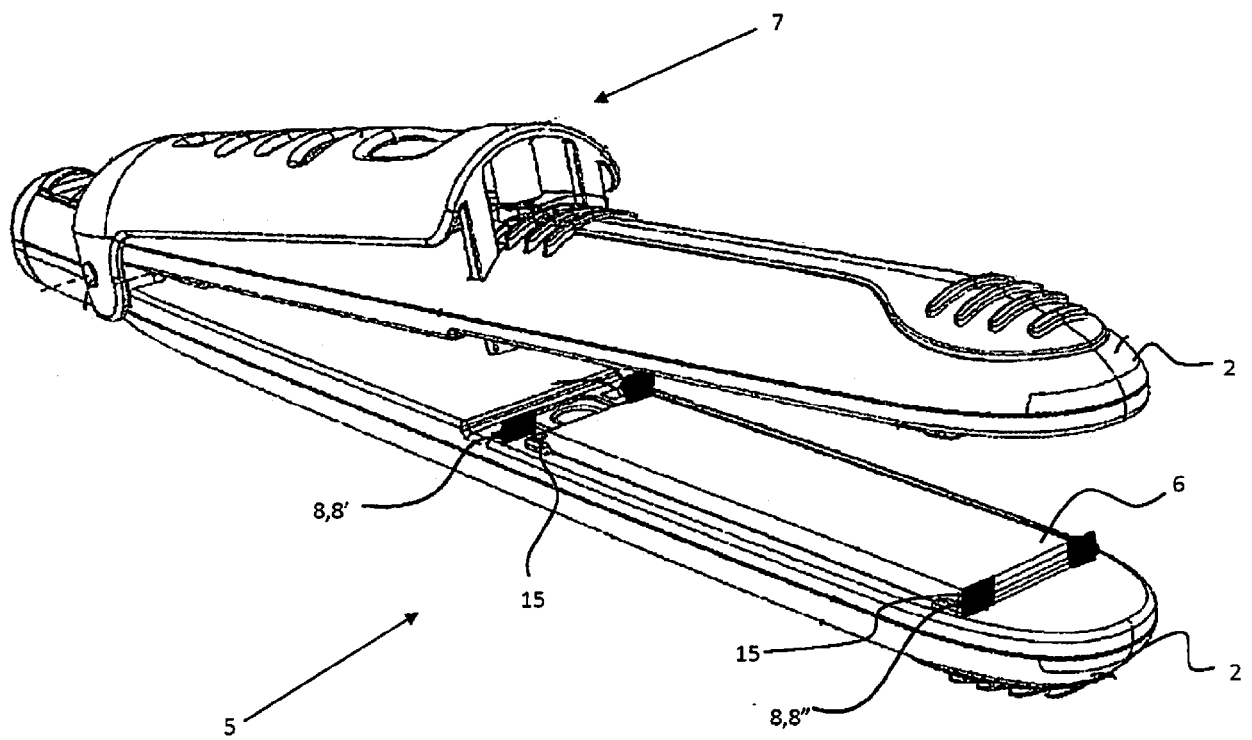
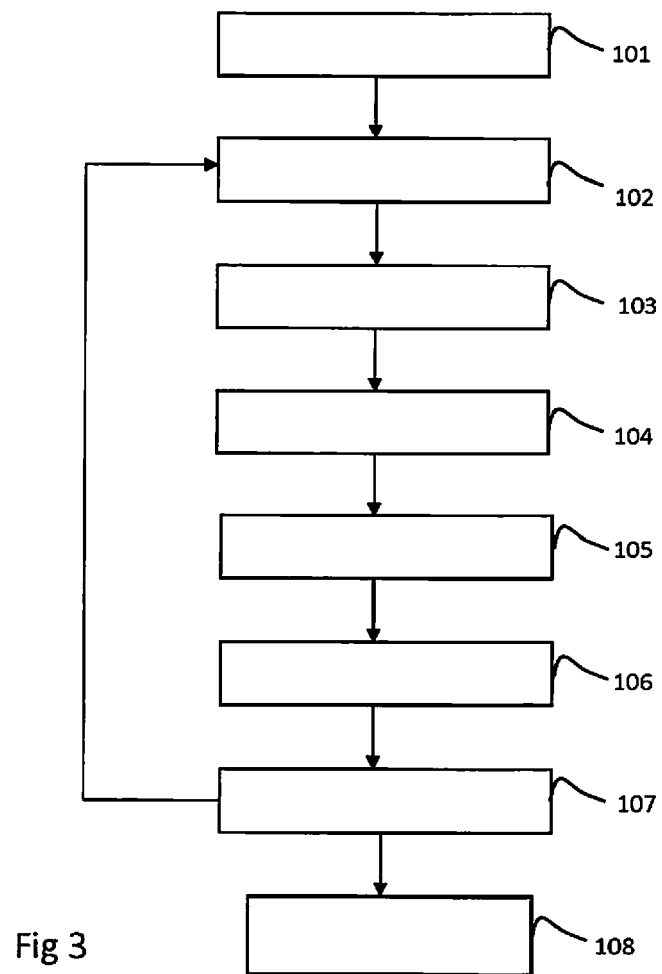


Fig 2b





EUROPEAN SEARCH REPORT

Application Number
EP 17 21 0782

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EPO FORM 1503 03.82 (P04C01)

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	US 2015/128983 A1 (VIC GABIN [FR] ET AL) 14 May 2015 (2015-05-14) * the whole document *	1-14	INV. A45D1/04 A45D1/06 A45D1/14 A45D2/00
A	US 2015/144610 A1 (CHO OKNAM [KR]) 28 May 2015 (2015-05-28) * abstract *	1,10,11	
			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		7 February 2018	Nicolás, Carlos
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