(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 3 838 065 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
23.06.2021 Bulletin 2021/25

(51) Int Cl.:
A46B 7/02 *(2006.01)* ***A46B 9/02*** *(2006.01)*
A46B 17/06 *(2006.01)*

(21) Application number: **20205448.2**

(22) Date of filing: **03.11.2020**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
KH MA MD TN

(30) Priority: **03.12.2019 TW 108216105 U**
03.12.2019 TW 108216106 U

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(54) HAIR BRUSH WITH RETRACTABLE BRISTLES

(57) A hair brush with retractable bristles includes a housing (10A, 10B), a brush body (20A, 20B), at least one restoring spring (60), and an actuating element (30A, 30B). The housing (10A, 10B) has a containing space (13) and multiple through holes (111). The multiple through holes (111) are disposed through the housing (10A, 10B). The brush body (20A, 20B) moves linearly in the containing space (13) and has a base (23A, 23B) and multiple bristles (21A, 21B) disposed on the base (23A, 23B). The multiple bristles (21A, 21B) are capable of extending out of a corresponding one of the multiple through holes (111). The at least one restoring spring (60) is mounted between the housing (10A, 10B) and the base (23A, 23B). The actuating element (30A, 30B) is rotatably mounted to the housing (10A, 10B) and has a bended portion (321A, 321B).

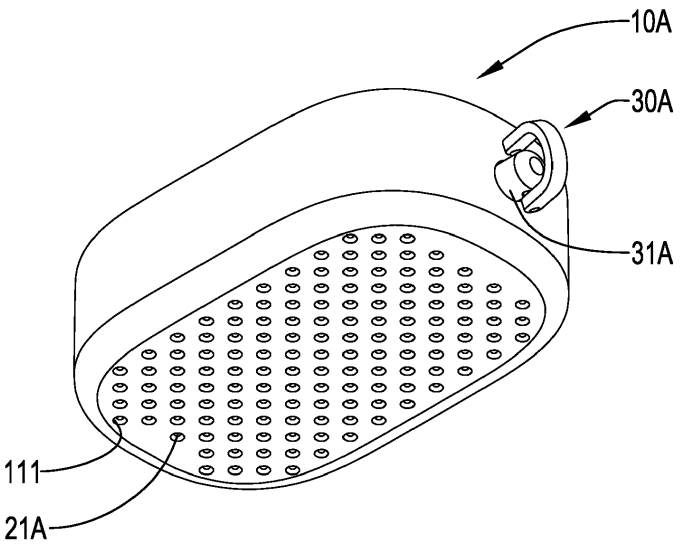

FIG.1

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Description

1. Field of the Invention

[0001] The present invention relates to a hair brush, and more particularly to a hair brush with retractable bristles.

2. Description of Related Art

[0002] A conventional hair brush includes a handle and a brush body. The handle is disposed at one of two ends of the conventional hair brush. The brush body is disposed at the other one of the two ends of the conventional hair brush, is fixed to the handle, and has multiple bristles protruding thereon at spaced intervals. In use, a user holds the handle and brushes his/her hair with the multiple bristles.

[0003] However, the multiple bristles protruding on the brush body are exposed to an exterior of the conventional hair brush. If the user puts the conventional hair brush in his/her bag in order to brush his/her hair when going out, the multiple bristles tend to bend or break when colliding with other objects put in the bag while the user is walking. In addition, even when the conventional hair brush is just placed on a vanity, the user still may break the multiple bristles when carelessly putting other objects on the multiple bristles of the conventional hair brush.

[0004] To overcome the shortcomings of the conventional hair brush, the present invention tends to provide a hair brush with retractable bristles to mitigate or obviate the aforementioned problems.

[0005] The main objective of the present invention is to provide a hair brush with retractable bristles.

[0006] The hair brush with retractable bristles in accordance with the present invention includes a housing, a brush body, at least one restoring spring, and an actuating element. The housing has a containing space and multiple through holes. The containing space is defined in the housing. The multiple through holes are disposed through a side of the housing, are disposed at spaced intervals, and communicate with the containing space of the housing. The brush body is disposed in the containing space of the housing, moves linearly in the containing space, and has a base and multiple bristles. The base is disposed in the containing space of the housing. The multiple bristles are disposed at spaced intervals on a side surface of the base, and each one of the multiple bristles is capable of extending out of a corresponding one of the multiple through holes. The at least one restoring spring is mounted between the housing and the base of the brush body. The actuating element is rotatably mounted to the housing, is disposed in the containing space of the housing, and has a bended portion. The bended portion is radially bended between two ends of the actuating element. When the actuating element is rotated and the bended portion pushes the base of the brush body, the brush body moves linearly and each one of the multiple bristles extends out of the corresponding through hole. Elastic potential energy is stored in the at least one restoring spring when the bended portion pushes the base of the brush body, and when the bended portion leaves the base, the elastic potential energy is released to make the at least one restoring spring bounce to retract the multiple bristles into the housing.

IN THE DRAWINGS:

[0007]

Fig. 1 is a perspective view of a first embodiment of a hair brush with retractable bristles in accordance with the present invention;
Fig. 2 is an exploded perspective view of the hair brush with retractable bristles in Fig. 1;
Fig. 3 is a cross-sectional front side view of the hair brush with retractable bristles in Fig. 1;
Fig. 4 is a cross-sectional side view of the hair brush with retractable bristles in Fig. 1;
Fig. 5 is an operational cross-sectional side view of the hair brush with retractable bristles in Fig. 1;
Fig. 6 is a perspective view of a second embodiment of a hair brush with retractable bristles in accordance with the present invention;
Fig. 7 is an exploded perspective view of the hair brush with retractable bristles in Fig. 6;
Fig. 8 is a front side view in partial section of the hair brush with retractable bristles in Fig. 6;
Fig. 9 is a circuit block diagram of an oscillation element and an electric control unit of the hair brush with retractable bristles in Fig. 6;
Fig. 10 is a cross-sectional side view of the hair brush with retractable bristles in Fig. 6; and
Fig. 11 is an operational cross-sectional side view of the hair brush with retractable bristles in Fig. 6.

[0008] With reference to Figs. 1 to 3, a first embodiment of a hair brush with retractable bristles in accordance with the present invention includes a housing 10A, a brush body 20A, an actuating element 30A, and at least one restoring spring 60.

[0009] With reference to Figs. 1 to 3, the housing 10A has a first casing 11A and a second casing 12A. The first casing 11A and the second casing 12A are assembled to form the housing 10A and to define a containing space 13 in the housing 10A. The first casing 11A has multiple through holes 111 and a first pivotal segment 113. Each one of the multiple through holes 111 is disposed through a bottom of the first casing 11A. The multiple through holes 111 are disposed at spaced intervals and communicate with the containing space 13. The first pivotal segment 113 is disposed on an inner wall of the first casing 11A, is disposed adjacent to an edge of the first casing 11A, and extends toward the second casing 12A.

[0010] With reference to Figs. 1 to 3, the second casing 12A has a second pivotal segment 126 and a passing

hole 127A. The second pivotal segment 126 is disposed on an inner wall of the second casing 12A, is disposed adjacent to an edge of the second casing 12A, extends toward the first casing 11A, and is aligned with the first pivotal segment 113 of the first casing 11A. The passing hole 127A is disposed through the second casing 12A and is disposed opposite to the second pivotal segment 126.

[0011] With reference to Figs. 1 to 3, the brush body 20A is disposed in the containing space 13 of the housing 10A and moves linearly between the first casing 11A and the second casing 12A. The brush body 20A has a base 23A and multiple bristles 21A. The base 23A is contained in the containing space 13 of the housing 10A and is disposed between the first casing 11A and the second casing 12A. The multiple bristles 21A are disposed at spaced intervals on a side surface of the base 23A facing the first casing 11A, and each one of the multiple bristles 21A protrudes toward a respective one of the multiple through holes 111 of the first casing 11A, such that each one of the multiple bristles 21A extends out of the corresponding through hole 111 when the base 23A moves toward the first casing 11A.

[0012] With reference to Figs. 2 to 5, the actuating element 30A is rotatably mounted to the housing 10A, is disposed between the brush body 20A and the second casing 12A of the housing 10A, and has a driving portion 31A and a shaft 32A. The driving portion 31A is mounted to the passing hole 127A of the second casing 12A, and the driving portion 31A extends into the containing space 13 of the housing 10A. The shaft 32A has two ends and a bended portion 321A. One of the two ends of the shaft 32A extends into the containing space 13 and is rotatably mounted between the first pivotal segment 113 of the first casing 11A and the second pivotal segment 126 of the second casing 12A. The other one of the two ends of the shaft 32A is mounted to the driving portion 31A, such that the shaft 32A is driven to rotate by rotating the driving portion 31A. The bended portion 321A is radially bended between the two ends of the shaft 32A. With reference to Figs. 4 and 5, when the actuating element 30A is rotated and the bended portion 321A in turn pushes the base 23A of the brush body 20A, the brush body 20A gradually moves linearly toward the first casing 11A and each one of the multiple bristles 21A gradually extends out of the corresponding through hole 111. Then a user can brush his/her hair with the present invention.

[0013] With reference to Figs. 2, 4, and 5, the at least one restoring spring 60 is mounted between the first casing 11A and the base 23A of the brush body 20A. In the present invention, the hair brush with retractable bristles includes two restoring springs 60. When the actuating element 30A pushes the base 23A of the brush body 20A, elastic potential energy is stored in the two restoring springs 60. After finishing brushing hair with the present invention, rotate the driving portion 31A in a reverse direction, and the bended portion 321A of the actuating element 30A leaves the base 23A of the brush body 20A. Then the elastic potential energy stored in the two restoring springs 60 is released and the two restoring springs 60 bounce to push the brush body 20A toward the second casing 12A to move back to its original position. Thereby, the multiple bristles 21A are retracted into the housing 10A automatically.

[0014] With reference to Figs. 6 to 8, a second embodiment of a hair brush with retractable bristles in accordance with the present invention is substantially the same as the first embodiment, and the differences between the second embodiment and the first embodiment are that: the housing 10B has a handle, the base 23B of the brush body 20B further has a passing hole 22B, and the hair brush with retractable bristles further has a mist spraying assembly 40 and an electric control unit 50.

[0015] With reference to Figs. 6 to 8, the first casing 11B has a first half handle portion 114B, a mounting hole 112B, two said first pivotal segments 113, a receiving hole 115B, a retaining hole 116B, and a first notch 117B. The first half handle portion 114B protrudes from one of two ends of the first casing 11B. The mounting hole 112B is disposed through the bottom of the first casing 11B, is spaced apart from the multiple through holes 111, and communicates with the containing space 13. In the second embodiment of the present invention, the multiple through holes 111 surround the mounting hole 112B. One of the two said first pivotal segments 113 is disposed on the inner wall of the first casing 11B, is disposed adjacent to the edge of the first casing 11B, and extends toward the second casing 12B. The other one of the two said first pivotal segments 113 is disposed on a position where the first half handle portion 114B is connected to the first casing 11B, and the first pivotal segment 113 extends toward the second casing 12B. The receiving hole 115B is disposed through a bottom of the first half handle portion 114B and communicates with the containing space 13. The retaining hole 116B is disposed through the bottom of the first half handle portion 114B, communicates with the containing space 13, and is spaced apart from the receiving hole 115B. The first notch 117B is concaved downwardly on the edge of the first half handle portion 114B and is aligned with the two said first pivotal segments 113.

[0016] With reference to Figs. 6 to 8, the second casing 12B has a second half handle portion 128B, two said second pivotal segments 126, a second notch 121B, an injection hole 122B, and an opening 123B. The second half handle portion 128B protrudes from one of two ends of the second casing 12B and corresponds to the first half handle portion 114B of the first casing 11B in contour and in position. One of the two said second pivotal segments 126 is disposed on the inner wall of the second casing 12B, is disposed adjacent to the edge of the second casing 12B, extends toward the first casing 11B, and is aligned with one of the two said first pivotal segments 113 of the first casing 11B. The other one of the two said second pivotal segments 126 is disposed on a position where the second half handle portion 128B is connected

to the second casing 12B and is aligned with the other one of the two said first pivotal segments 113 of the first casing 11B. The second notch 121B is caved upwardly on the edge of the second half handle portion 128B and is aligned with the first notch 117B of the first casing 11B. The injection hole 122B is disposed through the second casing 12B. The opening 123B is disposed through the second casing 12B and is spaced apart from the injection hole 122B. The injection hole 122B and the opening 123B both communicate with the containing space 13 of the housing 10B.

[0017] With reference to Figs. 7 and 8, the base 23B of the brush body 20B has the passing hole 22B disposed therethrough.

[0018] With reference to Figs. 7 and 8, when the first casing 11B and the second casing 12B are combined together, the driving portion 31B of the actuating element 30B is mounted between the first notch 117B of the first casing 11B and the second notch 121B of the second casing 12B, one of the two ends of the shaft 32B is rotatably mounted to the first pivotal segment 113 of the first casing 11B and the second pivotal segment 126 of the second casing 12B, and the second half handle portion 128B and the first half handle portion 114B form the handle together. A middle portion of the shaft 32B extends between the first pivotal segment 113 disposed on the position where the first half handle portion 114B is connected to the first casing 11B and the second pivotal segment 126 disposed on the position where the second half handle portion 128B is connected to the second casing 12B.

[0019] With reference to Figs. 7 and 8, the mist spraying assembly 40 is disposed in the containing space 13 of the housing 10B, and has an electric oscillation assembly 41 and a liquid tank 42. The oscillation assembly 41 is disposed in the containing space 13, is mounted in the mounting hole 112B of the housing 10B, and has a nozzle 411 and an oscillation element 412. The nozzle 411 is mounted in the mounting hole 112B, and the nozzle 411 has a spout being divergent toward an exterior of the housing 10B. The oscillation element 412 is disposed in the nozzle 411 and is adjacent to the spout of the nozzle 411. When the oscillation element 412 oscillates at a frequency high enough, the oscillation element 412 makes the liquid contained in the liquid tank 42 atomized.

[0020] With reference to Figs. 7 and 8, the liquid tank 42 is mounted to the second casing 12B, is disposed in the containing space 13 of the housing 10B, is disposed between the brush body 20B and the second casing 12B of the housing 10B, and has an injection portion 421, a liquid-supplying hole 422, a plug 423, and an absorbent swab 424. The injection portion 421 extends into the passing hole 22B of the brush body 20B and communicates with the nozzle 411 of the oscillation assembly 41, such that the liquid contained in the liquid tank 42 flows to the oscillation element 412 via the injection portion 421. The liquid-supplying hole 422 is disposed through the liquid tank 42, communicates with the injection portion 421, and is received in the injection hole 122B of the second casing 12B. The user can inject the liquid into the liquid tank 42 via the liquid-supplying hole 422. The plug 423 is detachably inserted in the liquid-supplying hole 422. Moreover, the plug 423 corresponds in contour to the liquid-supplying hole 422, which prevents seepage of the liquid contained in the liquid tank 42 after the plug 423 is inserted into the liquid-supplying hole 422. The absorbent swab 424 is contained in the liquid tank 42, extends into the injection portion 421, and abuts against the oscillation element 412.

[0021] With reference to Figs. 7 and 8, when the oscillation element 412 oscillates at a frequency high enough, the liquid flowing to the oscillation element 412 via the absorbent swab 424 is atomized into spray and flows out of the housing 10B via the spout of the nozzle 411 mounted in the mounting hole 112B. In this way, the user can brush his/her hair and spray the liquid such as water, hair conditioner, and essential oil on his/her hair at the same time by holding the present invention with a single hand rather than holding a hair brush and a spray bottle with two hands respectively.

[0022] With reference to Figs. 6 to 9, the electric control unit 50 is disposed in the containing space 13 of the housing 10B and is electrically connected to the oscillation element 412 of the mist spraying assembly 40 to generate high frequency oscillation of the oscillation element 412. The electric control unit 50 has a circuit board 51, a charging panel 52, a battery 53, a button 54, and a light guide 55. The circuit board 51 is disposed between the first half handle portion 114B of the first casing 11B and the second half handle portion 128B of the second casing 12B, is below the shaft 32B of the actuating element 30B, and is electrically connected to the oscillation element 412, the charging panel 52, the battery 53, and the button 54. The charging panel 52 is disposed in the containing space 13 of the housing 10B and has a charging port aligned with the opening 123B of the second casing 12B. In the second embodiment of the present invention, the charging port is a universal serial bus (USB) port, and the user can connect a charging cable to the charging port via the opening 123B to have the battery 53 charged. The battery 53 is disposed in the containing space 13 of the housing 10B. The button 54 is received in the receiving hole 115B of the first casing 11B, and oscillation of the oscillation element 412 can be controlled by pushing the button 54. The light guide 55 is received in the retaining hole 116B of the first casing 12B, and light emitted by the circuit board 51 can be guided by the light guide 55 to the exterior of the housing 10B. As a result, the user knows the operational status of the hair brush with retractable bristles in accordance with the present invention.

[0023] With reference to Figs. 8, 10, and 11, in use, the user makes the multiple bristles 21B extend out of the housing 10B or retracted into the housing 10B by rotating the actuating element 30B. The brush body 20B and the actuating element 30B work in the same way as

the brush body 20A and the actuating element 30A in the first embodiment of the hair brush with retractable bristles in accordance with the present invention do. Furthermore, after the user presses the button 54 disposed on the handle, the spray flows out of the nozzle 411, such that the user can brush his/her hair with the spray ejected onto his/her hair simultaneously.

[0024] With the aforementioned technical characteristics, the hair brush with retractable bristles in accordance with the present invention has the following advantages.

1. When the hair brush with retractable bristles is not in use, the multiple bristles 21A, 21B are retracted into the housing 10A, 10B. In this way, the multiple bristles 21A, 21B will not bend or break when carried in a bag full of objects or when carelessly pressed by other objects.
2. In use, the user only needs to press the button 54 once to keep the spray flowing out of the present invention since the button 54 is electrically connected to the circuit board 51. Therefore the present invention is convenient in use and prevents muscle soreness of the user's hand.
3. The brush body 20A, 20B, the actuating element 30A,30B, the mist spraying assembly 40, and the electric control unit 50 are all contained in the housing 10A, 10B, optimally utilizing the containing space 13 of the housing 10A, 10B. Therefore, the hair brush with retractable bristles is small in size and is convenient in storage.
4. Because the mist spraying assembly 40 is disposed in the housing 10A, 10B, the mist spraying assembly 40 is electrically controlled, and the button 54 is well received in the receiving hole 115B, the present invention can prevent the button 54 from being accidentally pressed by other objects carried in the bag. Thus, the present invention will not wet or stain the bag.

Claims

1. A hair brush with retractable bristles, and **characterized in that** the hair brush with retractable bristles comprises:

a housing (10A, 10B) having

a containing space (13) defined in the housing (10A, 10B); and
multiple through holes (111) disposed through a side of the housing (10A, 10B), disposed at spaced intervals, and communicating with the containing space (13);

a brush body (20A, 20B) disposed in the containing space (13) of the housing (10A, 10B), moving linearly in the containing space (13), and having

a base (23A, 23B) disposed in the containing space (13) of the housing (10A, 10B); and
multiple bristles (21A, 21B) disposed at spaced intervals on a side surface of the base (23A, 23B), and each one of the multiple bristles (21A, 21B) being capable of extending out of a corresponding one of the multiple through holes (111);

at least one restoring spring (60) mounted between the housing (10A, 10B) and the base (23A, 23B) of the brush body (20A, 20B); and
an actuating element (30A, 30B) rotatably mounted to the housing (10A, 10B), disposed in the containing space (13), and having a bended portion (321A, 321B) radially bended between two ends of the actuating element (30A, 30B);
wherein when the actuating element (30A, 30B) is rotated and the bended portion (321A, 321B) pushes the base (23A, 23B) of the brush body (20A, 20B), the brush body (20A, 20B) moves linearly and each one of the multiple bristles (21A, 21B) extends out of the corresponding through hole (111); and
elastic potential energy is stored in the at least one restoring spring (60) when the bended portion (321A, 321B) pushes the base (23A, 23B) of the brush body (20A, 20B), and when the bended portion (321A, 321B) leaves the base (23A, 23B), the elastic potential energy is released to make the at least one restoring spring (60) bounce to retract the multiple bristles (21A, 21B) into the housing (10A, 10B).

2. The hair brush with retractable bristles as claimed in claim 1, wherein
the housing (10B) has a mounting hole (112B) disposed through the side of the housing (10B) that the multiple through holes (111) are disposed through, spaced apart from the multiple through holes (111), and communicating with the containing space (13); and
the hair brush with retractable bristles has a mist spraying assembly (40) disposed in the containing space (13) of the housing (10B), and having

an oscillation assembly (41) mounted in the mounting hole (112B) of the housing (10B); and
an injection portion (421) disposed in the containing space (13) of the housing (10B) and communicating with the oscillation assembly (41), such that liquid flowing from the injection portion (421) to the oscillation assembly (41) is atomized into spray when the oscillation assembly (41) is oscillating, and then the spray flows out

of the housing (10B) via the mounting hole (112B).

3. The hair brush with retractable bristles as claimed in claim 2, wherein
the housing (10B) has an injection hole (122B) disposed through the housing (10B); and
the mist spraying assembly (40) has a liquid tank (42) having a liquid-supplying hole (422) communicating with the injection portion (421) and received in the injection hole (122B).

4. The hair brush with retractable bristles as claimed in claim 2 or 3, wherein
the mist spraying hair brush with retractable bristles has an electric control unit (50) disposed in the containing space (13); and
the oscillation assembly (41) has

a nozzle (411) mounted in the mounting hole (112B) and having a spout; and
an oscillation element (412) disposed in the nozzle (411), adjacent to the spout of the nozzle (411), and electrically connected to the electric control unit (50).

5. The hair brush with retractable bristles as claimed in claim 4, wherein
the housing (10B) has an opening (123B) disposed through the housing (10B); and
the electric control unit (50) has a charging panel (52) having a charging port aligned with the opening (123B).

6. The hair brush with retractable bristles as claimed in claim 4, wherein
the housing (10B) has a receiving hole (115B) disposed through the housing (10B); and
the electric control unit (50) has a button (54) received in the receiving hole (115B), and the oscillation element (412) is controllable by pushing the button (54).

7. The hair brush with retractable bristles as claimed in claim 4, wherein
the housing (10B) has a retaining hole (116B) disposed through the housing (10B); and
the electric control unit (50) has a light guide (55) received in the retaining hole (116B).

8. The hair brush with retractable bristles as claimed in claim 6, wherein
the housing (10B) has a handle; and
the button (54) of the electric control unit (50) is disposed on the handle of the housing (10B).

9. The hair brush with retractable bristles as claimed in claim 4, wherein the liquid tank (42) has an absorbent swab (424) contained in the liquid tank (42), extending into the injection portion (421), and abutting against the oscillation element (412).

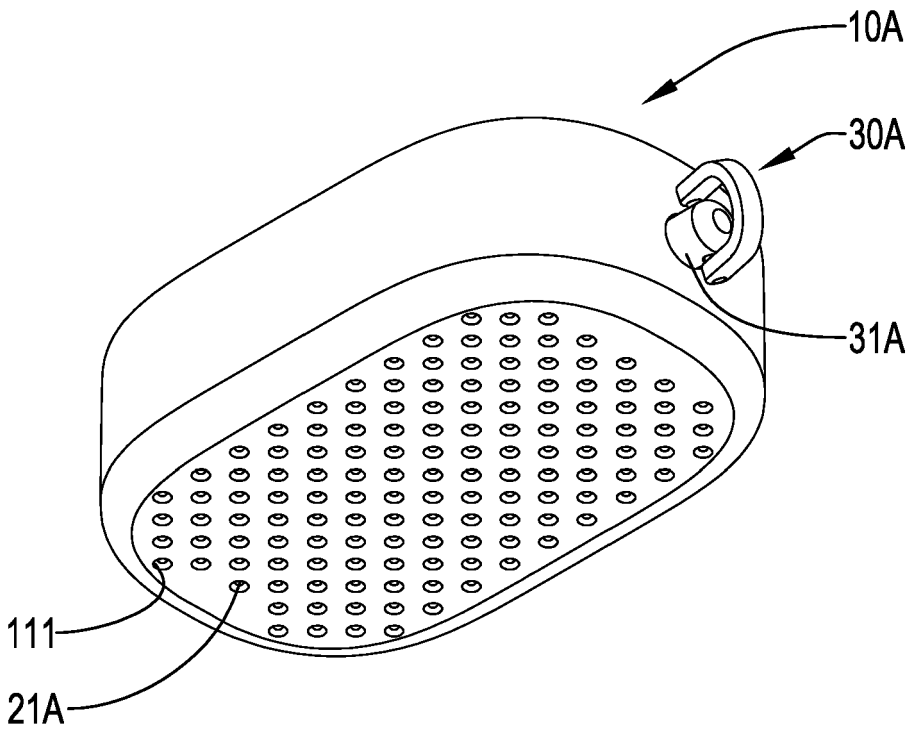

FIG.1

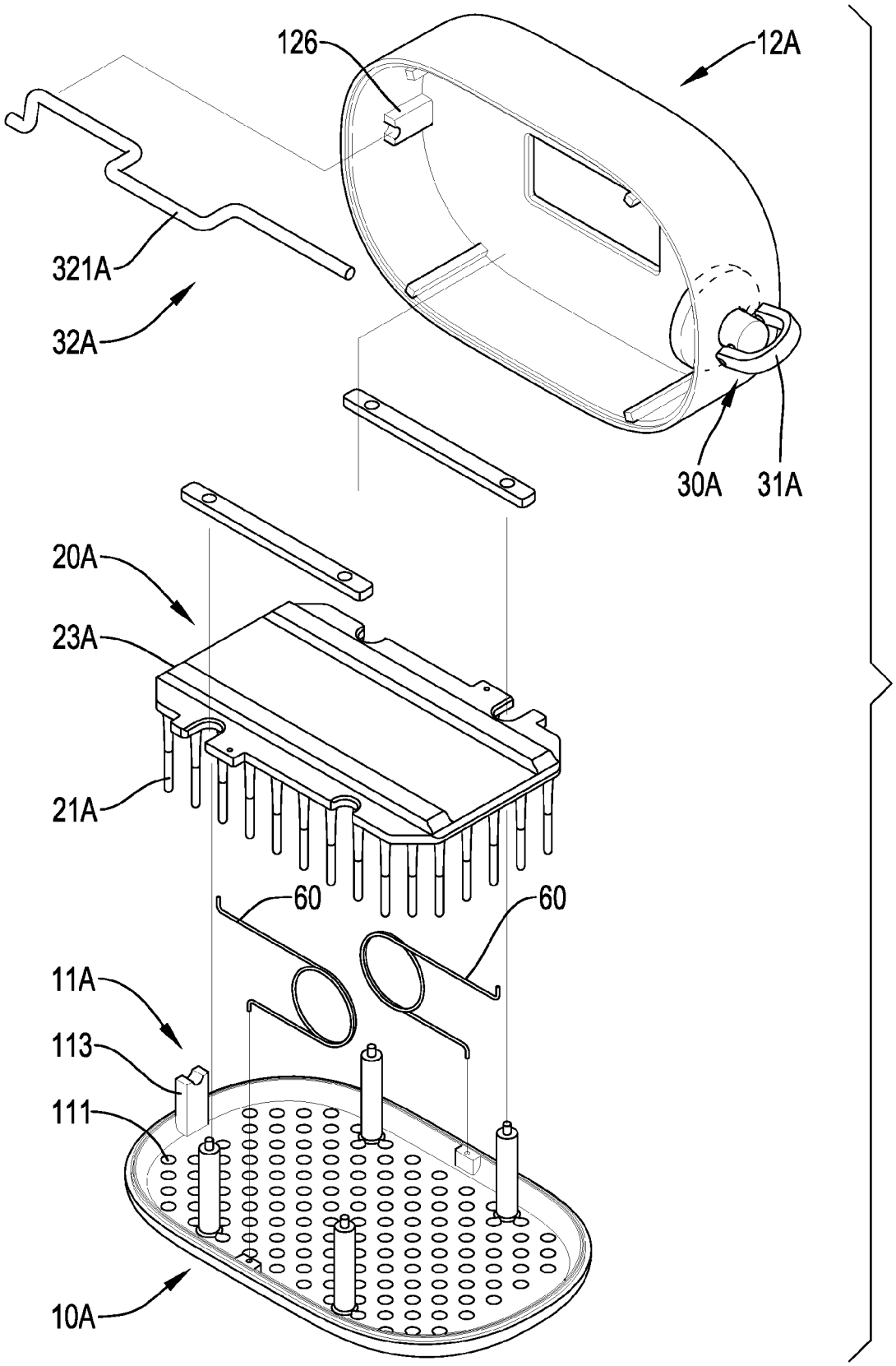

FIG.2

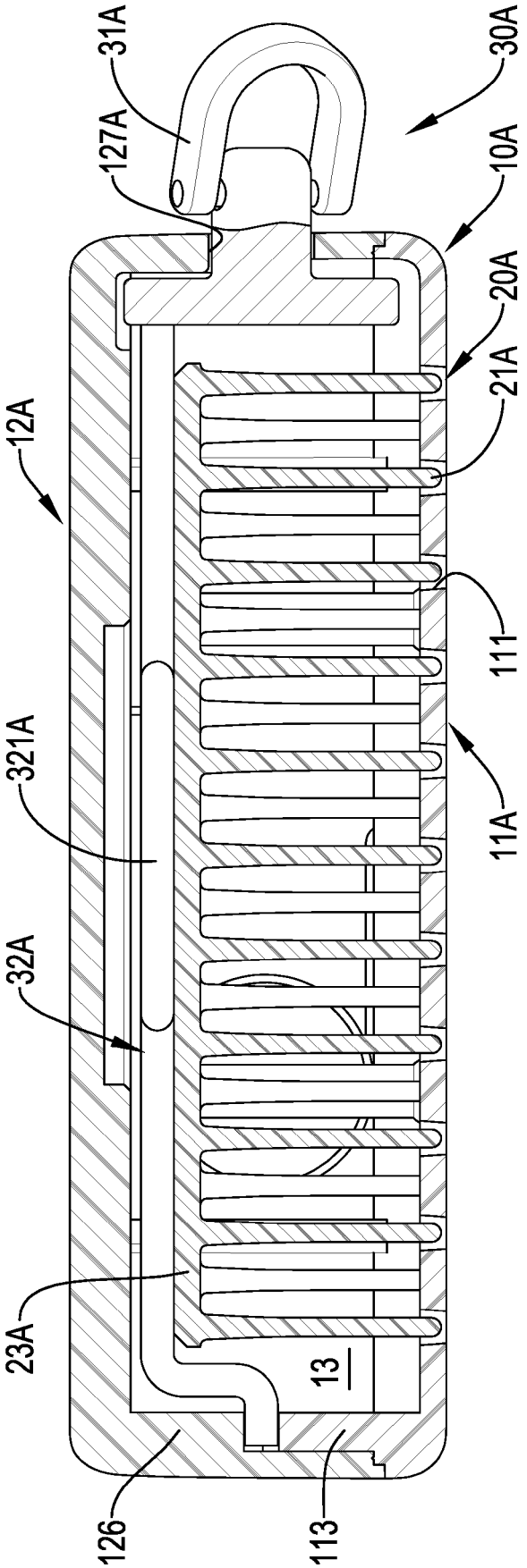

FIG.3

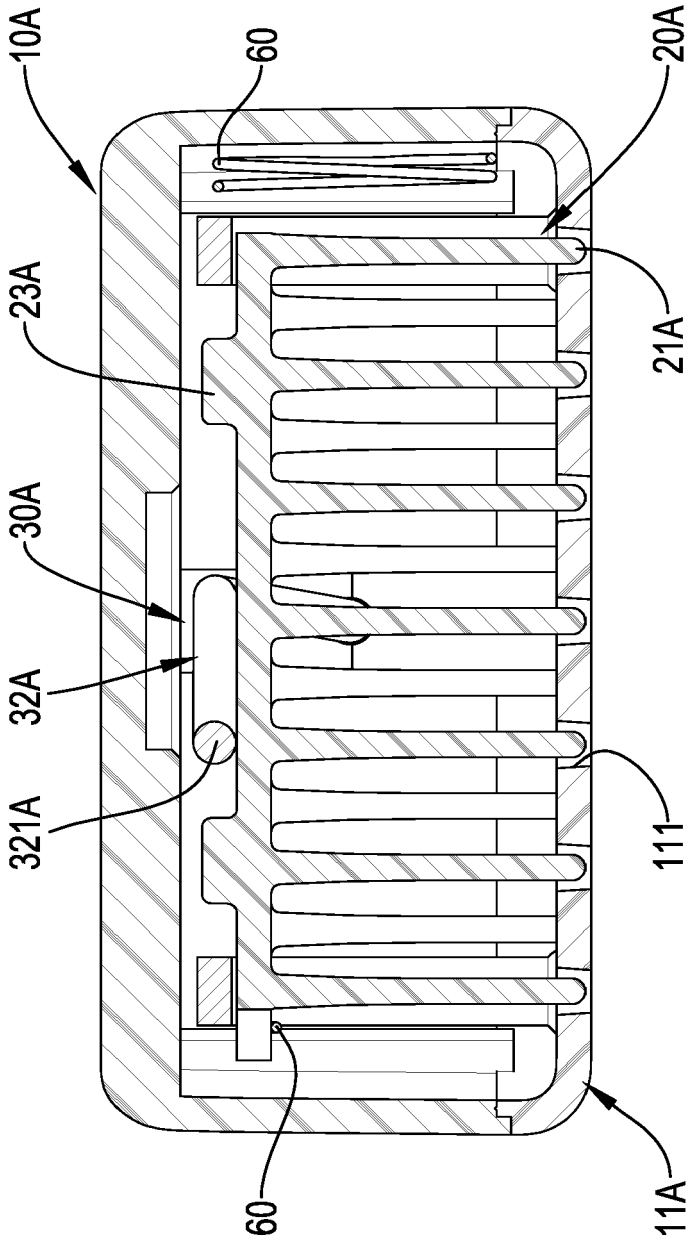

FIG.4

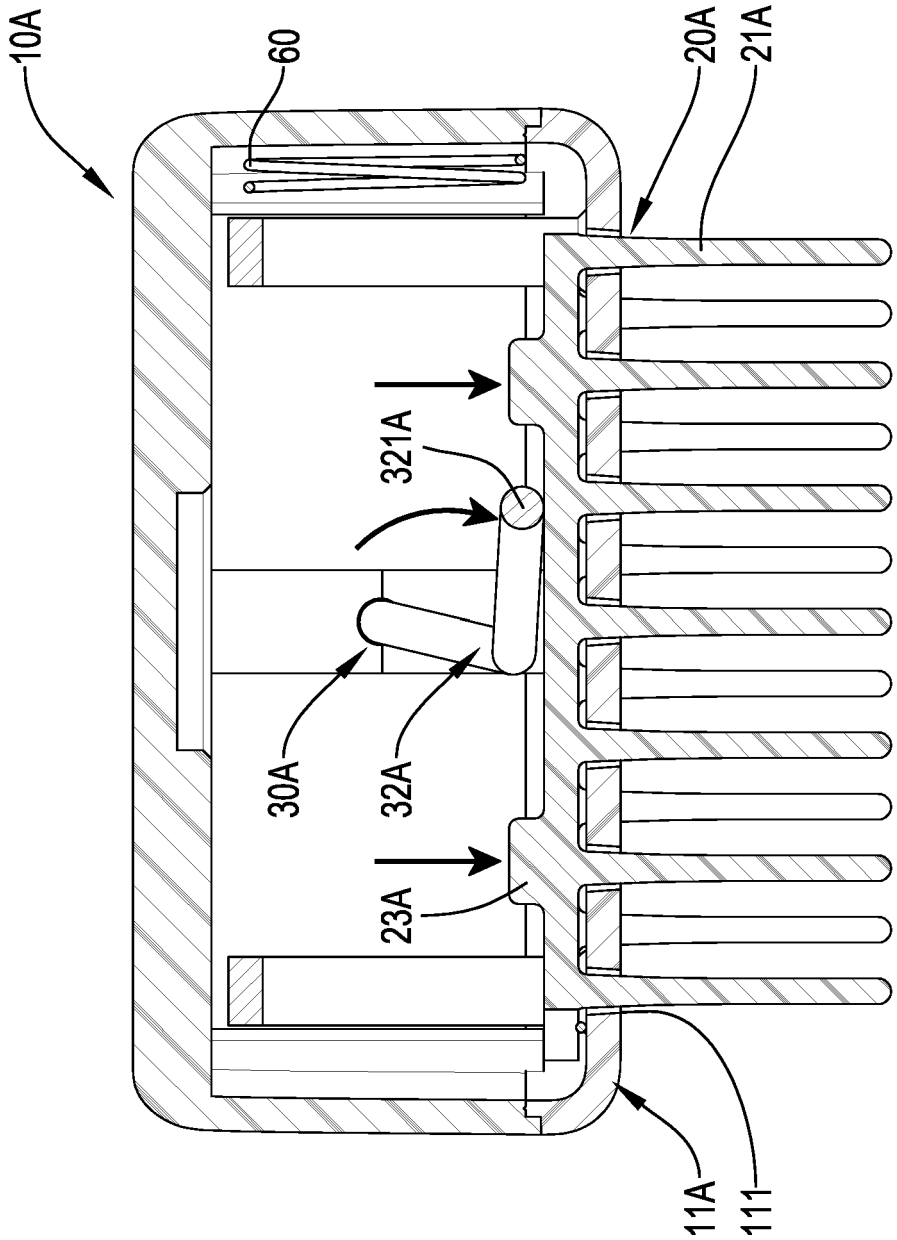

FIG.5

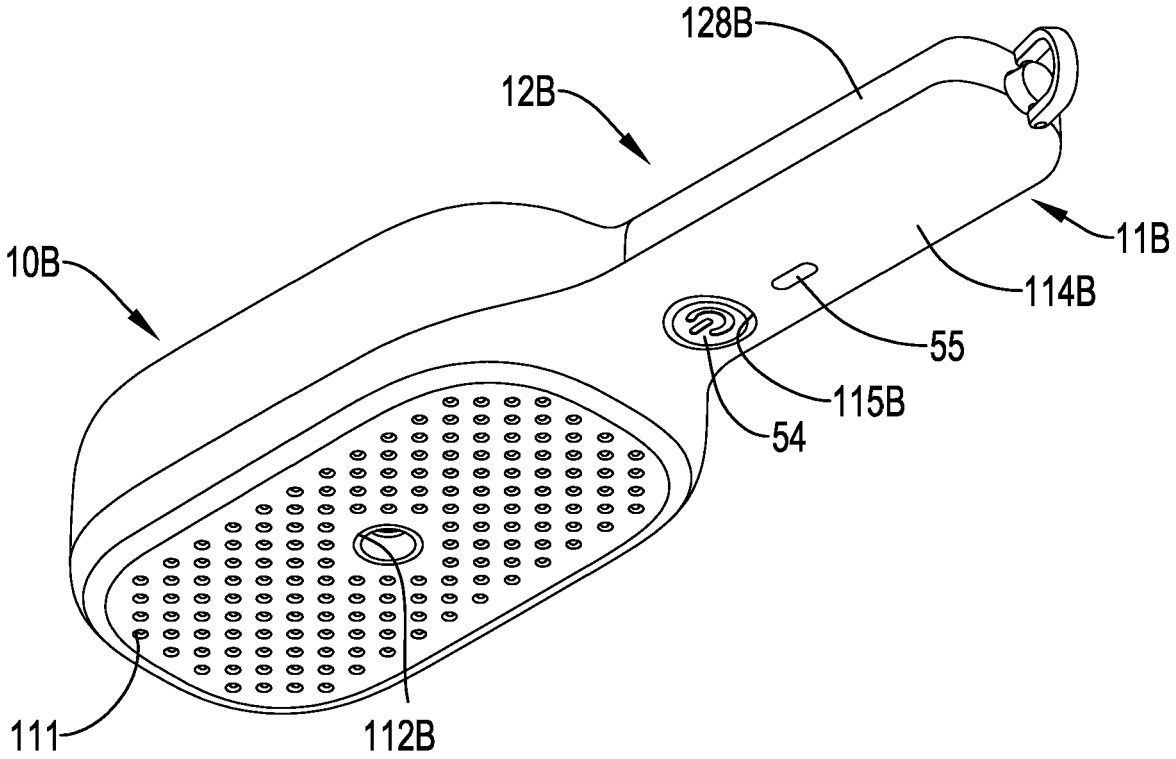

FIG.6

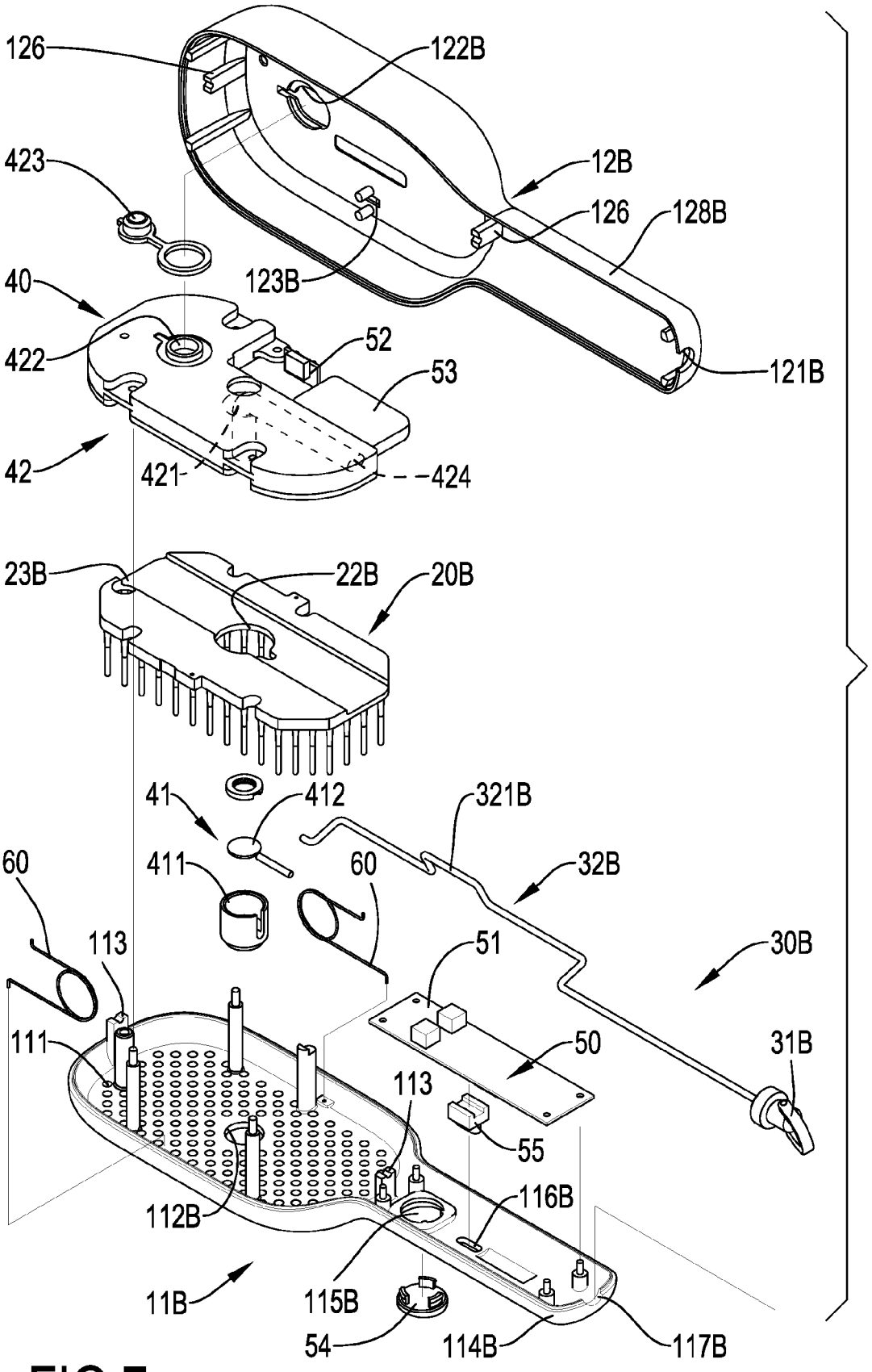
126
122B
423
12B
126
128B
40
123B
422
52
53
121B
42
421
424
23B
22B
20B
41
412
321B
60
411
60
32B
113
51
30B
111
50
31B
113
55
116B
112B
11B
115B
54
114B
117B

FIG.7

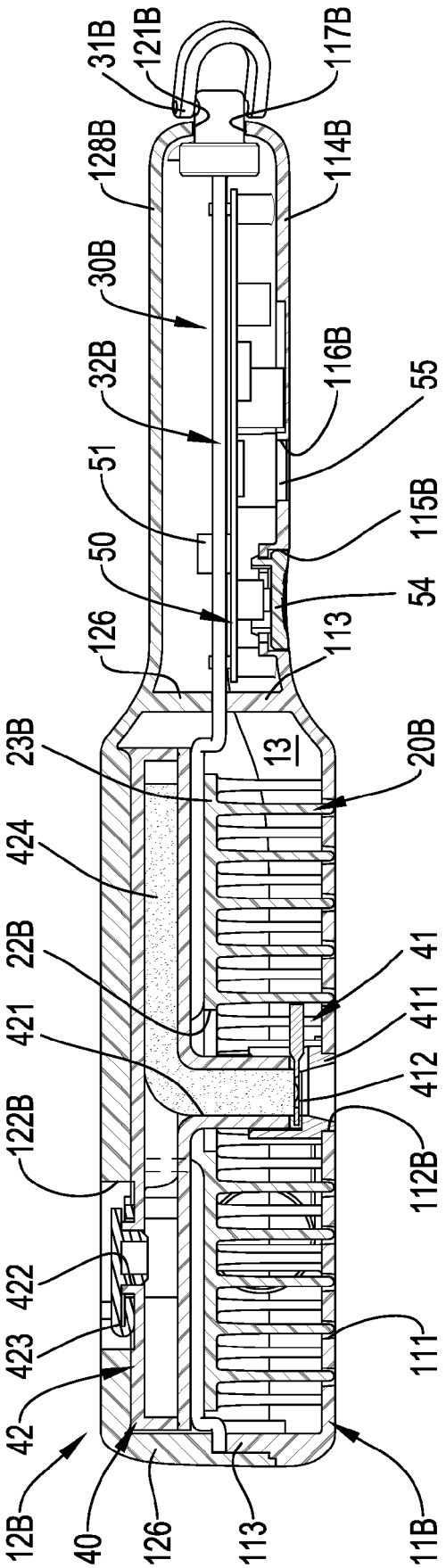
31B
121B
117B
128B
114B
30B
116B
32B
55
51
115B
50
54
126
113
13
23B
20B
424
22B
41
421
411
412
122B
112B
422
423
111
42
12B
40
126
113
11B

FIG.8

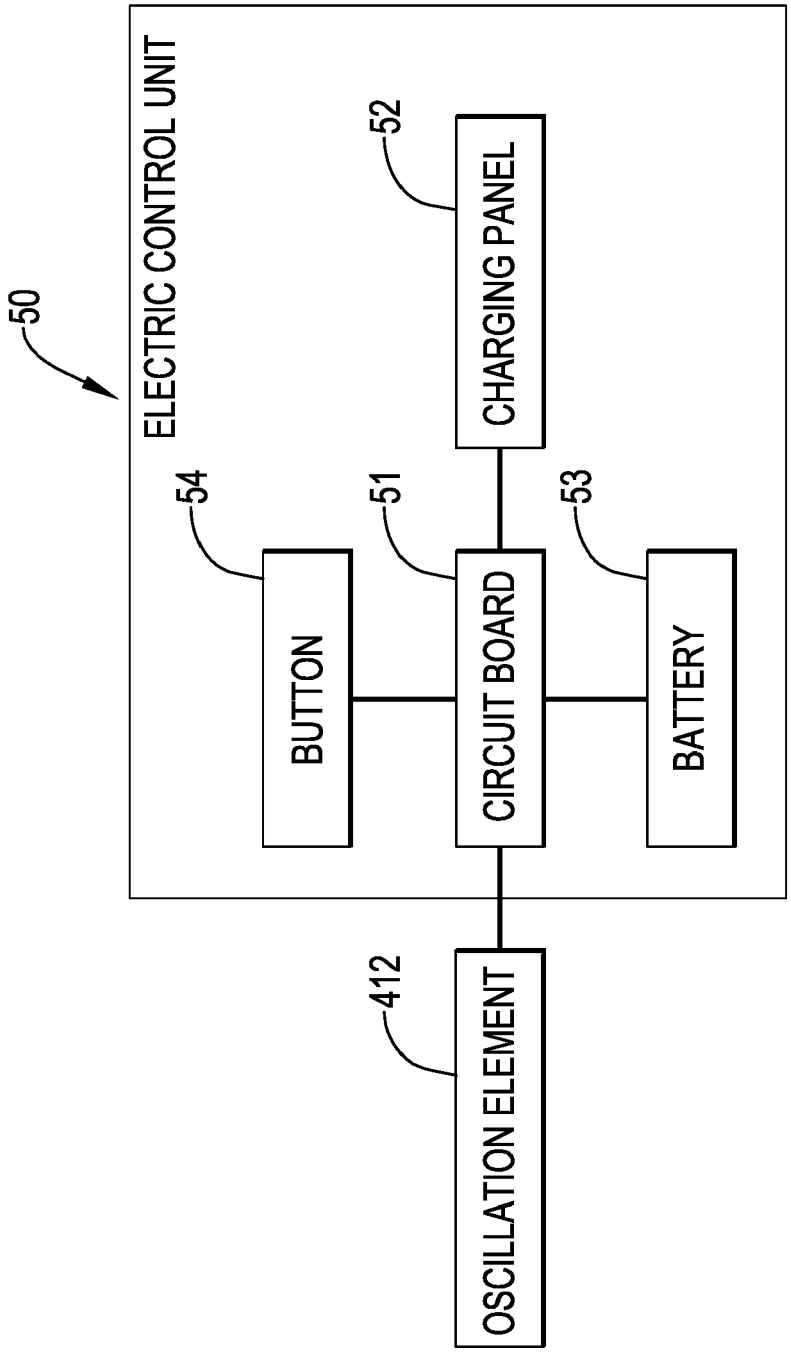
50
ELECTRIC CONTROL UNIT
52
CHARGING PANEL
54
51
53
BUTTON
CIRCUIT BOARD
BATTERY
412
OSCILLATION ELEMENT

FIG.9

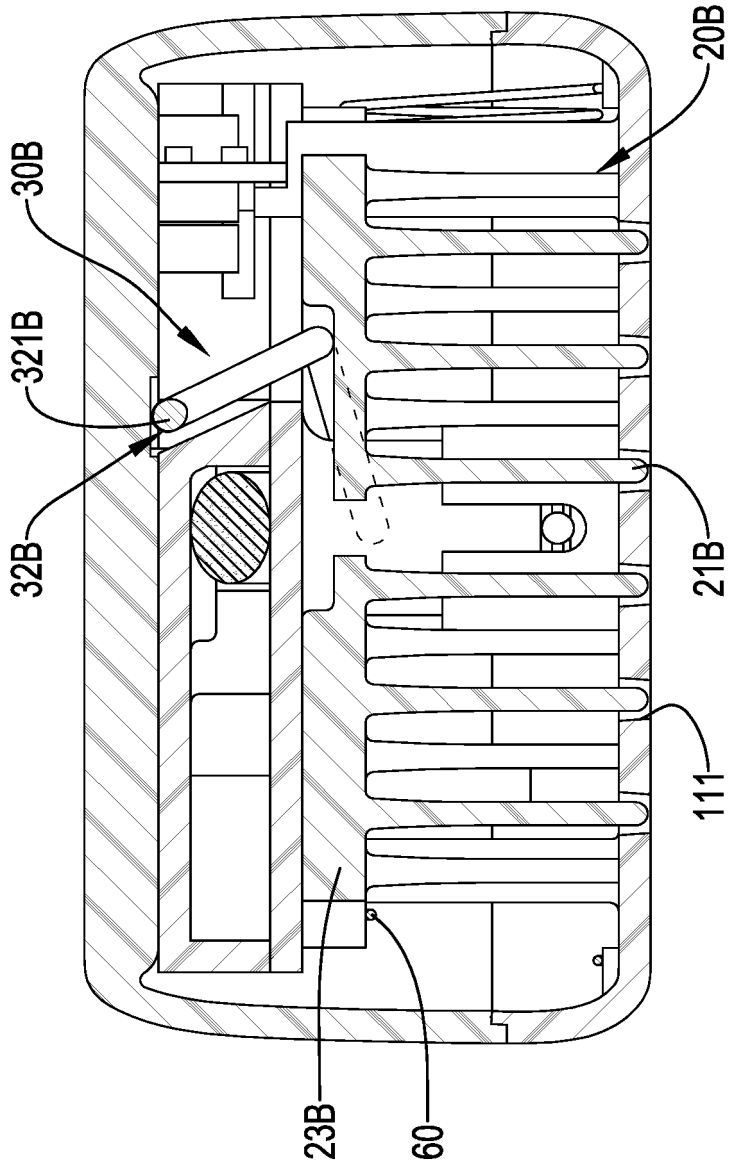

FIG.10

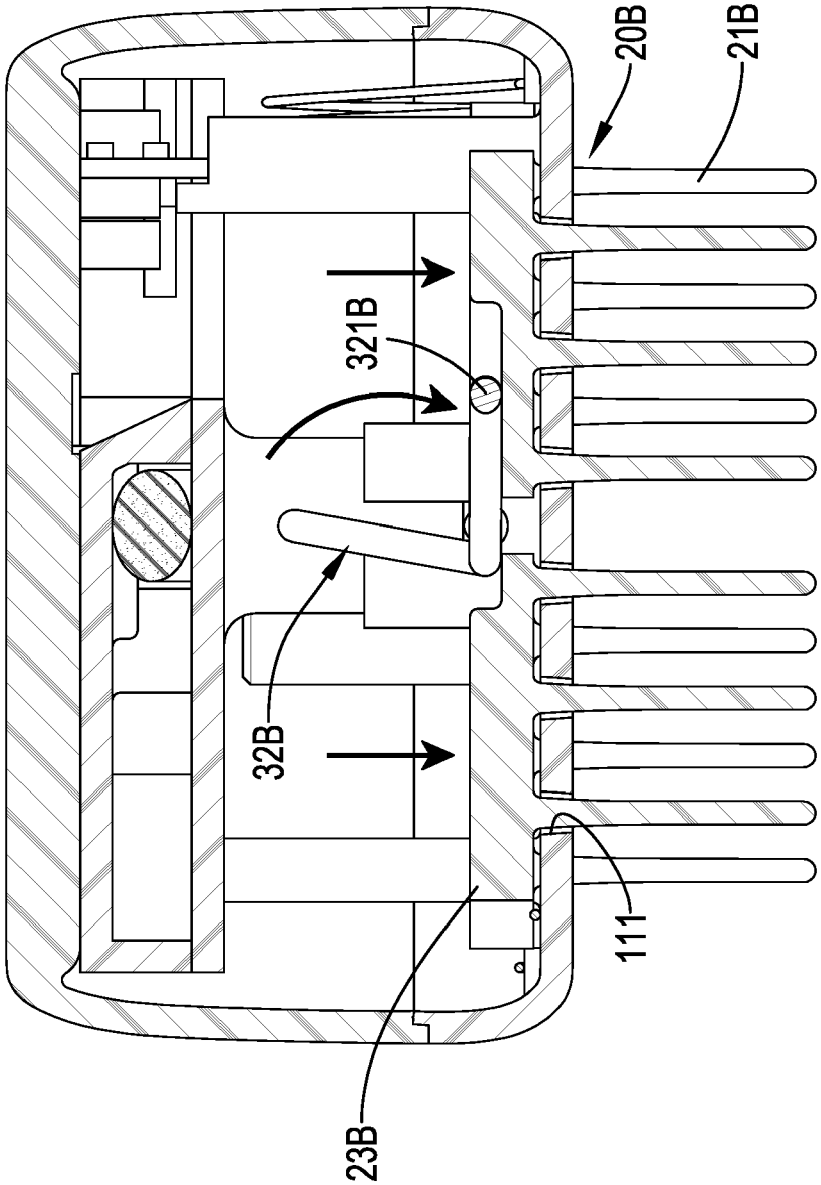

FIG.11

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EUROPEAN SEARCH REPORT

Application Number
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Place of search	Date of completion of the search	Examiner
The Hague	17 May 2021	Dal Bó, Paolo

CATEGORY OF CITED DOCUMENTS

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