



(11)

EP 3 184 888 A1

(12)

## EUROPEAN PATENT APPLICATION

(43) Date of publication:  
28.06.2017 Bulletin 2017/26

(51) Int Cl.:  
**F21V 23/04** (2006.01)      **F21S 10/02** (2006.01)  
**F21S 10/06** (2006.01)      **F21S 10/00** (2006.01)  
**F21V 21/08** (2006.01)      **F21W 131/107** (2006.01)  
**F21Y 115/30** (2016.01)      **F21Y 101/00** (2016.01)  
**F21Y 113/13** (2016.01)

(21) Application number: 16197895.2

(22) Date of filing: 09.11.2016

(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**  
Designated Validation States:  
**MA MD**

(30) Priority: 21.12.2015 US 201514976202

(71) Applicant: **Telebrands Corporation**  
**Fairfield NJ 07004 (US)**

(72) Inventors:  
• **KHUBANI, Ajit**  
**Fairfield, NJ 07004 (US)**  
• **PAN, Yun**  
**Shenzhen, 518081 (CN)**

(74) Representative: **Patentanwälte**  
**Ruff, Wilhelm, Beier, Dauster & Partner mbB**  
**Kronenstraße 30**  
**70174 Stuttgart (DE)**

## (54) DECORATIVE LIGHTING APPARATUS

(57) A motion assembly for a decorative lighting apparatus. The motion assembly including an articulating element configured to secure an optical element in a path of a light being generated by the decorative lighting apparatus, and a motor coupled to the articulating element via a linkage such that a movement generated by the motor is imparted to the articulating element so that the light passing through the optical element is articulated when projected onto a surface.

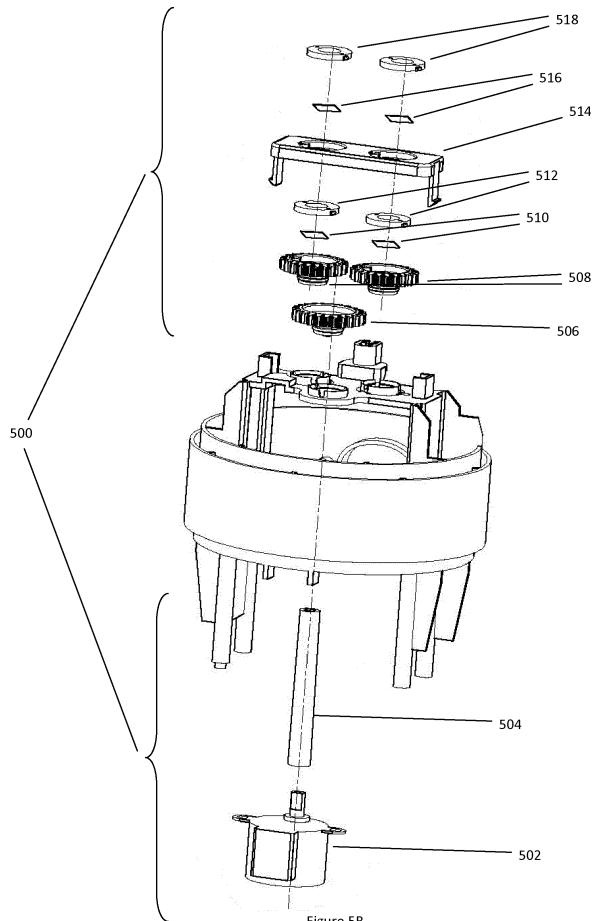


Figure 5B

## Description

### CROSS-REFERENCE TO PRIOR APPLICATIONS

**[0001]** This application is a continuation-in-part application of U.S. Application Serial No. 14/958,657, filed on December 3, 2015 and U.S. Application Serial No. 14/958,667, filed on December 3, 2015, which are both incorporated by reference herein in their entireties.

### FIELD

**[0002]** The present invention generally relates to a decorative lighting apparatus. Specifically, embodiments of the present invention relate to a decorative laser light apparatus.

### BACKGROUND

**[0003]** Lighting is often used in a decorative manner. For example, many people decorate homes, offices, stores, outdoor spaces, etc. with various lighting to achieve certain effects, designs, atmospheres, festive moods, etc. Although decorative lighting may be used at any time of the year, many people utilize decorative lighting during certain holidays.

**[0004]** There are many types of decorative lighting. For example, string lights, character lights, and laser lights are just a few of the various forms of decorative lighting. However, existing laser lights having numerous shortcomings in their design and functionality. For example, switch mechanisms used to control the operation of many laser lights are typically limited in their functionality and are often disposed in inconvenient locations. This can make accessing the switch and operating the decorative light difficult, especially when the light is positioned for use. Additionally, although the lasers used in the decorative lights can be dangerous, many decorative laser lights use unreliable adhesives and tapes that are prone to failure to affix lenses that scatter the light emitted by lasers.

### SUMMARY

**[0005]** Embodiments of the present invention can provide a motion assembly for a decorative lighting apparatus. The motion assembly can include an articulating element configured to secure an optical element in a path of a light being generated by the decorative lighting apparatus, and a motor coupled to the articulating element via a linkage such that a movement generated by the motor is imparted to the articulating element so that the light passing through the optical element is articulated when projected onto a surface.

**[0006]** The motion assembly can further include a second articulating element configured to secure a second optical element in a second path of a second light being generated by the decorative lighting apparatus. The mo-

tor can be coupled to the second articulating element via the linkage such that a movement generated by the motor is imparted to the second articulating element so that the second light passing through the second optical element is articulated when projected onto a surface. The motion assembly can further include an optical element cover configured to secure the optical element to the articulating element and an attenuator positioned in the path of the light. Further, the articulating element can include gears.

**[0007]** According to another embodiment, the present invention can provide a decorative lighting apparatus including at least one light source and a motion assembly. The motion assembly can include an articulating element configured to secure an optical element in a path of a light being generated by the at least one light source and a motor coupled to the articulating element via a linkage such that a movement generated by the motor is imparted to the articulating element so that the light passing through the optical element is articulated when projected onto a surface.

**[0008]** The decorative lighting apparatus can further include an attenuation assembly, which can include an attenuator; and a first housing being configured to be coupled to a second housing, and when the first housing is coupled to the second housing, the first and second housings form a recess designed and dimensioned to receive and hold the attenuator in a substantially fixed position in the path of the light being generated by the at least one light source.

**[0009]** The decorative lighting apparatus can further include a second articulating element configured to secure a second optical element in a second path of a second light being generated by the decorative lighting apparatus. When the motor is coupled to the second articulating element via the linkage, a movement generated by the motor is imparted to the second articulating element so that the second light passing through the second optical element is articulated when projected onto a surface. The motion assembly can further include an optical element cover configured to secure the optical element to the articulating element and an attenuator positioned in the path of the light. The at least one light source can include a laser and the articulating element can include gears.

**[0010]** According to yet another embodiment, the present invention can provide a laser light decorative lighting apparatus. The laser light decorative lighting apparatus can include a first laser light source providing a first light having a first color, a second laser light source providing a second light having a second color, a first switch including a first position corresponding to the first light source and the second light source being in an off condition, a second position corresponding to the first light source being in an on condition and the second light source being in an off condition, and a third position corresponding to the first light source and the second light source being in an on condition, a visual indicator includ-

ing a first colored portion corresponding to the first color and corresponding to the second position of the first switch and a second colored portion corresponding to the first color and the second color and corresponding to the third position of the first switch, and a second switch for controlling activation of a motion assembly. The motion assembly can include an articulating element configured to secure a first optical element in a first path of the first light being generated by the first laser light source and a second optical element in a second path of the second light being generated by the second laser light source and a motor coupled to the articulating element via a linkage such that a movement generated by the motor is imparted to the articulating element so that the first light and the second light passing through the first and second optical elements are articulated when projected onto a surface.

**[0011]** The laser light decorative lighting apparatus can further include an attenuation assembly, which can include a first attenuator; a second attenuator; and a first housing being configured to be coupled to a second housing. When the first housing is coupled to the second housing, the first and second housings form a first recess and a second recess, the first and second recesses designed and dimensioned to receive and hold the first and second attenuators in a substantially fixed position in the first and second paths of the first and second lights being generated by the first and second laser light sources, respectively.

**[0012]** The laser light decorative lighting apparatus can further include an optical element cover configured to secure the optical element to the articulating element and a light sensor configured to measure a level ambient of light and control the first laser light source and the second laser light source based on the measured level of ambient light. Further, the articulating element can include gears.

#### BRIEF DESCRIPTION OF THE DRAWINGS

**[0013]** The features and advantages of the present invention can be more readily understood from the following detailed description with reference to the accompanying drawings, wherein:

Figure 1 is a front perspective of an exemplary decorative lighting apparatus according to an embodiment of the present invention;

Figure 2 is a rear perspective of an exemplary decorative lighting apparatus according to an embodiment of the present invention;

Figure 3A is a front view of an exemplary decorative lighting apparatus according to an embodiment of the present invention;

Figure 3B is a front view of an exemplary decorative lighting apparatus according to an embodiment of the present invention;

Figure 3C is a front view of an exemplary decorative lighting apparatus according to an embodiment of

the present invention;

Figure 4 is a top view of an exemplary decorative lighting apparatus according to an embodiment of the present invention;

Figure 5A is a side view of an exemplary decorative lighting apparatus according to an embodiment of the present invention;

Figure 5B is an exploded view of an exemplary motion assembly according to an embodiment of the present invention;

Figure 6A is an exploded view of an exemplary attenuation assembly according to an embodiment of the present invention;

Figure 6B is an exemplary attenuator scatter pattern according to an embodiment of the present invention; and

Figure 7 is an exemplary weather-proofing element according to an embodiment of the present invention.

#### DETAILED DESCRIPTION

**[0014]** Embodiments of the present invention generally relate to a decorative lighting apparatus. Specifically, certain exemplary embodiments of the present invention provide various new and novel features for a decorative lighting apparatus, such as a decorative laser lighting apparatus. Although the embodiments of the present invention are primarily described with respect to a decorative laser lighting apparatus, it is not limited thereto, and it should be noted that the exemplary apparatus and systems described herein may be used in connection with any decorative lighting apparatus.

**[0015]** In accordance with embodiments of the present invention, Figure 1 shows a perspective view of an exemplary decorative lighting apparatus 100. As shown in Figure 1, decorative lighting apparatus 100 may include body 102, mounting element 104, one or more light sources 106, switch 108, and light sensor 116. According to one embodiment, in operation, decorative lighting apparatus 100 is positioned via mounting element 104 and is coupled to a power source. A user can then actuate switch 108 to control the operation of decorative lighting apparatus 100. When decorative lighting apparatus 100

is turned on via switch 108, light sources 106 are activated to produce light, and decorative lighting apparatus 100 thereby emits and projects the light generated by light sources 106 onto a target, such as a wall of a house or other structure. According to certain embodiments of the present invention, the light generated by light sources 106 passes through a light attenuator to attenuate the light being emitted and projected by decorative lighting apparatus 100.

**[0016]** According to embodiments of the present invention, decorative lighting apparatus 100 can generate any combination of colored light depending on the light source(s) 106 employed by decorative lighting apparatus 100. For example, light source(s) 106 may include one

or more light sources all producing the same color light (e.g., green) so that decorative lighting apparatus 100 only emits and projects one color light. Alternatively, light source(s) 106 may include multiple light sources capable of producing lights of various colors so that decorative lighting apparatus 100 can generate multiple different colored lights (e.g., red light and green light). Although the embodiments of the present invention are primarily described with respect to a decorative laser lighting apparatus generating two different colored lights (i.e., red light and green light), it is not limited thereto, and it should be noted that the exemplary apparatus and systems described herein may generate any combination of any number of different colored lights.

**[0017]** As shown in Figure 1, body 102 may be cylindrical in shape and preferably houses the mechanical and electrical components of decorative lighting apparatus 100. For example, body 102 may include housing 112, light source(s) 106, light cover 110, switch 108, switch visual indicator 114, and light sensor 116. Inside housing 112, body 102 may house electronic circuitry (not shown) that enables the electrical operation of decorative lighting apparatus 100, as well as various mechanical components (not shown) that facilitate the design and operation of decorative lighting apparatus 100. According to certain embodiments of the present invention, as shown in Figure 5A, decorative lighting apparatus 100 may also include a motion switch 118 to control a motion, modulation, or articulation of light source(s) 106.

**[0018]** As shown in Figures 1 and 2, body 102 may be coupled to pivoting arm 105 via a coupling element 116. According to certain embodiments of the present invention, coupling element 116 may include a nut and a hand screw, as shown in Figure 2. For example, projection 103 of body 102 may include a nut disposed within a recess which may prevent the nut from rotating, and pivoting arm 105 may include an opening through which the hand screw may pass. To secure pivoting arm 105 to body 102, the hand screw can pass through the opening in pivoting arm 105 and engage the nut disposed in projection 103 of body 102. Further, coupling element 116 may also allow body 102 to be rotatably adjusted relative to pivoting arm 105. For example, the surfaces of projection 103 and pivoting arm 105 which contact each other may be toothed or geared so that body 102 can be rotatably adjusted relative to pivoting arm 105 in discrete positions. Alternatively, the contacting surfaces can be smooth such that body 102 can be rotatably adjusted relative to pivoting arm 105 through a full range of motion. In operation, when the hand screw and the nut of coupling element 116 are not fully tightened, body 102 can be rotatably adjusted relative to pivoting arm 105 so that the angle at which the light is projected can be adjusted. After body 102 is positioned in a desired angle relative to pivoting arm 105, the hand screw of coupling element 116 can be tightened so that body 102 is substantially fixed relative to pivoting arm 105. Although coupling element 116 is shown as a screw and a nut, coupling element 116

can include any mechanism by which the angle of body 102 can be adjusted and fixed relative to pivoting arm 105, such as a hinge, or the like. According to certain embodiments of the present invention, body 102 is rotatably adjustable relative to pivoting arm 105 via a single pivoting point.

**[0019]** As shown in Figures 1 and 2, to facilitate positioning of decorative lighting apparatus 100 in a desired location and position, mounting element 104 is coupled to pivoting arm 105. According to certain embodiments, mounting element 104 and pivoting arm 105 can include complementary threads configured to engage each other to couple mounting element 104 and pivoting arm 105, allowing mounting element 104 and pivoting arm 105 to be screwed together. Alternatively, mounting element 104 and pivoting arm 105 can be coupled via any coupling engagement, such as a locking nut, an engaging projection and recess, etc. As shown in Figure 1, according to certain embodiments of the present invention, mounting element 104 may include a ground stake. This can enable decorative lighting apparatus 100 to be positioned outside by positioning and securing decorative lighting apparatus 100 in a material such as soil, grass, dirt, etc. by inserting the mounting element 104 into such material.

25

Although mounting element 104 is shown as a ground stake in Figure 1, alternatively, mounting element 104 can be any mechanism that facilitates positioning decorative lighting apparatus 100. For example, mounting element 104 may include a bracket, a clip, a platform, or

30

any other mechanism by which decorative lighting apparatus 100 may be located and/or positioned in a desired location.

**[0020]** As noted above, the operation of decorative lighting apparatus 100 can be controlled using switch

35

108. Although switch 108 is shown as a button, switch 108 can be any type of switch that can control the operation of decorative lighting apparatus 100, such as, e.g., a rocker switch, a toggle switch, a dimmer switch, a rotating switch, and the like. Preferably, switch 108 is dis-

40

posed on a top portion of body 102 to facilitate easy access to the switch by a user. For example, if decorative lighting apparatus 100 is placed outdoors in a discreet location, such as behind bushes or some other structure, locating switch 108 on a top portion of body 102 enables

45

a user to easily access switch 108 and operate decorative lighting apparatus 100. According to one embodiment, switch 108 may include weather-proofing elements to

protect switch 108, as well as other internal components of decorative lighting apparatus 100, from the exterior

50

environment, including weather. For example, weather-

55

proofing elements for switch 108 may include rubber, plastic, and/or other sealing elements to make it substan-

tially waterproof, water-repellant, dirt-proof, and the like.

As shown in Figure 7, according to one embodiment,

waterproofing switch 108 may include a rubber or plastic

cover 109 that can be disposed over switch 108. For ex-

ample, switch 108 can be received within cover 109 to

protect switch 108 from water and other environmental

elements. Cover 109 may include a main body 109a, within which switch 108 may be received, and an extension 109b. Extension 109b may be sealed on an interior surface of housing 112 to prevent water and other environmental elements from penetrating within the interior of housing 112, thereby protecting switch 108 and the interior of housing 112 from water and other environmental elements.

**[0021]** As shown in Figure 3A, according to certain embodiments of the present invention, switch 108 may include a rocker switch having switch portions 108a and 108b. As shown in Figures 3A, 3B, and 3C, switch 108 may include three positions and may be articulated between the various positions by pressing on switch portion 108a or 108b to articulate the switch in the directions depicted by arrows A and B.

**[0022]** According to certain embodiments of the present invention, Figure 3A shows switch 108 in an OFF position. In this OFF position, neither switch portion 108a nor 108b is depressed, and light sources 106 are in an off condition (i.e., not generating light) and decorative lighting apparatus 100 is therefore not emitting or projecting any light. In the OFF position, either switch portion 108a or 108b can be pressed in the directions depicted by arrows A and B, respectively, to articulate switch 108 into one of two ON positions.

**[0023]** Figure 3B shows switch 108 in a first ON position. In the position shown in Figure 3B, switch 108 may have been articulated from the OFF position shown in Figure 3A in the direction shown by the arrows. Specifically, the movement of switch portion 108b is shown by arrow A and the movement of switch portion 108a is shown by arrow B. For example, from the OFF position shown in Figure 3A, switch portion 108b may have been pressed to articulate switch 108 from the OFF position to this first ON position as shown in Figure 3B. According to certain embodiments of the present disclosure, in this first ON position, decorative lighting apparatus 100 may be operating in a first operating mode. For example, in an embodiment where light sources 106 produce red light and green light, this first ON position of switch 108 may correspond to an operation of decorative lighting apparatus 100 where light sources 106 producing both red light and green light are turned on so that decorative lighting apparatus 100 emits and projects both red light and green light.

**[0024]** Figure 3C shows switch 108 in a second ON position. In the position shown in Figure 3C, switch 108 may have been articulated from the OFF position in the direction shown by the arrows. Specifically, the movement of switch portion 108b is shown by arrow A and the movement of switch portion 108a is shown by arrow B. For example, from the OFF position shown in Figure 3A, switch portion 108a may have been pressed to articulate switch 108 from the OFF position to this second ON position as shown in Figure 3C. According to certain embodiments of the present disclosure, in this second ON position, decorative lighting apparatus 100 may be op-

erating in a second operating mode. For example, in an embodiment where light sources 106 produce red light and green light, this second ON position of switch 108 may correspond to an operation of decorative lighting apparatus 100 where only the light sources 106 which only produce green light are turned on so that decorative lighting apparatus 100 emits and projects only green light.

**[0025]** Figure 4 shows a top view of decorative lighting apparatus 100, including a view of body 102, switch 108, and switch visual indicator 114. As shown in Figure 4, according to certain embodiments of the present invention, switch visual indicator 114 may include portions 114a, 114b, and 114c. Portions 114a, 114b, and 114c can include visual indicators that correlate the position of switch 108 to the operating modes of decorative lighting apparatus 100. For example, portion 114b may include a green color and portion 114c may include a red color. These colors may correspond to the first operating mode described with respect to Figure 3B, where decorative lighting apparatus 100 emits and projects both green light and red light. Accordingly, articulating switch 108 toward the side of visual indicator 114 which includes green portion 114b and red portion 114c can activate the light sources 106 which produce green light and red light. Thus, articulating switch 108 in this direction would turn decorative lighting apparatus 100 on to emit and project both red light and green light. Further, portion 114a may include only a green portion and may correspond to the second operating mode of decorative lighting apparatus 100 described above with respect to Figure 3C. Similarly, articulating switch 108 towards the side of visual indicator 114 which only includes green portion 114a can activate only the light sources 106 which produce green light, thereby activating decorative lighting apparatus 100 to emit and project only green light.

**[0026]** Light sensor 116 can also control the operation of decorative lighting apparatus 100 in conjunction with switch 108. According to certain embodiments of the present invention, light sensor 116 measures the ambient light present and can control whether light sources 106 are on or off. For example, assuming that switch 108 is in one of the two operating modes described above, light sensor may turn the appropriate light sources 106 on or off depending on the level of ambient light measured by light sensor 116. During the day, when light sensor 116 measures a level ambient light above a certain predetermined threshold, light sensor 116 may turn light sources 106 off, regardless of the position of switch 108. When the level of ambient light measured by light sensor 116 drops below the predetermined threshold (e.g., as it becomes night), light sensors 116 may allow light sources 106 to operate as dictated by switch 108. Accordingly, the operation of light sensor 116 can extend the lifetime of decorative lighting apparatus 100, prevent overheating of decorative lighting apparatus 100, and provide energy savings by ensuring that decorative lighting apparatus 100 is not operating continuously during high levels of

ambient light when the light emitted and projected by decorative lighting apparatus 100 may be difficult to see in any event.

**[0027]** As shown in Figure 5A, according to certain embodiments of the present invention, decorative lighting apparatus 100 may also include a motion switch 118. Similar to switch 108, motion switch 118 may also be disposed on a top portion of body 102 to enable a user to easily access switch 118, especially while decorative lighting apparatus 100 is positioned in use where access to other portions of decorative lighting apparatus 100 may be hindered or difficult. Motion switch 118 may also optionally include weather-proofing elements to protect motion switch 118, as well as other internal components of decorative lighting apparatus 100, from the exterior environment, including weather. For example, weather-proofing elements for motion switch 118 may include rubber, plastic, and/or other sealing elements to make it substantially waterproof, dirt-proof, and the like.

**[0028]** As noted above, motion switch 118 may control any visual and/or optical effect that can be produced by decorative lighting apparatus 100, such as a motion, modulation, or articulation of the light produced by light source(s) 106. For example, motion switch 118 may turn on and off the various visual and/or optical effects produced by decorative lighting apparatus 100, such as pulsing light sources 106, activating the colored lights being produced by light sources 106 in a pattern (e.g., first red, then green, then red, the together, etc.), moving the light being emitted and projected by decorative lighting apparatus 100. Moving the light being emitted and projected by decorative lighting apparatus 100 may be achieved by moving a reflective element within decorative lighting apparatus 100 so that the light projected by decorative lighting apparatus 100 on a target surface moves.

**[0029]** Figure 5B shows an exploded view of motion assembly 500 according to an embodiment of the present invention. According to an embodiment, motion assembly 500 may enable the movement, modulation, and/or articulation of the light which is controlled by motion switch 118. As shown in Figure 5B, according to an embodiment of the present invention, motion assembly 500 may include a motor 502, a connecting shaft 504, gears 506 and 508, articulating optical elements 510, articulating covers 512, a fixed optical elements seat 514, fixed optical elements 516, and fixed covers 518. Articulating optical elements 510 and/or fixed optical elements 516 may include attenuators as described herein and may be disposed in gears 508 or fixed optical elements seat 514 and secured via articulating covers 512 or fixed covers 518. Articulating optical elements 510 and fixed optical elements 516 may include any type of optical component, such as a lens, a diffracting element, an attenuator, etc., and may be disposed within a recess of gears 508 and fixed optical elements seat 514 and secured via articulating covers 512 and fixed covers 518, respectively. Motion switch 118 may control activation of motor 502. Once activated, motor 502 may provide a rotating or oscillating

motion which may be transferred via a linkage, such as connecting shaft 504, to gear 506. The rotating or oscillating motion provided by motor 502 may rotate or oscillate gear 506, which may in turn rotate or oscillate gears 508. As shown in Figure 5B, articulating optical elements 510 may be secured within recesses of gears 508. Alternatively, articulating optical elements 510 may be secured on a separate component which may be coupled to gears 506 and/or 508 and thereby articulated via the coupling mechanism to gears 506 and/or 508. Accordingly, optical elements 510 may then be rotated or oscillated in accordance with the rotating and/or oscillating motion of gears 508.

**[0030]** In operation, when light sources 106 can be turned on via switch 108, and the motion, movement, modulation, and/or articulation or the light is activated via motion switch 118. Once light sources 106 are turned on, the light generated by light sources 106 passes through articulating optical elements 510, which are articulated by motor 502. Accordingly, as the light passes through articulating optical elements 510, the light is articulated, in accordance with the motion provided by motor 502, on the surface onto which decorative lighting apparatus 100 is projecting the light. For example, if the light is being projected on a wall, the articulation of the articulating optical elements 510 may cause the light to move across the surface of the wall. For example, the light may rotate in a circular manner, the light may oscillate linearly or rotationally about an axis, etc. on the surface on which the light is being projected. Further, articulating optical elements 510 and/or fixed optical elements 516 may include optical features to scatter, or create patterns in the light being projected.

**[0031]** Figure 6A shows an exploded view of attenuator assembly 620 of decorative lighting apparatus 100 according to certain embodiments of the present invention. As shown in Figure 6A, attenuator assembly 620 includes attenuator lower housing 602, attenuator lower base 604, attenuators 606, attenuator upper base 608, attenuator upper housing 610, and fastening elements 612 and 614. Attenuator assembly 620 positions and secures attenuator 606 in the path of the light generated by light source 106 within body 102 of decorative lighting apparatus 100. According to some embodiments of the present invention, optical elements 510 and/or fixed optical elements 516 shown in Figure 5B may include attenuator 606, and attenuator assembly 620 may be used in conjunction with motion assembly 500, as shown and described with respect to Figure 5B. Although Figure 6A shows decorative lighting apparatus 100 only having two attenuators 606, decorative lighting apparatus 100 preferably includes an attenuator 606 for each light source 106 included in decorative lighting apparatus 100. Thus, if decorative lighting apparatus 100 were to include five light sources 106, decorative lighting apparatus 100 would preferably include five attenuators 606. Accordingly, embodiments of the present invention contemplate modifications to attenuator assembly 620 shown in Figure 6A to accommodate

any number of attenuators 606 that may be required in view of the number of light sources 106 employed by decorative lighting apparatus 100.

**[0032]** According to certain embodiments of the present invention, attenuators 606 can include any type of attenuating device to be placed in the path of the light generated by light sources 106. For example, attenuator 606 can include an opening/slit or a lens to diffract and/or scatter the light produced by light source 106. Alternatively, attenuators can include an optical attenuator (e.g., fixed, variable, etc.) to reduce the power of the light produced by light sources 106. Attenuators may be necessary where light sources 106 include lasers since lasers can be dangerous and can cause damage to eyesight. Although attenuator 606 is shown to be substantially square, attenuator 606 may be any shape, such as a circle, rectangle, triangle, hexagon, octagon, or any other shape. Figure 6B shows an exemplary scatter pattern 690 that may be employed by attenuator 606. Attenuator 606 is not limited to the scatter pattern 690 shown in Figure 6B. Attenuator 606 may include any scattering or attenuating elements therein.

**[0033]** As shown in Figure 6A, attenuator assembly 620 includes attenuator 606 disposed between upper and lower attenuator bases 604 and 608, which is disposed between upper and lower attenuator housings 602 and 610. Upper and lower attenuator bases 604 and 608 can include complementary designs and, when coupled together, preferably form a recess shaped and configured to receive attenuator 606 such that attenuator 606 is held in a substantially fixed position. Similarly, upper and lower attenuator housings 602 and 610 can include complementary designs and preferably include a recess, when coupled together, shaped and configured to receive the assembled upper and lower attenuator bases 604 and 608 such that the assembled upper and lower attenuator bases 604 and 608 are held in a substantially fixed position. The assembled attenuator assembly 620 can be held together and mounted within housing 112 by fastening devices 612 and 614. Although fastening devices 612 and 614 are shown as screws, fastening devices 612 and 614 may include any type of mechanism that can hold attenuator assembly 620 together and/or mount attenuator assembly 620 within housing 112 of body 102, such as snap-fits, adhesives, glue, screws, bolts, Velcro, hinges or any other fastening mechanisms. Accordingly, fastening devices 612 and 614 can secure attenuator assembly 620 together and position attenuator 606 in the path of the light generated by light sources 106.

**[0034]** According to certain embodiments of the present invention, decorative lighting apparatus 100 may include an anti-theft device. For example, decorative lighting apparatus 100 may include an anti-theft device that includes a proximity sensor disposed within decorative lighting apparatus 100 and a base unit that may be disposed in a secure location, such as inside a home. The anti-theft device may be configured that the proximity

sensor disposed within decorative lighting apparatus 100 and the base unit must remain within a certain distance to each other for decorative lighting apparatus 100 to be operable. If the distance between the proximity sensor with decorative lighting apparatus 100 and the base unit exceeds a certain threshold distance (e.g., if decorative lighting apparatus 100 had been placed outside and is stolen and removed from the premises), anti-theft device preferably renders decorative lighting apparatus 100 inoperable. Alternatively or additionally, once the anti-theft device is activated, decorative lighting apparatus 100 may also include an audio and/or visual alerting mechanism, such as flashing lights, emitting a sound, etc. The anti-theft device may include other features, such as a key-pad to enable utilizing a security code, a biometric sensor, a motion sensor, etc.

**[0035]** According to yet another embodiment of the present invention, decorative lighting apparatus 100 may include a solar power module configured to power decorative lighting apparatus 100. For example, decorative lighting apparatus 100 may include solar panels, such as photovoltaic panels, which can convert solar energy into electricity and store the electricity in a storage medium, such as batteries or capacitors, which can then be used to power decorative lighting apparatus 100. This can remove the need for decorative lighting apparatus 100 to be connected to an external power supply by, for example, having to run extension cords to the location of decorative lighting apparatus 100. Accordingly, this can enable decorative lighting apparatus 100 to be more easily placed and positioned in virtually any location.

**[0036]** The embodiments and examples shown above are illustrative, and many variations can be introduced to them without departing from the spirit of the disclosure or from the scope of the appended claims. For example, elements and/or features of different illustrative and exemplary embodiments herein may be combined with each other and/or substituted with each other within the scope of the disclosure. For a better understanding of the disclosure, reference should be had to the accompanying drawings and descriptive matter in which there is illustrated exemplary embodiments of the present invention.

45

## Claims

1. A motion assembly for a decorative lighting apparatus, the motion assembly comprising:

50

an articulating element configured to secure an optical element in a path of a light being generated by the decorative lighting apparatus; and a motor coupled to the articulating element via a linkage such that a movement generated by the motor is imparted to the articulating element so that the light passing through the optical element is articulated when projected onto a sur-

face.

2. The motion assembly of claim 1, wherein the articulating element includes gears.

3. The motion assembly of claim 1, further comprising a second articulating element configured to secure a second optical element in a second path of a second light being generated by the decorative lighting apparatus, wherein the motor is coupled to the second articulating element via the linkage such that a movement generated by the motor is imparted to the second articulating element so that the second light passing through the second optical element is articulated when projected onto a surface.

4. The motion assembly of claim 1, further comprising an optical element cover configured to secure the optical element to the articulating element.

5. The motion assembly of claim 1, further comprising an attenuator positioned in the path of the light.

6. A decorative lighting apparatus comprising:  
 at least one light source;  
 a motion assembly including:  
 an articulating element configured to secure an optical element in a path of a light being generated by the at least one light source; and  
 a motor coupled to the articulating element via a linkage such that a movement generated by the motor is imparted to the articulating element so that the light passing through the optical element is articulated when projected onto a surface.

7. The decorative lighting apparatus of claim 6, further comprising:  
 an attenuation assembly including:  
 an attenuator; and  
 a first housing being configured to be coupled to a second housing, when the first housing is coupled to the second housing, the first and second housings form a recess designed and dimensioned to receive and hold the attenuator in a substantially fixed position in the path of the light being generated by the at least one light source.

8. The decorative lighting apparatus of claim 6, wherein the at least one light source includes a laser.

9. The decorative lighting apparatus of claim 6, wherein the articulating element includes gears.

10. The decorative lighting apparatus of claim 6, further comprising a second articulating element configured to secure a second optical element in a second path of a second light being generated by the decorative lighting apparatus, wherein the motor is coupled to the second articulating element via the linkage such that a movement generated by the motor is imparted to the second articulating element so that the second light passing through the second optical element is articulated when projected onto a surface.

11. The decorative lighting apparatus of claim 6, further comprising an optical element cover configured to secure the optical element to the articulating element.

12. The decorative lighting apparatus of claim 6, further comprising an attenuator positioned in the path of the light

13. A laser light decorative lighting apparatus, comprising:  
 a first laser light source providing a first light having a first color;  
 a second laser light source providing a second light having a second color,  
 a first switch including a first position corresponding to the first light source and the second light source being in an off condition, a second position corresponding to the first light source being in an on condition and the second light source being in an off condition, and a third position corresponding to the first light source and the second light source being in an on condition;  
 a visual indicator including a first colored portion corresponding to the first color and corresponding to the second position of the first switch and a second colored portion corresponding to the first color and the second color and corresponding to the third position of the first switch; and  
 a second switch for controlling activation of a motion assembly, the motion assembly including:  
 an articulating element configured to secure a first optical element in a first path of the first light being generated by the first laser light source and a second optical element in a second path of the second light being generated by the second laser light source; and  
 a motor coupled to the articulating element via a linkage such that a movement generated by the motor is imparted to the articulating element so that the first light and the second light passing through the first and second optical elements are articulated when projected onto a surface.

14. The laser light decorative lighting apparatus of claim 13, further comprising:

an attenuation assembly including:

5

a first attenuator;  
a second attenuator; and  
a first housing being configured to be coupled to a second housing,  
when the first housing is coupled to the second housing, the first and second housings form a first recess and a second recess, the first and second recesses designed and dimensioned to receive and hold the first and second attenuators in a substantially fixed position in the first and second paths of the first and second lights being generated by the first and second laser light sources, respectively.

10

15

20

15. The laser light decorative lighting apparatus of claim 13, wherein the articulating element includes gears.

16. The laser light decorative lighting apparatus of claim 13, further comprising an optical element cover configured to secure the optical element to the articulating element.

25

17. The laser light decorative lighting apparatus of claim 14, further comprising a light sensor configured to measure a level ambient of light and control the first laser light source and the second laser light source based on the measured level of ambient light.

30

35

40

45

50

55

FIG. 1

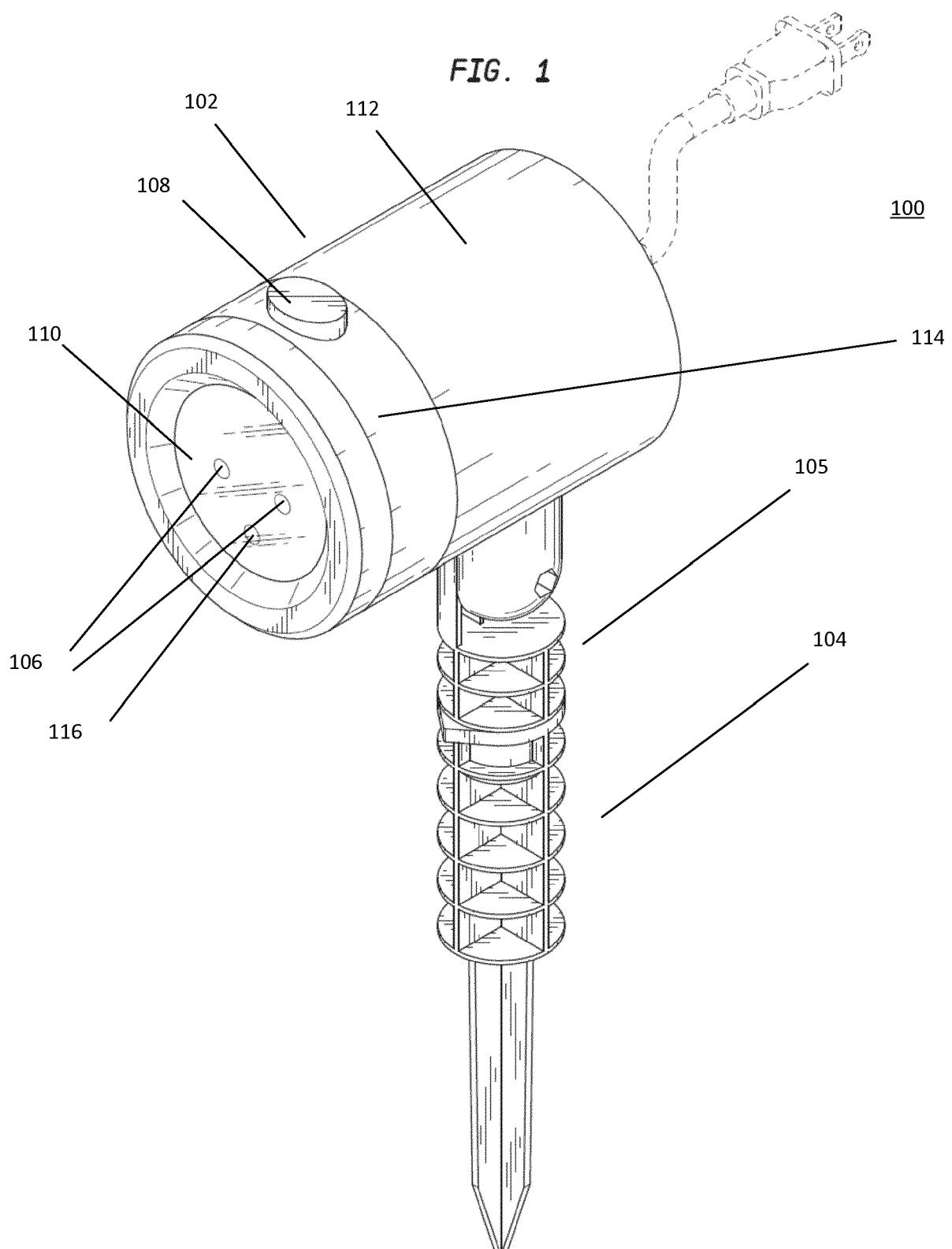
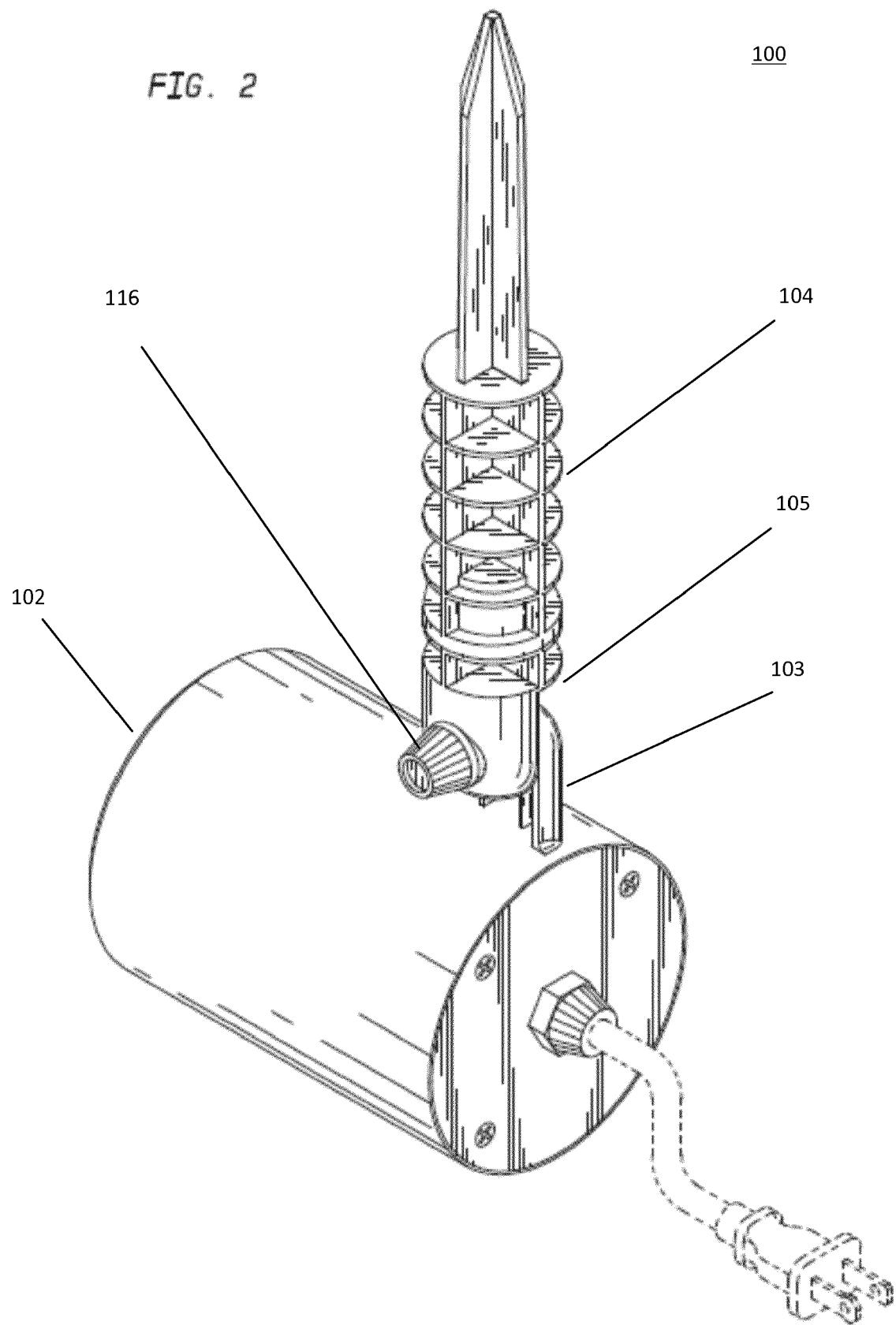
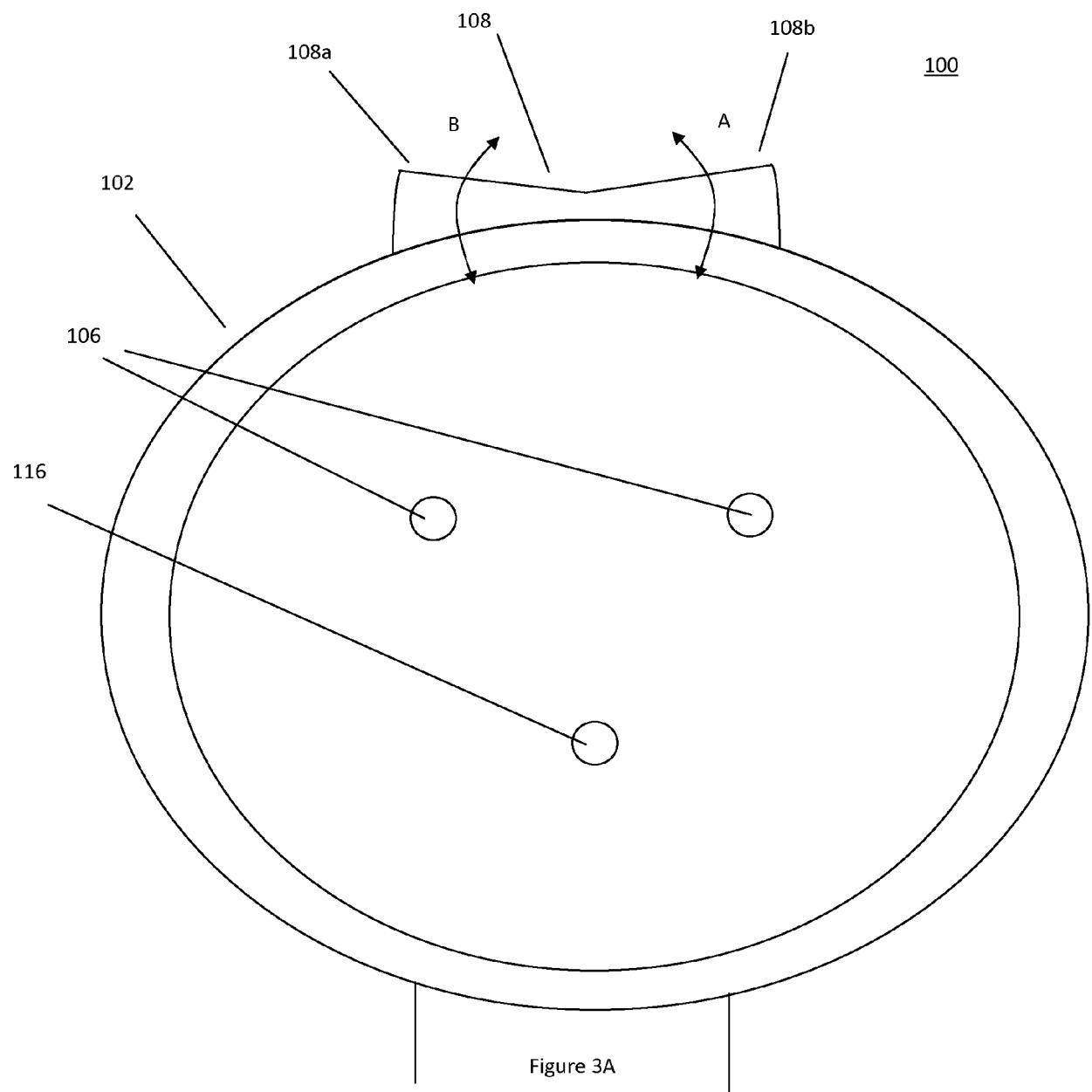
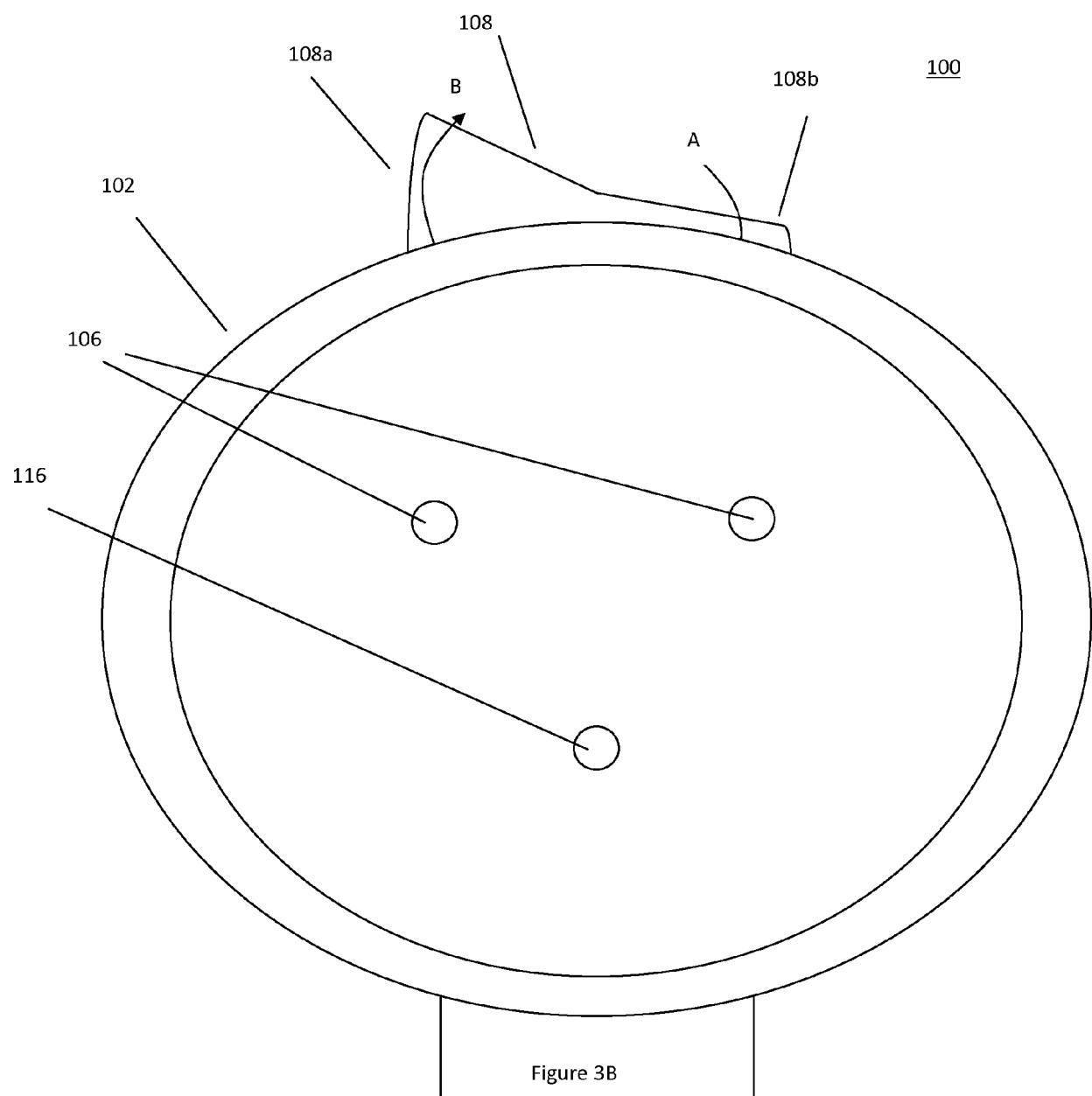
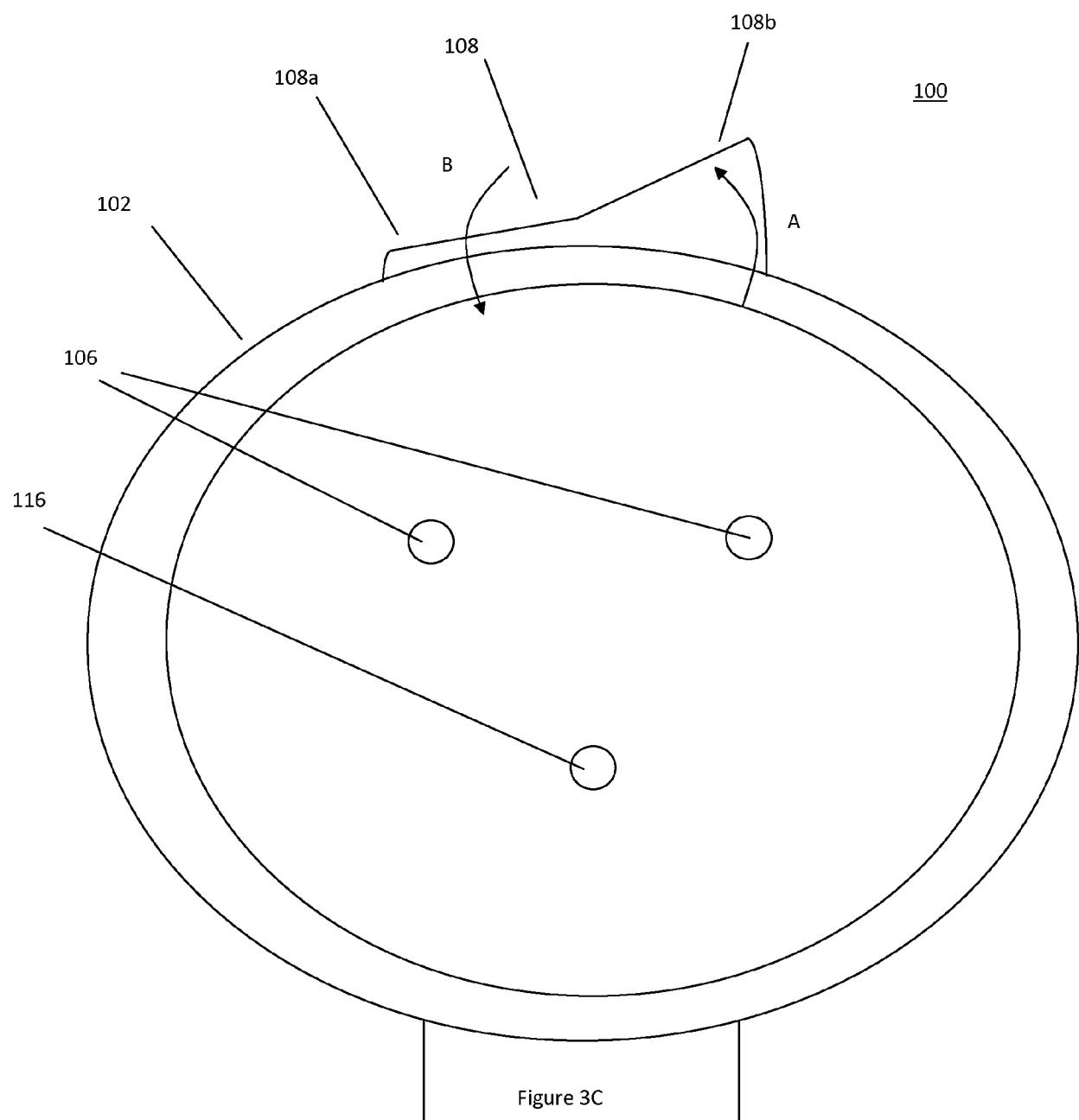


FIG. 2









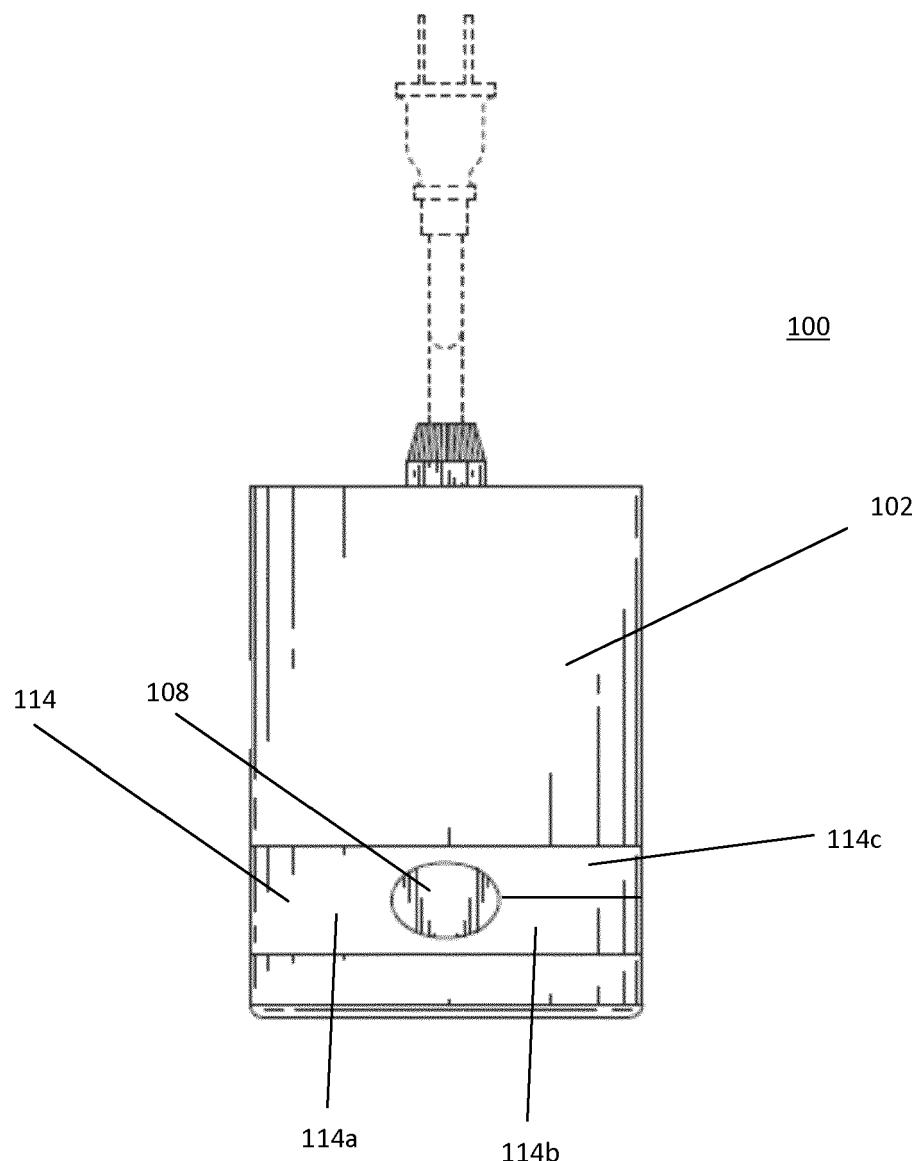


Figure 4

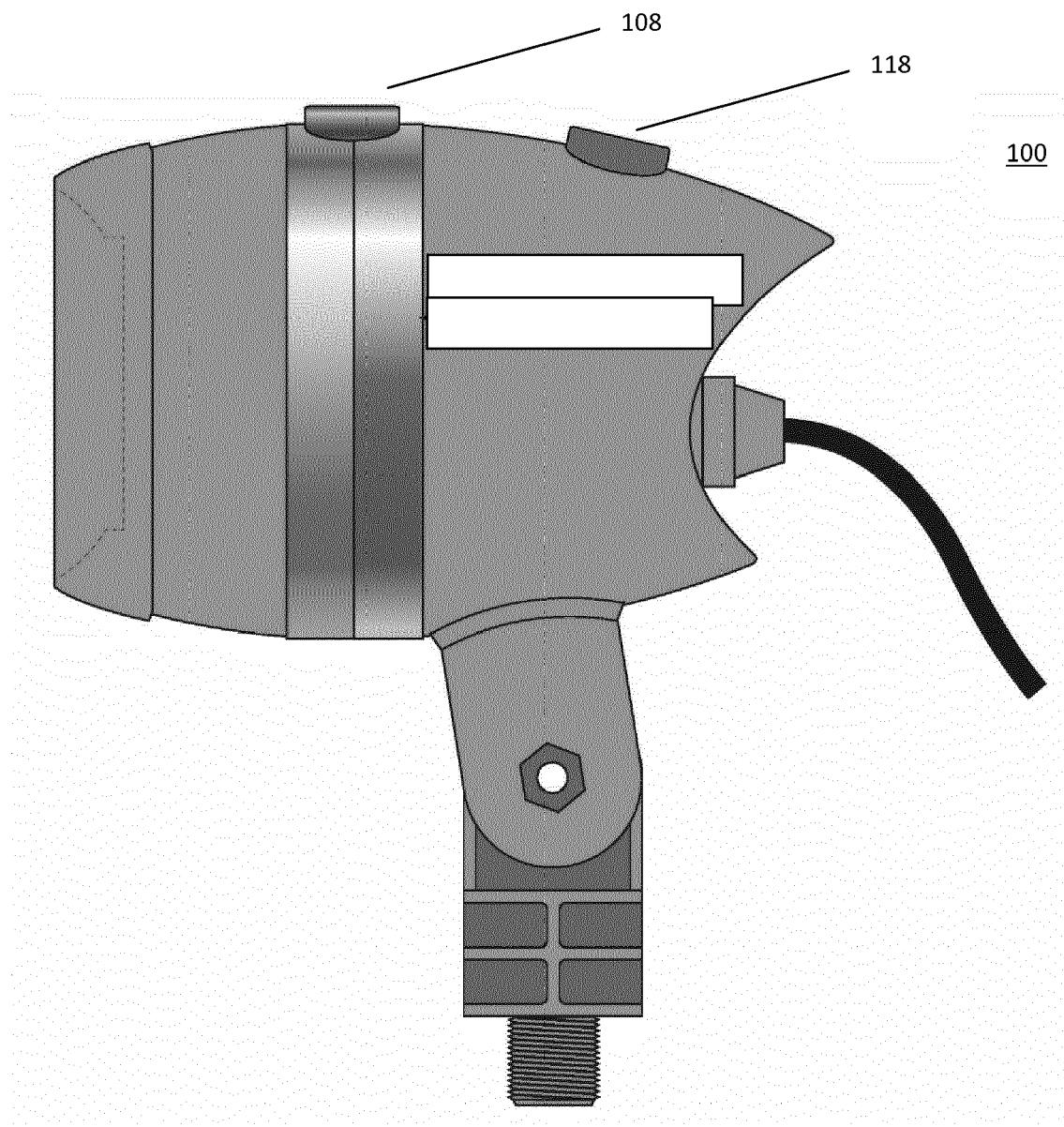


Figure 5A

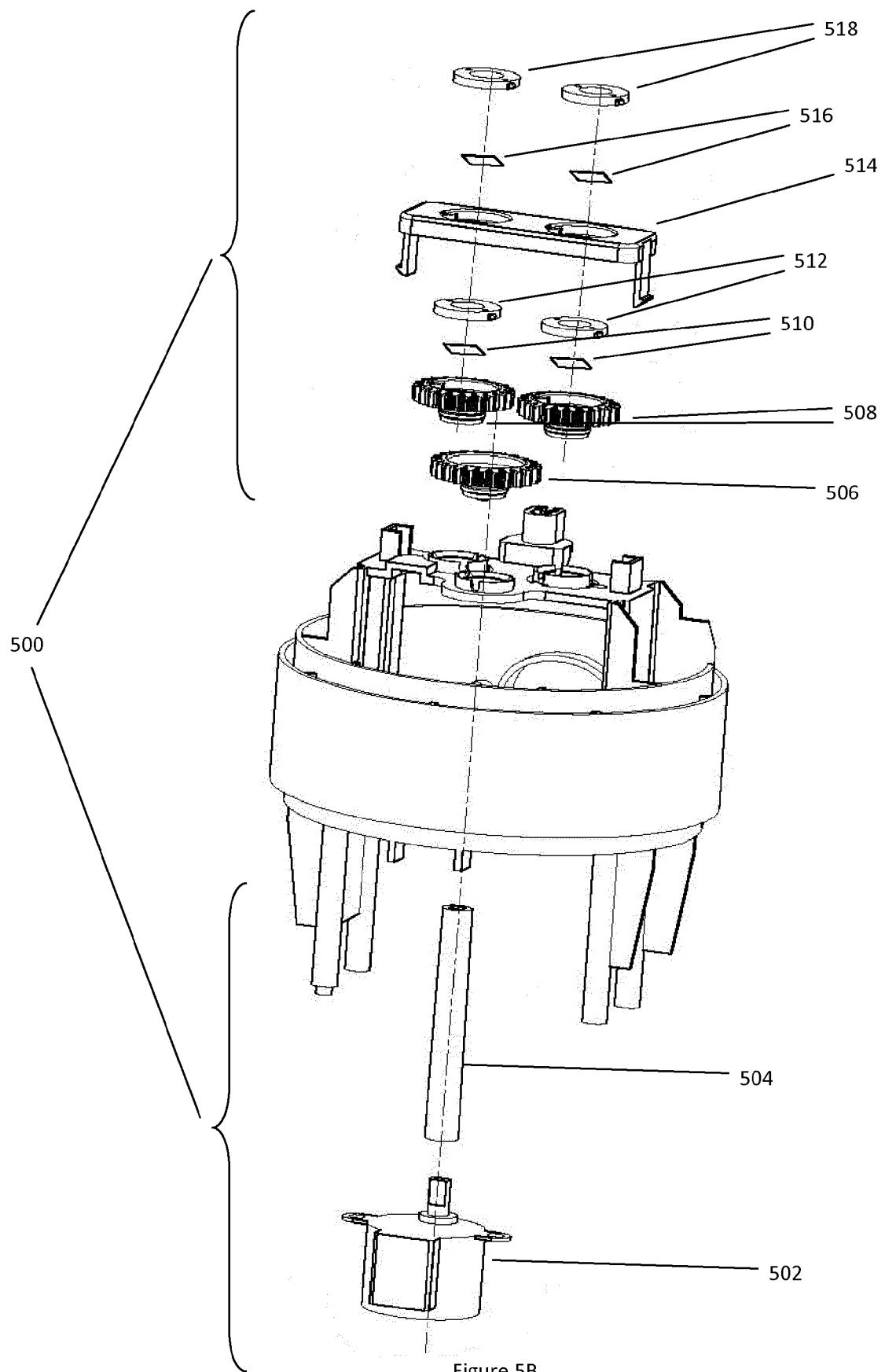


Figure 5B

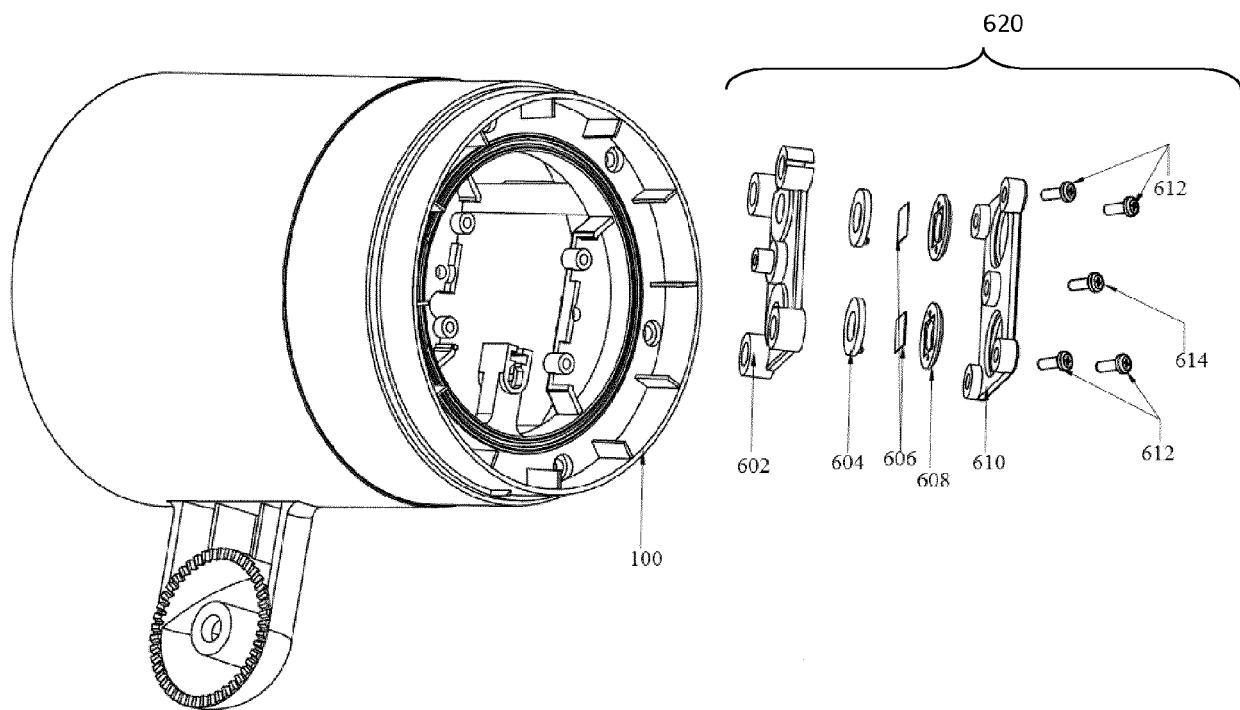


Figure 6A

Dots Quantity: 800  
Beam Angle: > 90°  
Texture: Polymers  
Area: 50mm X 50mm  
Evenness: 90%

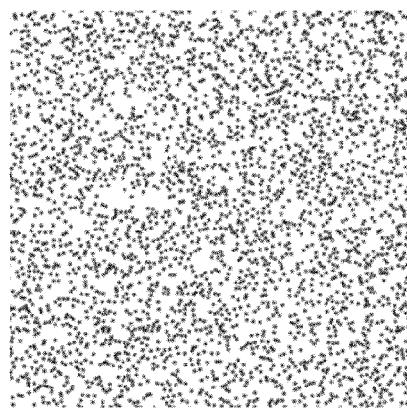


Figure 6B

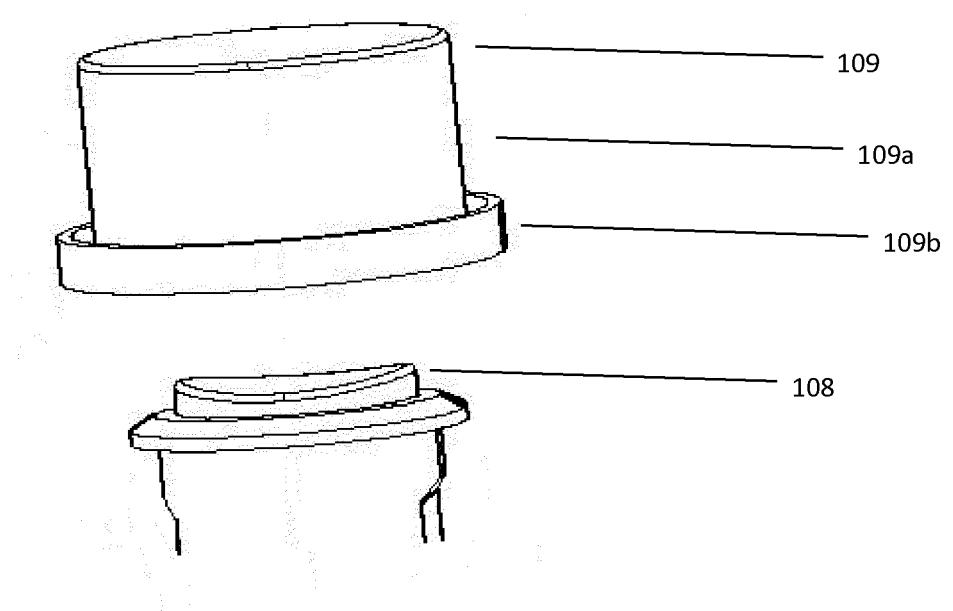


Figure 7



## EUROPEAN SEARCH REPORT

Application Number

EP 16 19 7895

5

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
10 X	US 6 474 837 B1 (BELLIVEAU RICHARD S [US]) 5 November 2002 (2002-11-05) * column 5 - column 14 * * figures 1-9 * -----	1-12	INV. F21V23/04 F21S10/02 F21S10/06 F21S10/00 F21V21/08
15 X	US 2014/328060 A1 (GADEGAARD JESPER [DK] ET AL) 6 November 2014 (2014-11-06) * paragraph [0026] - paragraph [0043] * * figures 2a, 2b * -----	1,2,4-9, 11,12	ADD. F21W131/107 F21Y115/30 F21Y101/00 F21Y113/13
20 X	US 2005/243560 A1 (CHEN SHIH-HSIEN [TW]) 3 November 2005 (2005-11-03) * the whole document * -----	1-12	
25 A	CN 204 629 169 U (HUBEI XIANGJIANG ELECTRICAL APPLIANCE CO LTD) 9 September 2015 (2015-09-09) * the whole document * -----	1-17	
30			TECHNICAL FIELDS SEARCHED (IPC)
			F21V F21W F21Y F21S
35			
40			
45			
50 1	The present search report has been drawn up for all claims		
55	Place of search The Hague	Date of completion of the search 20 April 2017	Examiner Demirel, Mehmet
	CATEGORY OF CITED DOCUMENTS	T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ..... & : member of the same patent family, corresponding document	
	X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		

**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

EP 16 19 7895

5 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 The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

20-04-2017

10	Patent document cited in search report	Publication date		Patent family member(s)	Publication date
	US 6474837 B1	05-11-2002	US	RE40015 E	22-01-2008
			US	6474837 B1	05-11-2002
15	US 2014328060 A1	06-11-2014	CN	103998859 A	20-08-2014
			EP	2795185 A1	29-10-2014
			US	2014328060 A1	06-11-2014
			WO	2013091654 A1	27-06-2013
20	US 2005243560 A1	03-11-2005	DE	202005001704 U1	25-05-2005
			JP	3110149 U	16-06-2005
			US	2005243560 A1	03-11-2005
25	CN 204629169 U	09-09-2015		NONE	
30					
35					
40					
45					
50					
55					

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

**REFERENCES CITED IN THE DESCRIPTION**

*This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.*

**Patent documents cited in the description**

- US 95865715 A [0001]
- US 95866715 A [0001]