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(54) OSCILLATING RANGE ADJUSTING MODULE FOR USE IN OSCILLATING SPRINKLERS

OSZILLIERENDES BEREICHSEINSTELLMODUL ZUR VERWENDUNG IN OSZILLIERENDEN
SPRINKLERN

MODULE DE RÉGLAGE DE PLAGE D'OSCILLATION POUR UNE UTILISATION DANS DES
PULVÉRISATEURS OSCILLANTS

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Description

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] The present invention relates to the technology field of water sprinklers, and more particularly to an oscillating range adjusting module for use in an oscillating sprinkler.

2. Description of the Prior Art

[0002] A water sprinkler is one kind of necessary device for horticultural irrigation, which is used for wide-rangingly providing water flowing out from a faucet to the flowers, lawn, and/or trees cultivated in nursery garden. Nowadays, conventional water sprinklers have been known, including water spray guns, impact water sprinklers, oscillating water sprinklers, rotary water sprinklers and swing arm water sprinklers.

[0003] U.S. Patent US 7,931,214 B2 discloses an oscillating sprinkler according to the prior art. U.S. Patent US 9,764,340 B2 discloses another conventional oscillating sprinkler. FIG. 1 shows a stereo diagram of the conventional oscillating sprinkler as disclosed by US 9,764,340 B2. From FIG. 1, it is understood that the conventional oscillating sprinkler 100' comprises several principal constituting modules and units of a spraying nozzle module 108', an oscillation driving module 106', an oscillation range limiter consisting of a first limiting unit 180' and a second limiting unit 182'. FIG. 2 shows an exploded view of the oscillation range limiter. As illustrated in FIG. 2, the first limiting unit 180' has a first circular-shaped substrate, wherein a first arc-shaped perforation groove 188' and a first circular-shaped wall 184' are formed on the top surface and the peripheral sides of the first circular-shaped substrate, respectively. In addition, there is a first stopping block 186' provided at one end of the first arc-shaped perforation groove 188'. On the other hand, the second limiting unit 182' has a second circular-shaped substrate, wherein a second arc-shaped perforation groove 194' and a second circular-shaped wall 190' are formed on the top surface and the peripheral sides of the second circular-shaped substrate, respectively. Moreover, there is a second stopping block 192' provided at one end of the first arc-shaped perforation groove 194'.

[0004] It needs to be particularly explained that, when assembling the conventional oscillating sprinkler 100', the oscillation range limiter is connected between the oscillation driving module 106' and a water inlet module, for example implemented by the element with the numeric symbol of 110 shown in FIG. 2 of U.S. Patent US 9,764,340 B2. As described in more detail below, an inlet tube of the water inlet module is simultaneously assembled with a center opening of the first circular-shaped substrate and a center opening of the second circular-

shaped substrate through riveting. However, other currently commercially available oscillating sprinklers are all designed to have a modular structure in order to allow any two of the principal constituting modules and units of one oscillating sprinkler being directly assembled without using any other assembling processes like riveting. However, since the water inlet module must be riveted with the first circular-shaped substrate and the second circular-shaped substrate, the conventional oscillating sprinkler 100' disclosed by US 9,764,340 B2 does not have a modular structure and therefore fails to be compatible with a current modularization assembly line.

[0005] From the above description it is understood that it is necessary to redesign the structure of an oscillation range limiter consisting of a first limiting unit 180' and a second limiting unit 182', so that the oscillation range limiter can be directly assembled with the water inlet module and the oscillation driving module 106'. Accordingly, the inventors of the present application have made great efforts to make inventive research and eventually provided an oscillating range adjusting module for use in oscillating sprinklers.

SUMMARY OF THE INVENTION

[0006] The primary objective of the present invention is to provide an oscillating range adjusting module for use in oscillating sprinklers, which is connected between a water inlet module and an oscillation driving module, and mainly comprises a first adjusting unit and a second adjusting unit. For assembling the oscillating range adjusting module, the water inlet module and the oscillation driving module, it just needs to firstly connect an inlet tube of the water inlet module and an O-ring seal to the first adjusting unit, and then to connect a second adjusting unit to the inlet tube and the first adjusting unit, such that at least one snapping member of the second adjusting unit could snap at least one combination platform of the first adjusting unit. Consequently, a modularization assembly is therefore achieved for the oscillating range adjusting module, the water inlet module and the oscillation driving module after a water inlet port of the oscillation driving module has been connected to the second adjusting unit.

[0007] In order to achieve the primary objective, the present invention provides an oscillating range adjusting module according to claim 1. Preferred embodiments thereof are represented in the dependent claims. The oscillating range adjusting module according to the present invention is for use in an oscillating sprinkler, which is connected between a water inlet module and an oscillation driving module, the oscillating range adjusting module comprising:

a first adjusting unit, comprising:

a first circular-shaped substrate;
a first circular-shaped peripheral wall, being

formed on a top surface of the first circular-shaped substrate; and
a first arc-shaped perforation groove, being formed on the first circular-shaped substrate; and

a second adjusting unit, comprising:

a second circular-shaped substrate, a top surface thereof being connected to a bottom surface of the first circular-shaped substrate ;
a second circular-shaped peripheral wall, being formed on a bottom surface of the second circular-shaped substrate; and
a second arc-shaped perforation groove, being formed on the second circular-shaped substrate;

wherein the oscillating range adjusting module system is characterized in that the first adjusting unit further comprises:

a hollow cylinder member, being formed on a center of the first circular-shaped substrate for use in connection with an inlet tube of the water inlet module; and
at least one combination platform, being connected to peripheral sides of a bottom end of the hollow cylinder member;

wherein the oscillating range adjusting module system is further characterized in that the second adjusting unit further comprises:

at least one snapping member, being formed on a top surface of the second circular-shaped substrate and being configured for snapping the at least one combination platform, when the second circular-shaped substrate is connected to the first circular-shaped substrate; and

a combination hole, being formed on a center of the second circular-shaped substrate and being adopted for connecting between the bottom end of the hollow cylinder member and a water inlet port of the oscillation driving module.

[0008] In one preferred embodiment, the oscillating range adjusting module further includes an O-ring seal disposed between the bottom end of the hollow cylinder member and an edge of the combination hole.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] The invention as well as a preferred mode of use and advantages thereof will be best understood by referring to the following detailed description of an illustrative embodiment in conjunction with the accompany-

ing drawings, wherein:

- FIG. 1 shows a stereo diagram of a conventional oscillating sprinkler according to the prior art document US 9,764,340 B2;
- FIG. 2 shows an exploded view of an oscillation range limiter according to the prior art;
- FIG. 3 shows a first three-dimensional view of an oscillating sprinkler integrated with an oscillating range adjusting module according to the present invention;
- FIG. 4 shows a second three-dimensional view of the oscillating sprinkler integrated with an oscillating range adjusting module according to the present invention;
- FIG. 5 shows a first three-dimensional view of an oscillation driving module in combination with an oscillating range adjusting module of the present invention;
- FIG. 6 shows a cross-sectional view of the oscillating range adjusting module of the present invention;
- FIG. 7 shows a first exploded view of the oscillating range adjusting module of the present invention;
- FIG. 8 shows a second exploded view of the oscillating range adjusting module of the present invention;
- FIG. 9 shows a front view of a first adjusting unit of the oscillating range adjusting module of the present invention;
- FIG. 10 shows a front view of a second adjusting unit of the oscillating range adjusting module of the present invention;
- FIG. 11 shows a rear view of the first adjusting unit;
- FIG. 12 shows a rear view of the second adjusting unit;
- FIG. 13 shows a first front view of the oscillating range adjusting module of the present invention;
- FIG. 14 shows another three-dimensional view of the oscillation driving module in combination with the oscillating range adjusting module of the present invention;
- FIG. 15 shows a second front view of the oscillating range adjusting module of the present invention; and
- FIG. 16 shows still another three-dimensional view of the oscillation driving module in combination with the oscillating range adjusting module of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0010] To more clearly describe an oscillating range adjusting module for use in an oscillating sprinkler according to the present invention, some preferred embodiments of the present invention will be described herein-

after in detail with reference to the attached drawings.

[0011] With reference to FIG. 3, a first schematic three-dimensional view of an oscillating sprinkler 1 integrated with an oscillating range adjusting module according to the present invention is shown. Moreover, FIG. 4 shows a second three-dimensional view of the oscillating sprinkler 1 integrated with an oscillating range adjusting module according to the present invention. By comparing FIG. 4 with FIG. 3, it can be easily understood that the oscillating sprinkler 1 shown in FIG. 4 differs in that it does not comprise a supporting base. Therefore, as shown in both FIG. 3 and FIG. 4, an oscillating sprinkler 1 mainly comprises a hose connecting module 14, a water inlet module 12, an oscillating range adjusting module 10 (i.e. the one proposed by the present invention), an oscillation driving module 11 and a spraying nozzle module 13, wherein the oscillating range adjusting module 10 of the present invention is connected between the oscillation driving module 11 and the water inlet module 12.

[0012] Further reference is made to FIG. 3 and FIG. 4 and simultaneously it is referred to FIG. 5 and FIG. 6, in which FIG. 5 shows a first three-dimensional view of an oscillation driving module in combination with the oscillating range adjusting module of the present invention, and FIG. 6 shows a cross-sectional view of the oscillating range adjusting module of the present invention. In addition, FIG. 7 shows a first exploded view of the oscillating range adjusting module of the present invention and FIG. 8 shows a second exploded view of the oscillating range adjusting module of the present invention. According to the particular design of the present invention, the oscillating range adjusting module 10 mainly comprises a first adjusting unit 101, a second adjusting unit 102 and an O-ring seal 103. As illustrated in FIG. 6, 7 and 8 the first adjusting unit 101 comprises a first circular-shaped substrate 1011, a first arc-shaped perforation groove 1015 and a first circular-shaped peripheral wall 1012, wherein the first circular-shaped peripheral wall 1012 is formed on a top surface of the first circular-shaped substrate 1011, and wherein the first arc-shaped perforation groove 1015 is formed on the first circular-shaped substrate 1011. Moreover, a hollow cylinder member 1013 is formed on a center of the first circular-shaped substrate 1011 for use in connection with an inlet tube of a water inlet module 12. Particularly, there is an embedding groove 10E formed on an inner surface of the hollow cylinder member 1013 for receiving an O-ring seal.

[0013] According to the particular design of the present invention, the first arc-shaped perforation groove 1015 and a third arc-shaped perforation groove 1014 are formed on the first circular-shaped substrate 1011. As shown in FIG. 7 and 8, the first arc-shaped perforation groove 1015 is located at a position below the hollow cylinder member 1013 and near the first circular-shaped peripheral wall 1012. On the other hand, the third arc-shaped perforation groove 1014 is located above the hollow cylinder member 1013 and near the first circular-shaped peripheral wall 1012. It is worth noting that at

least one combination platform 10P1, 10P2 is connected to the peripheral sides of a bottom end of the hollow cylinder member 1013. The term "at least one" in the above description means that the number of combination platforms may be one or more. For example, FIG. 7 and 8 show that there is one first combination platform 10P1 and one second combination platform 10P2 connected to the peripheral sides of the bottom end of the hollow cylinder member 1013. As described in more detail below, the first combination platform 10P1 is located between the third arc-shaped perforation groove 1014 and the hollow cylinder member 1013, whereas the second combination platform 10P2 is located between the first arc-shaped perforation groove 1015 and the hollow cylinder member 1013. In addition, FIG. 7 and 8 also depict that a first pull member 1016 is connected to an outer surface of the first circular-shaped peripheral wall 1012, and that an arc-shaped groove 1017 is formed on the bottom surface of the first circular-shaped substrate 1011.

[0014] As can be seen in FIG. 6, 7 and 8 the second adjusting unit 102 comprises a second circular-shaped substrate 1021, a second circular-shaped peripheral wall 1022 and a second arc-shaped perforation groove 1025, wherein a top surface of the second circular-shaped substrate 1021 is connected to a bottom surface of the first circular-shaped substrate 1011. Moreover, the second circular-shaped peripheral wall 1022 is formed on a bottom surface of the second circular-shaped substrate 1021 and the second arc-shaped perforation groove 1025 is formed on the second circular-shaped substrate 1021. Particularly, at least one snapping member 10C1, 10C2 is formed on the top surface of the second circular-shaped substrate 1021 and is configured for snapping the at least one combination platform 10P1, 10P2, when the second circular-shaped substrate 1021 is connected to the first circular-shaped substrate 1011. In this context, the expression "at least one" means that the number of snapping members may be one or more. For example, FIG. 7 and 8 show that one first snapping member 10C1 and one second snapping member 10C2 are formed on the top surface of the second circular-shaped substrate 1021, which respectively snap the first combination platform 10P1 and the second combination platform 10P2, when the second circular-shaped substrate 1021 is connected to the first circular-shaped substrate 1011. On the other hand, a combination hole 1023 is formed on a center of the second circular-shaped substrate 1021 and is adopted for connecting between the bottom end of the hollow cylinder member 1013 and a water inlet port of the oscillation driving module 11.

[0015] According to the particular design of the present invention, a second arc-shaped perforation groove 1025 and a fourth arc-shaped perforation groove 1024 are formed on the second circular-shaped substrate 1021. Referring to FIG. 7 and 8, the fourth arc-shaped perforation groove 1024 is located at a specific position above the combination hole 1023 and near the second circular-

shaped peripheral wall 1022, whereas the second arc-shaped perforation groove 1025 is located at a position below the combination hole 1023 and near the second circular-shaped peripheral wall 1012. Moreover, referring to FIG. 7 and 8, a second pull member 1026 is connected to an outer surface of the second circular-shaped peripheral wall 1022 and an arc-shaped protrusion 1027 is formed on the top surface of the second circular-shaped substrate 1021, which is configured for sliding in the arc-shaped groove 1017), when the second circular-shaped substrate 1021 is connected to the first circular-shaped substrate 1011. From FIG. 7 and 8 it can be further seen that the first pull member 1016 consists of a first base portion 11B and a first pull portion 11P, and the second pull member 1026 consists of a second base portion 12B and a second pull portion 12P. As described in more detail below, after a top surface of the second circular-shaped substrate 1021 has been connected to a bottom surface of the first circular-shaped substrate 1011, the O-ring seal 103 is disposed between the bottom end of the hollow cylinder member 1013 and an edge of the combination hole 1023. Moreover, the arc-shaped protrusion 1027 is inserted into the arc-shaped groove 1017 and is capable of sliding in the arc-shaped groove 1017. According to the particular design of the present invention, a first insertion member 10S1 and a second insertion member 10S2 are disposed on the top surface of the second circular-shaped substrate 1021, which are adopted for being respectively inserted into the third arc-shaped perforation groove 1014 and the first arc-shaped perforation groove 1015, when the second circular-shaped substrate (1021) is connected to the first circular-shaped substrate (1011).

[0016] In the following paragraphs, it will be explained in detail how the oscillating range adjusting module 10 of the present invention interacts with an oscillation driving module 11. FIG. 9 shows a front view of a first adjusting unit 101 of the oscillating range adjusting module 10 and FIG. 10 shows a front view of a second adjusting unit 102 of the oscillating range adjusting module 10. Moreover, FIG. 11 shows a rear view of the first adjusting unit 101 and FIG. 12 shows a rear view of the second adjusting unit 102. On the other hand, FIG. 13 shows a first front view of the oscillating range adjusting module 10. Furthermore, FIG. 14 shows a three-dimensional view of the oscillation driving module 11 in combination with the oscillating range adjusting module 11, FIG. 15 shows a second front view of the oscillating range adjusting module 10 and FIG. 16 shows another three-dimensional view of the oscillation driving module 11 in combination with the oscillating range adjusting module 10. Herein, FIG. 13 to 16 are provided for supporting the explanation of how the oscillating range adjusting module 10 of the present invention interacts with the oscillation driving module 11. In FIG. 9 and 13 to 16, there are not many numeric symbols labeled therein. Simultaneously referring to FIG. 7 to 10 may be helpful for finding related numeric symbols of already described constituting ele-

ments of the oscillating range adjusting module 10 of the present invention.

[0017] During an operation or application of an oscillating sprinkler 1 integrated with the oscillating range adjusting module 10 of the present invention, a user is able to adjust or change an oscillating range of the spraying nozzle module 13 by pulling the first pull member 1016 and/or the second pull member 1026. Of course, the oscillation driving module 11 of the present invention integrated in the oscillating sprinkler 1 is configured for driving the spraying nozzle module 13 swing back and forth in a user-set oscillating range. From FIG. 13, it can be found that, after the first pull member 1016 has been pulled by the first base portion 11B thereof to contact with the second base portion 12B of the second pull member 1026, an intersection between the first arc-shaped perforation groove 1015 on the first circular-shaped substrate 1011 and the second arc-shaped perforation groove 1025 on the second circular-shaped substrate 1021 forms a first swing limiting perforation groove, such that a swing limiting member 111 of the oscillation driving module 11 can be limited to swing in the first swing limiting perforation groove. According to FIG. 13 and FIG. 14 the first swing limiting perforation groove is configured for forming a minimum oscillating range of the spraying nozzle module 13.

[0018] On the contrary, the user is able to set a maximum oscillating range for the spraying nozzle module 13 by pulling the first pull member 1016 and/or the second pull member 1026. In this case, the intersection between the first arc-shaped perforation groove 1015 on the first circular-shaped substrate 1011 and the second arc-shaped perforation groove 1025 on the second circular-shaped substrate 1021 form a second swing limiting perforation groove, wherein a swing limiting member 111 of the oscillation driving module 11 is limited to swing in the second swing limiting perforation groove. From FIG. 15 and FIG. 16, it can be seen that the second swing limiting perforation groove is configured for forming a maximum oscillating range of the spraying nozzle module 13.

[0019] Therefore, through the above description, all constituting elements, their features and related functions of the oscillating range adjusting module for use in an oscillating sprinkler have been introduced completely and clearly. In summary, the present invention provides the following advantages:

[0020] The present invention provides an oscillating range adjusting module 10 for use in an oscillating sprinkler 1, connected between a water inlet module 12 and an oscillation driving module 11, the oscillating range adjusting module 10 mainly comprising a first adjusting unit 101 and a second adjusting unit 102. When assembling the oscillating range adjusting module 10, the water inlet module 12 and the oscillation driving module 11, it is just needed to firstly connect an inlet tube of the water inlet module 12 and an O-ring seal 103 to the first adjusting unit 101, and then to connect a second adjusting unit 102 to the inlet tube and the first adjusting unit 101, such that

at least one snapping member 10C1, 10C2 of the second adjusting unit 102 engages with at least one combination platform 10P1, 10P2 of the first adjusting unit 101. Consequently, a modularization assembly of the oscillating range adjusting module 10, the water inlet module 12 and the oscillation driving module 11 is achieved after a water inlet port of the oscillation driving module 11 has been connected to the second adjusting unit 102.

[0021] The above description is made based on exemplary embodiments of the present invention. However, the embodiments are not intended to limit the scope of the present invention. All equivalent implementations or alterations within the scope of the appended claims of the present invention still fall within the scope of the present invention.

Claims

1. An oscillating range adjusting module (10) for use in an oscillating sprinkler (1), being connected between a water inlet module (12) and an oscillation driving module (11), the oscillating range adjusting module (10) comprising:

a first adjusting unit (101), comprising:

a first circular-shaped substrate (1011);
a first circular-shaped peripheral wall (1012), being formed on a top surface of the first circular-shaped substrate (1011); and
a first arc-shaped perforation groove (1015), being formed on the first circular-shaped substrate (1011); and

a second adjusting unit (102), comprising:

a second circular-shaped substrate (1021), a top surface thereof being connected to a bottom surface of the first circular-shaped substrate (1011);
a second circular-shaped peripheral wall (1022), being formed on a bottom surface of the second circular shaped substrate (1021); and
a second arc-shaped perforation groove (1025), being formed on the second circular-shaped substrate (1021);

wherein the first adjusting unit (101) further comprises:

a hollow cylinder member (1013), being formed on a center of the first circular-shaped substrate (1011) for use in connection with an inlet tube of the water inlet module (12); and
at least one combination platform (10P1,

10P2), being connected to peripheral sides of a bottom end of the hollow cylinder member (1013);

wherein the second adjusting unit (102) further comprises:

at least one snapping member (10C1, 10C2), being formed on the top surface of the second circular-shaped substrate (1021) and being configured for being engaged with the at least one combination platform (10P1, 10P2), when the second circular-shaped substrate (1021) is connected to the first circular-shaped substrate (1011); and
a combination hole (1023), being formed on a center of the second circular-shaped substrate (1021) and being adopted for connecting between the bottom end of the hollow cylinder member (1013) and a water inlet port of the oscillation driving module (11).

2. The oscillating range adjusting module of claim 1, further comprising:

an O-ring seal (103), being disposed between the bottom end of the hollow cylinder member (1013) and an edge of the combination hole (1023).

3. The oscillating range adjusting module of claim 1, wherein the first adjusting unit (101) further comprises:

a third arc-shaped perforation groove (1014), being formed on the first circular-shaped substrate (1011) and being located near the first circular-shaped peripheral wall (1012);
a first pull member (1016), being connected to an outer surface of the first circular-shaped peripheral wall (1012); and
an arc-shaped groove (1017), being formed on the bottom surface of the first circular-shaped substrate (1011).

4. The oscillating range adjusting module of claim 3, wherein the second adjusting unit (102) further comprises:

a fourth arc-shaped perforation groove (1024), being formed on the second circular-shaped substrate (1021) and being located near the second circular-shaped peripheral wall (1022);
a second pull member (1026), being connected to an outer surface of the second circular-shaped peripheral wall (1022); and
an arc-shaped protrusion (1027), being formed on the top surface of the second circular-shaped substrate (1021) and being configured for sliding

in the arc-shaped groove (1017), when the second circular-shaped substrate (1021) is connected to the first circular-shaped substrate (1011).

5. The oscillating range adjusting module of claim 4, wherein the second adjusting unit (102) further comprises:

at least one insertion member (10S1, 10S2), being disposed on the top surface of the second circular-shaped substrate (1021) and being adopted for insertion into the third arc-shaped perforation groove (1014) and/or the first arc-shaped perforation groove (1015).

6. The oscillating range adjusting module of claim 1, further comprising an embedding groove (10E) formed on an inner surface of the hollow cylinder member (1013) for receiving an O-ring seal.

Patentansprüche

1. Oszillationsbereichs-Einstellmodul (10) zur Verwendung in einem oszillierenden Sprinkler (1), welcher zwischen einem Wasser-Einlassmodul (12) und einem Oszillations-Antriebsmodul (11) angeschlossen ist, wobei das Oszillationsbereichs-Einstellmodul (10) Folgendes umfasst:

eine erste Einstelleinheit (101), umfassend:

ein erstes kreisförmiges Substrat (1011),
eine erste kreisförmige Umfangswand (1012), welche auf einer oberen Fläche des ersten kreisförmigen Substrats (1011) ausgebildet ist, und
eine erste bogenförmige Perforationsnut (1015), welche auf dem ersten kreisförmigen Substrat (1011) ausgebildet ist, und

eine zweite Einstelleinheit (102), umfassend:

ein zweites kreisförmiges Substrat (1021), dessen obere Fläche mit einer unteren Fläche des ersten kreisförmigen Substrats (1011) verbunden ist,
eine zweite kreisförmige Umfangswand (1022), welche auf einer Bodenfläche des zweiten kreisförmigen Substrats (1021) ausgebildet ist, und
eine zweite bogenförmige Perforationsnut (1025), welche auf dem zweiten kreisförmigen Substrat (1021) ausgebildet ist,

wobei die erste Einstelleinheit (101) ferner umfasst:

ein Hohlzylinder-Element (1013), welches auf einer Mitte des ersten kreisförmigen Substrats (1011) zur Verwendung in Verbindung mit einem Einlassrohr des Wasser-Einlassmoduls (12) ausgebildet ist, und mindestens eine Kombinationsplattform (10P1, 10P2), welche mit den Umfangsseiten eines unteren Endes des Hohlzylinder-Elements (1013) verbunden ist,

wobei die zweite Einstelleinheit (102) ferner umfasst:

mindestens ein Schnappelement (10C1, 10C2), welches auf der oberen Oberfläche des zweiten kreisförmigen Substrats (1021) ausgebildet ist und so konfiguriert ist, dass es mit der mindestens einen Kombinationsplattform (10P1, 10P2) in Eingriff gebracht wird, wenn das zweite kreisförmige Substrat (1021) mit dem ersten kreisförmigen Substrat (1011) verbunden ist, und eine Kombinationsöffnung (1023), welche in einer Mitte des zweiten kreisförmigen Substrats (1021) ausgebildet ist und zur Verbindung zwischen dem unteren Ende des Hohlzylinder-Elements (1013) und einem Wasser-Einlassmodul des Oszillations-Antriebsmoduls (11) angepasst ist.

2. Oszillationsbereichs-Einstellmodul nach Anspruch 1, ferner umfassend:

eine O-Ring-Dichtung (103), welche zwischen dem unteren Ende des Hohlzylinder-Elements (1013) und einem Rand einer Kombinationsöffnung (1023) angeordnet ist.

3. Oszillationsbereichs-Einstellmodul nach Anspruch 1, bei welchem die erste Einstelleinheit (101) ferner umfasst:

eine dritte bogenförmige Perforationsnut (1014), welche auf dem ersten kreisförmigen Substrat (1011) ausgebildet ist und sich in der Nähe der ersten kreisförmigen Umfangswand (1012) befindet,
ein erstes Zugelement (1016), das mit einer Außenfläche der ersten kreisförmigen Umfangswand (1012) verbunden ist, und
eine bogenförmige Nut (1017), welche an der Bodenfläche des ersten kreisförmigen Substrats (1011) ausgebildet ist.

4. Oszillationsbereichs-Einstellmodul nach Anspruch 3, bei welchem die zweite Einstelleinheit (102) ferner umfasst:

eine vierte bogenförmige Perforationsnut

- (1024), welche auf dem zweiten kreisförmigen Substrat (1021) ausgebildet ist und sich in der Nähe der zweiten kreisförmigen Umfangswand (1022) befindet,
- ein zweites Zugelement (1026), welches mit einer Außenfläche der zweiten kreisförmigen Umfangswand (1022) verbunden ist, und einen bogenförmigen Vorsprung (1027), welcher an der oberen Oberfläche des zweiten kreisförmigen Substrats (1021) ausgebildet ist und zum Gleiten in der bogenförmigen Nut (1017) konfiguriert ist, wenn das zweite kreisförmige Substrat (1021) mit dem ersten kreisförmigen Substrat (1011) verbunden ist.
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5. Oszillationsbereichs-Einstellmodul nach Anspruch 4, bei welchem die zweite Einstelleinheit (102) ferner umfasst:

mindestens ein Einsteckelement (10S1, 10S2), welches auf der Oberseite des zweiten kreisförmigen Substrats (1021) angeordnet ist und zum Einstecken in die dritte bogenförmige Perforationsnut (1014) und / oder die erste bogenförmige Perforationsnut (1015) angepasst ist.
 6. Oszillationsbereichs-Einstellmodul nach Anspruch 1, ferner umfassend eine Einbettungsnut (10E), welche an einer Innenfläche des Hohlzylinder-Elements (1013) zur Aufnahme einer O-Ring-Dichtung ausgebildet ist.

Revendications

1. Module d'ajustement de plage d'oscillation (10) pour l'utilisation dans un pulvérisateur oscillant (1), étant raccordé entre un module d'entrée d'eau (12) et un module d'entraînement d'oscillation (11), le module d'ajustement de plage d'oscillation (10) comprenant:

une première unité d'ajustement (101), comprenant:

un premier substrat circulaire (1011);

une première paroi périphérique circulaire (1012), étant formée sur une surface supérieure du premier substrat circulaire (1011);

et

une première rainure de perforation arquée (1015), étant formée sur le premier substrat circulaire (1011); et

une seconde unité d'ajustement (102), comprenant:

un second substrat circulaire (1021), une surface supérieure de celui-ci étant raccordée à une surface inférieure du premier

substrat circulaire (1011);

une seconde paroi périphérique circulaire (1022), étant formée sur une surface inférieure du second substrat circulaire (1021);

et

une deuxième rainure de perforation arquée (1025), étant formée sur le second substrat circulaire (1021);

dans lequel la première unité d'ajustement (101) comprend en outre:

un élément de cylindre creux (1013), étant formé sur un centre du premier substrat circulaire (1011) pour l'utilisation en connexion avec un tube d'entrée du module d'entrée d'eau (12); et

au moins une plateforme de combinaison (10P1, 10P2), étant raccordée aux côtés périphériques d'une extrémité inférieure de l'élément de cylindre creux (1013);

dans lequel la seconde unité d'ajustement (102) comprend en outre:

au moins un élément d'encliquetage (10C1, 10C2), étant formé sur la surface supérieure du second substrat circulaire (1021) et étant configuré pour être mis en prise avec l'au moins une plateforme de combinaison (10P1, 10P2), lorsque le second substrat circulaire (1021) est raccordé au premier substrat circulaire (1011); et

un trou de combinaison (1023), étant formé sur un centre du second substrat circulaire (1021) et étant adopté pour le raccordement entre l'extrémité inférieure de l'élément de cylindre creux (1013) et un orifice d'entrée d'eau du module d'entraînement d'oscillation (11).

2. Module d'ajustement de plage d'oscillation selon la revendication 1, comprenant en outre:

un joint torique (103), étant disposé entre l'extrémité inférieure de l'élément de cylindre creux (1013) et une arête du trou de combinaison (1023).

3. Module d'ajustement de plage d'oscillation selon la revendication 1, dans lequel la première unité d'ajustement (101) comprend en outre:

une troisième rainure de perforation arquée (1014), étant formée sur le premier substrat circulaire (1011) et étant située près de la première paroi périphérique circulaire (1012);

un premier élément de traction (1016), étant raccordé à une surface extérieure de la première paroi périphérique circulaire (1012); et

une rainure arquée (1017), étant formée sur la surface inférieure du premier substrat circulaire (1011).

4. Module d'ajustement de plage d'oscillation selon la revendication 3, dans lequel la seconde unité d'ajustement (102) comprend en outre: 5

une quatrième rainure de perforation arquée (1024), étant formée sur le second substrat circulaire (1021) et étant située près de la seconde paroi périphérique circulaire (1022); 10
un second élément de traction (1026), étant raccordé à une surface extérieure de la seconde paroi périphérique circulaire (1022); et 15
une saillie arquée (1027), étant formée sur la surface supérieure du second substrat circulaire (1021) et étant configurée pour coulisser dans la rainure arquée (1017), lorsque le second substrat circulaire (1021) est raccordé au premier substrat circulaire (1011). 20

5. Module d'ajustement de plage d'oscillation selon la revendication 4, dans lequel la seconde unité d'ajustement (102) comprend en outre: 25
au moins un élément d'insertion (10S1, 10S2), étant disposé sur la surface supérieure du second substrat circulaire (1021) et étant adopté pour l'insertion dans la troisième rainure de perforation arquée (1014) et/ou la première rainure de perforation arquée (1015). 30

6. Module d'ajustement de plage d'oscillation selon la revendication 1, comprenant en outre une rainure d'intégration (10E) formée sur une surface intérieure de l'élément de cylindre creux (1013) pour la réception d'un joint torique. 35

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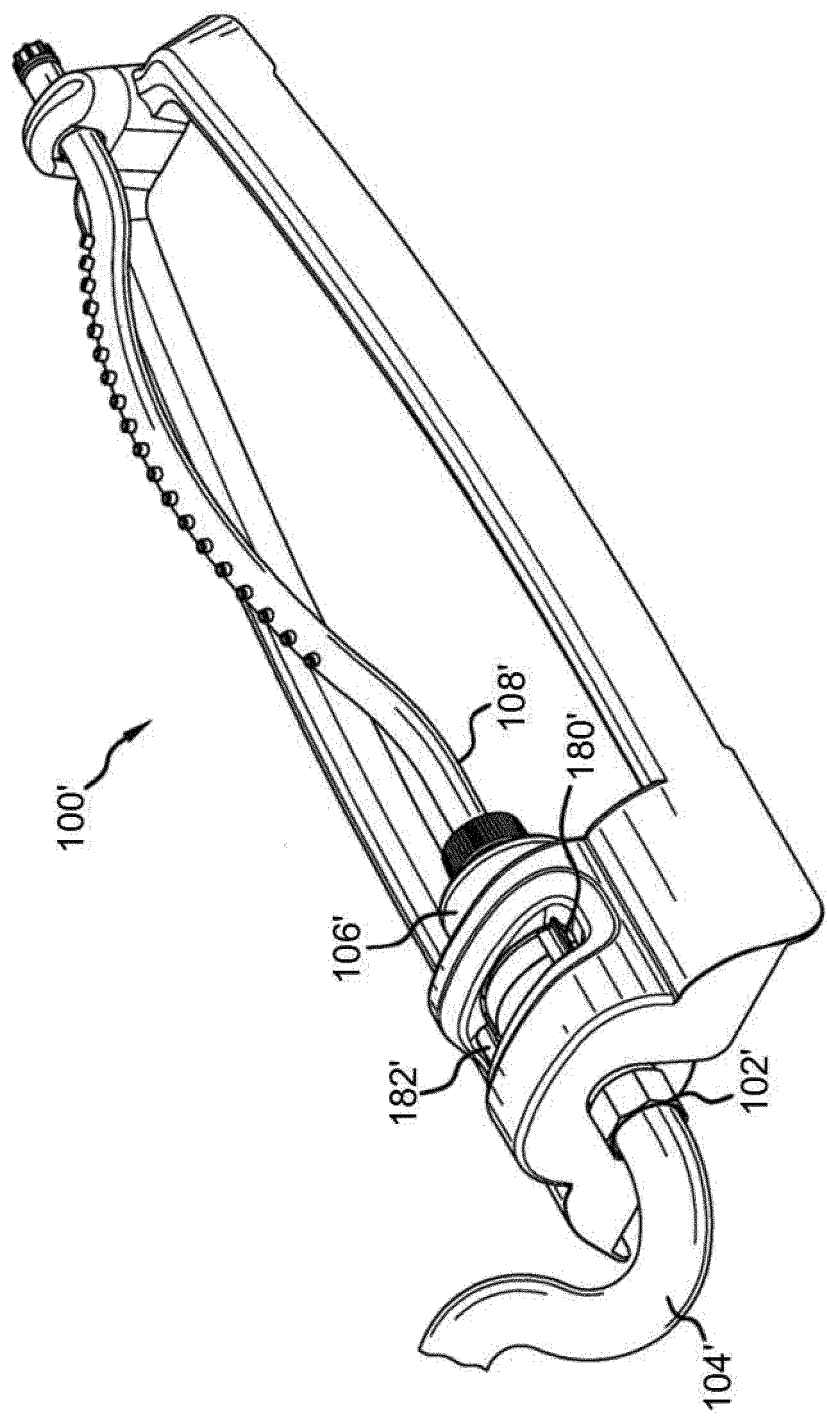


FIG. 1
(Prior Art)

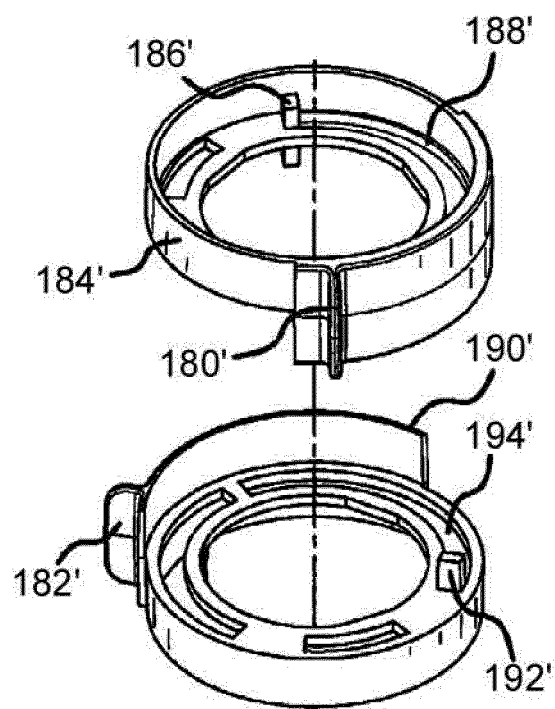


FIG. 2
(Prior Art)

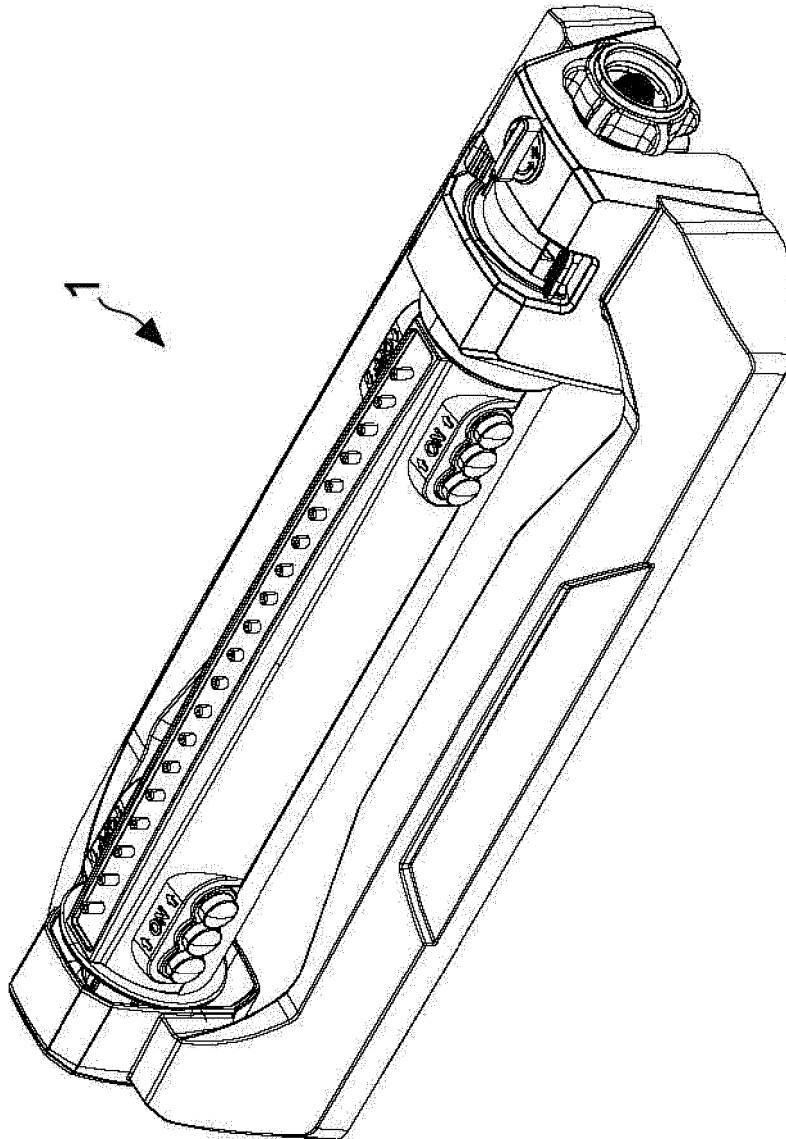


FIG. 3

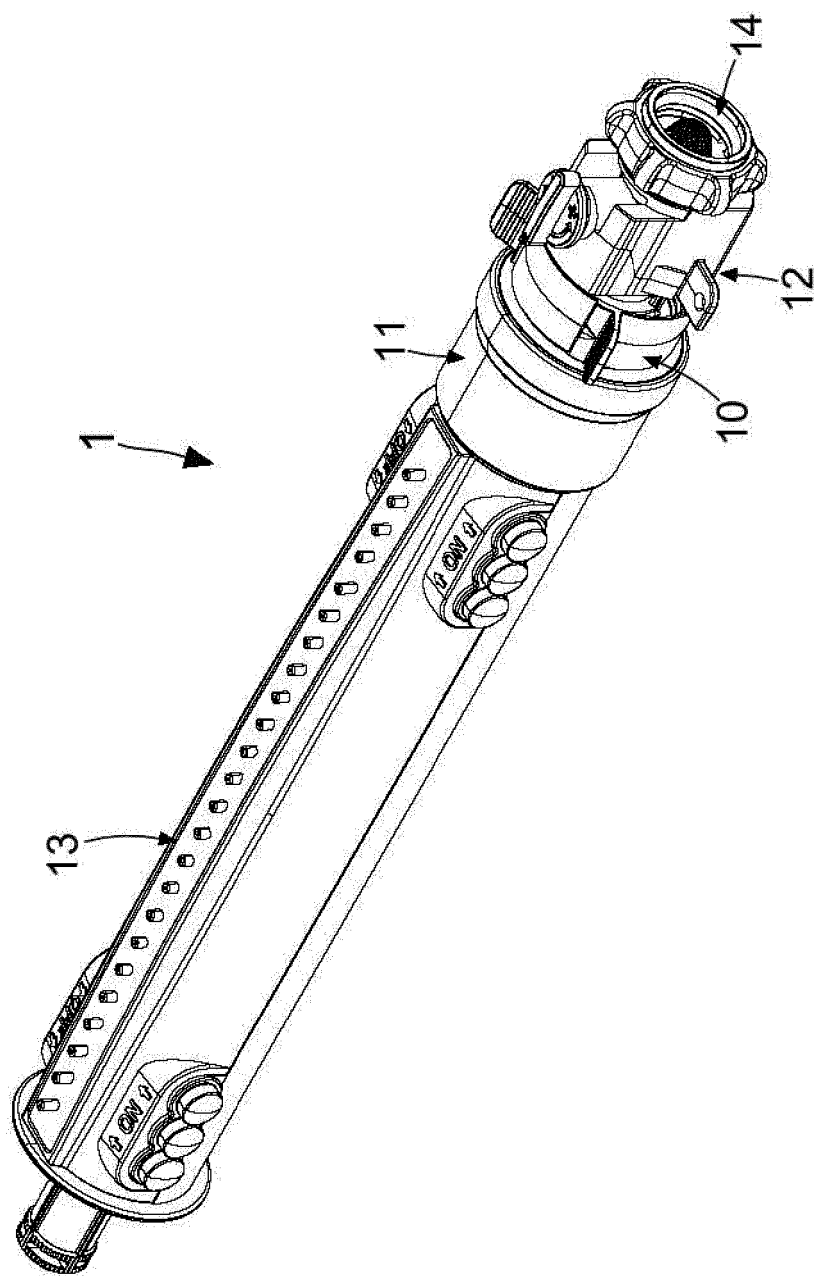


FIG. 4

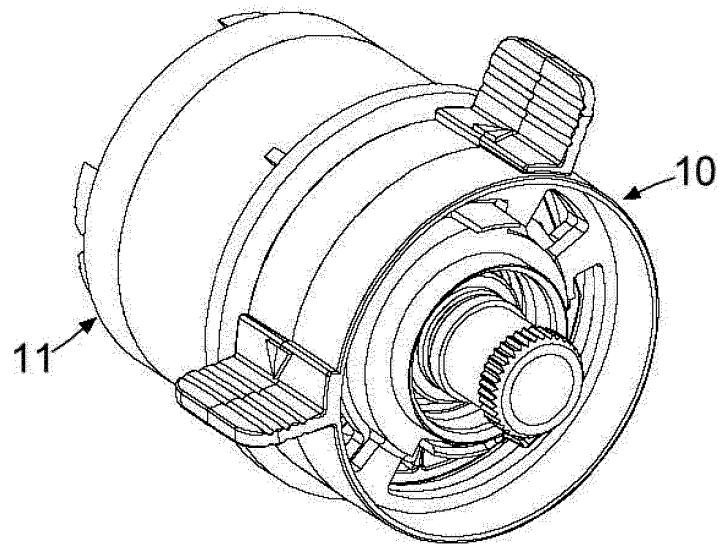


FIG. 5

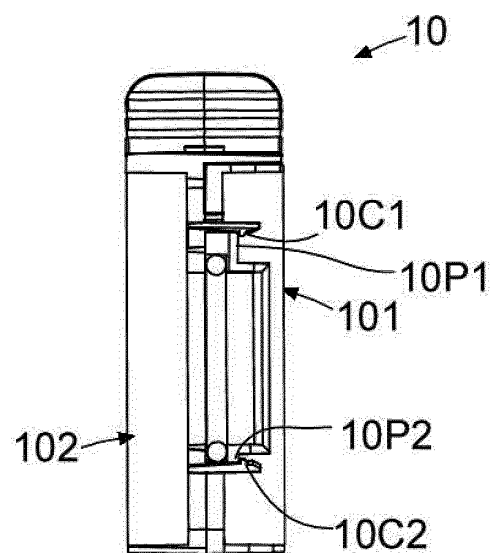


FIG. 6

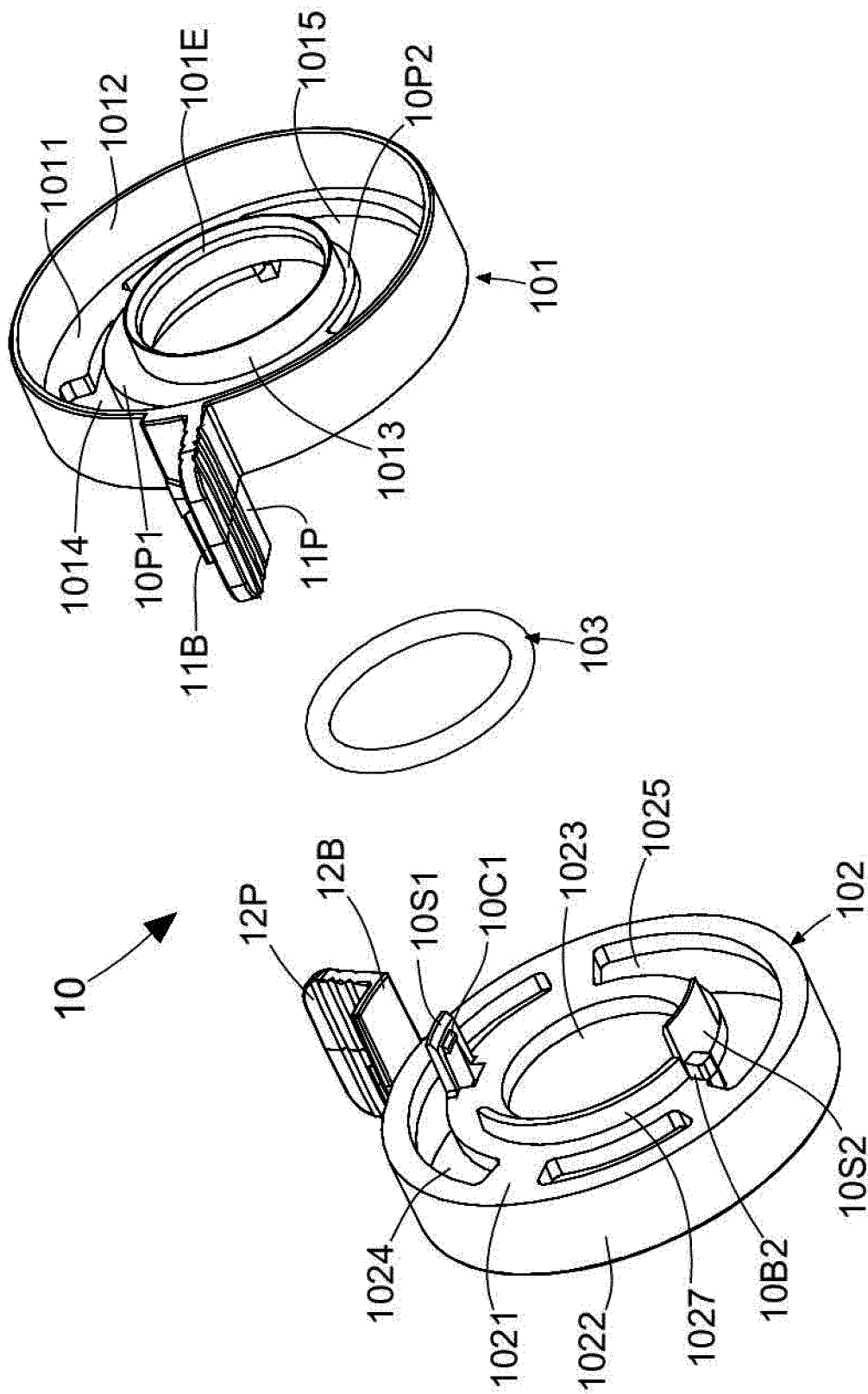


FIG. 7

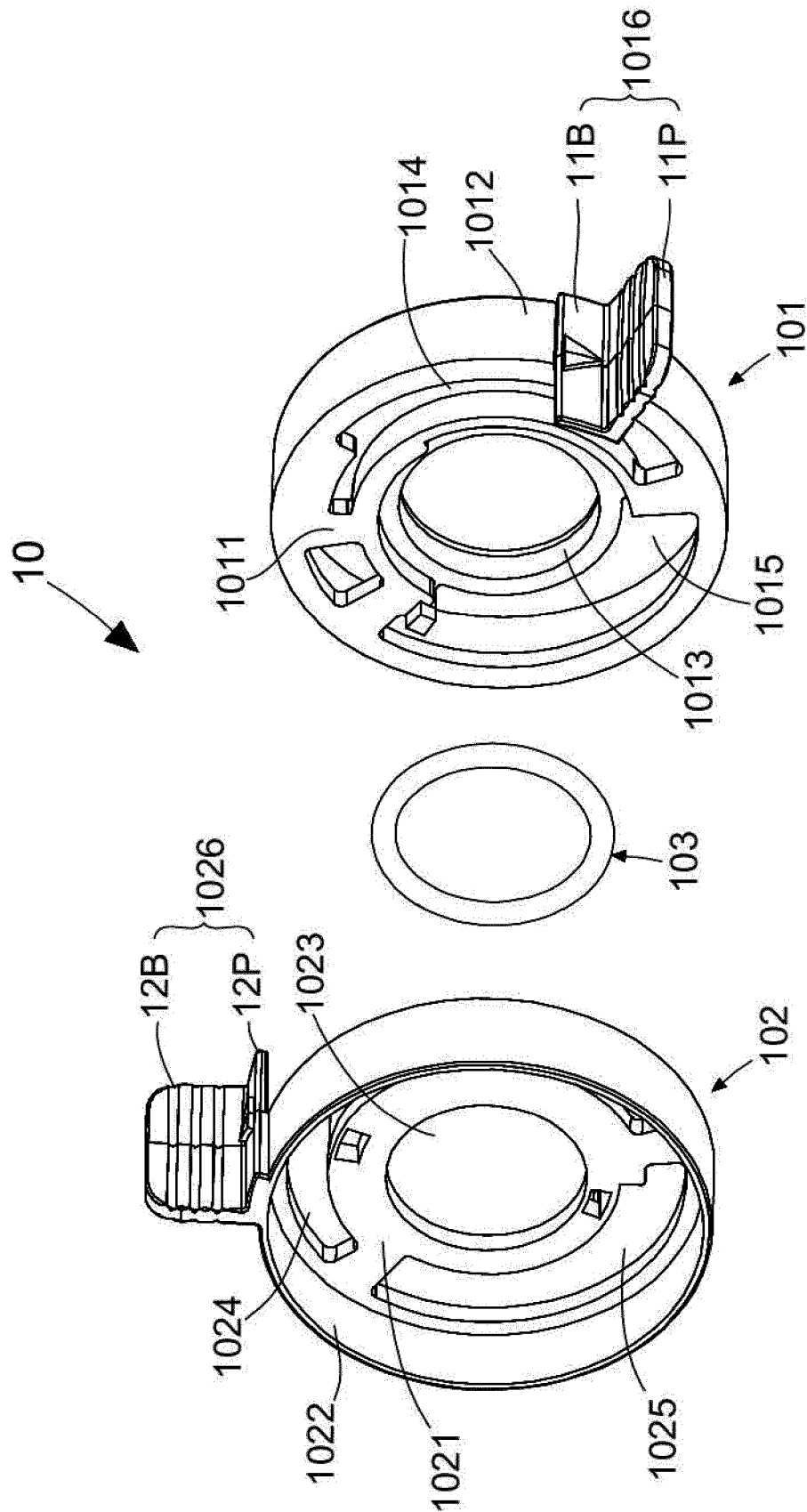


FIG. 8

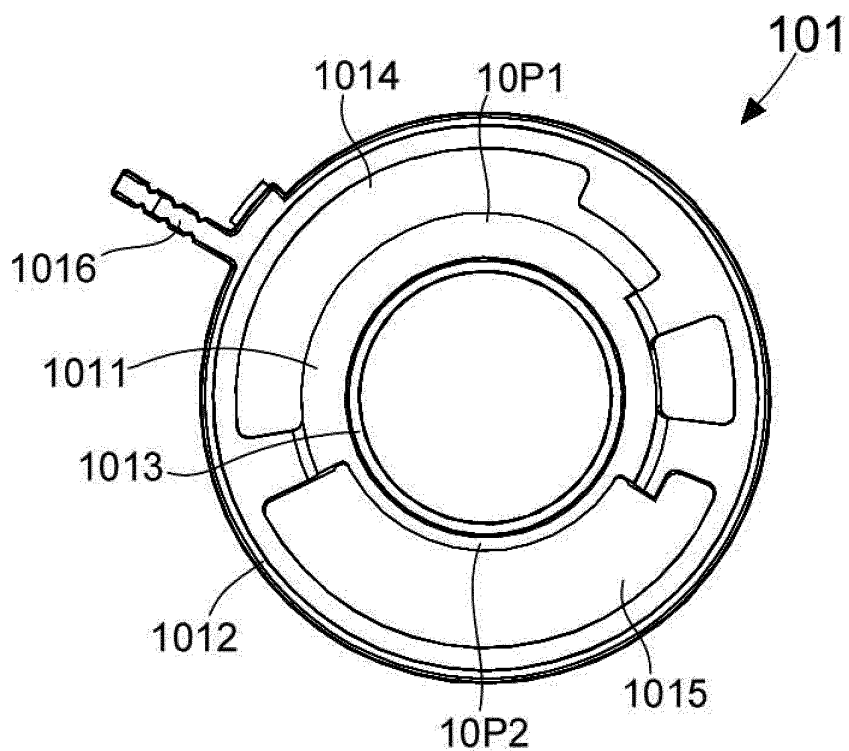


FIG. 9

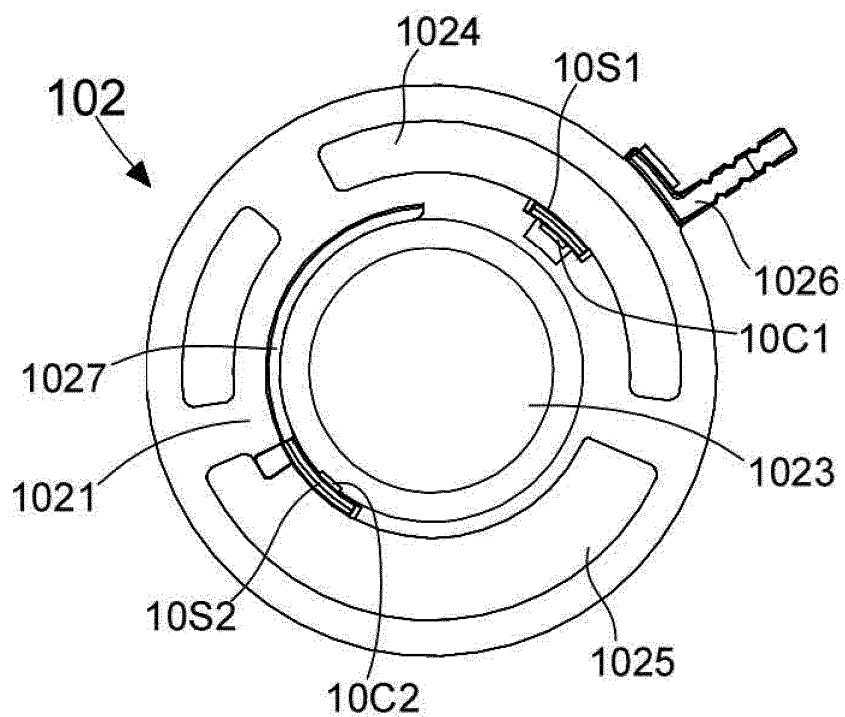


FIG. 10

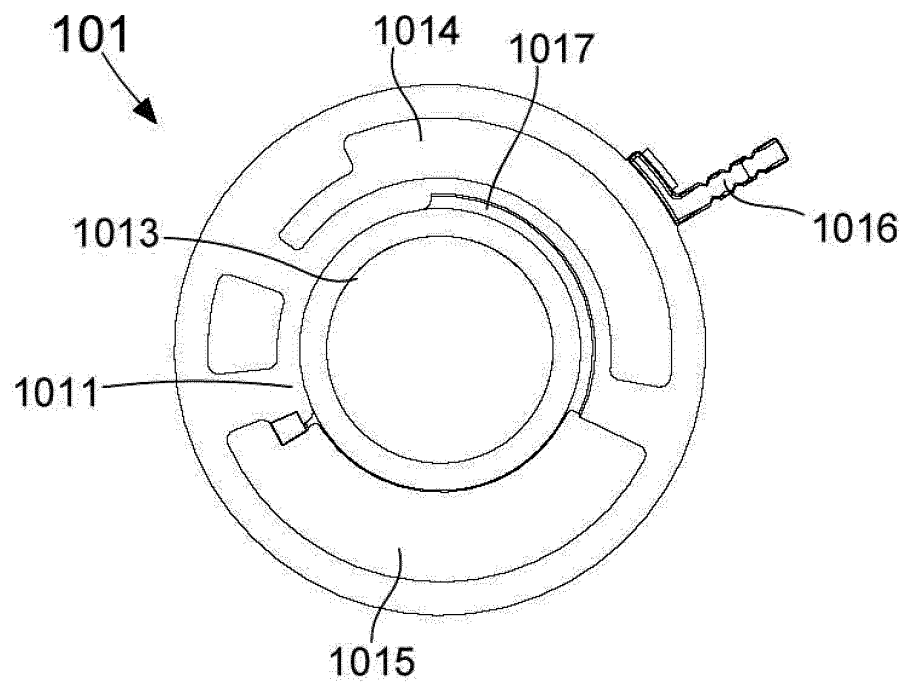


FIG. 11

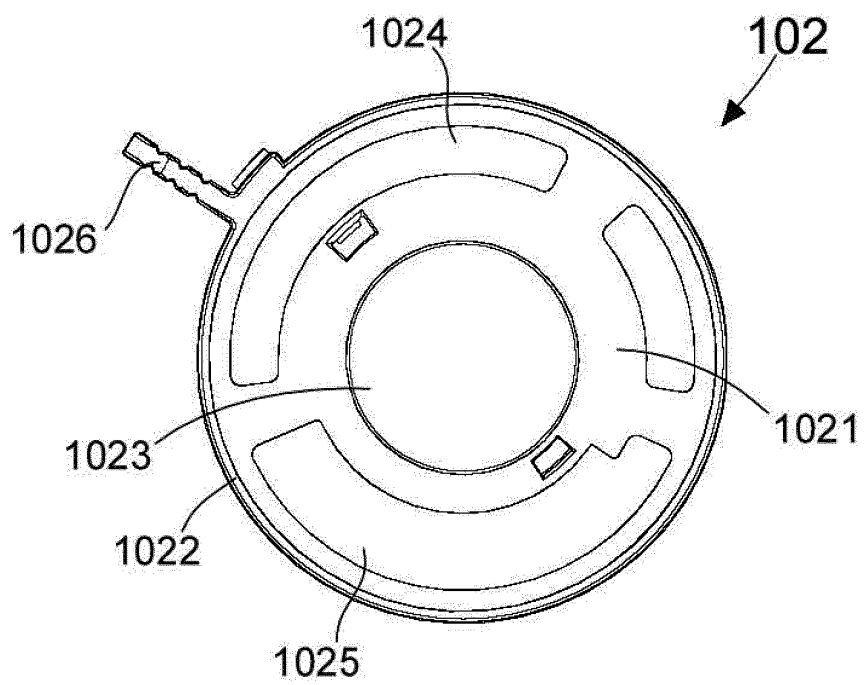


FIG. 12

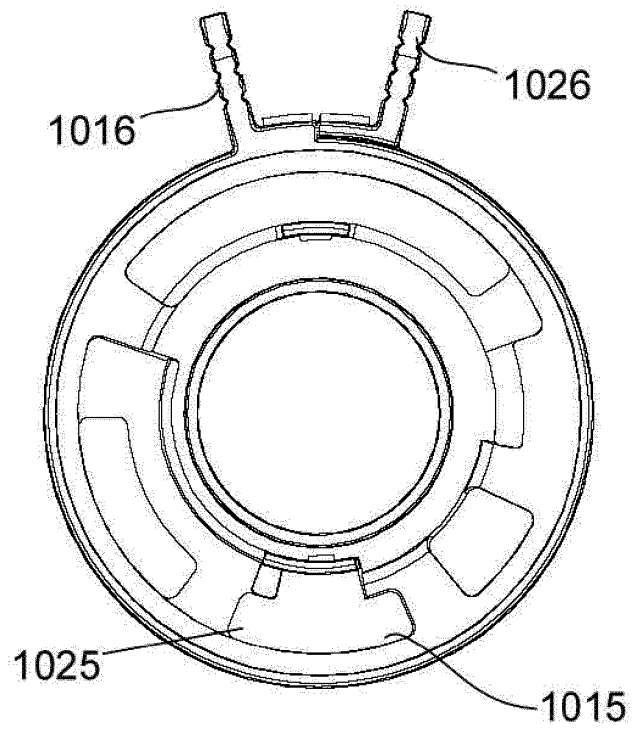


FIG. 13

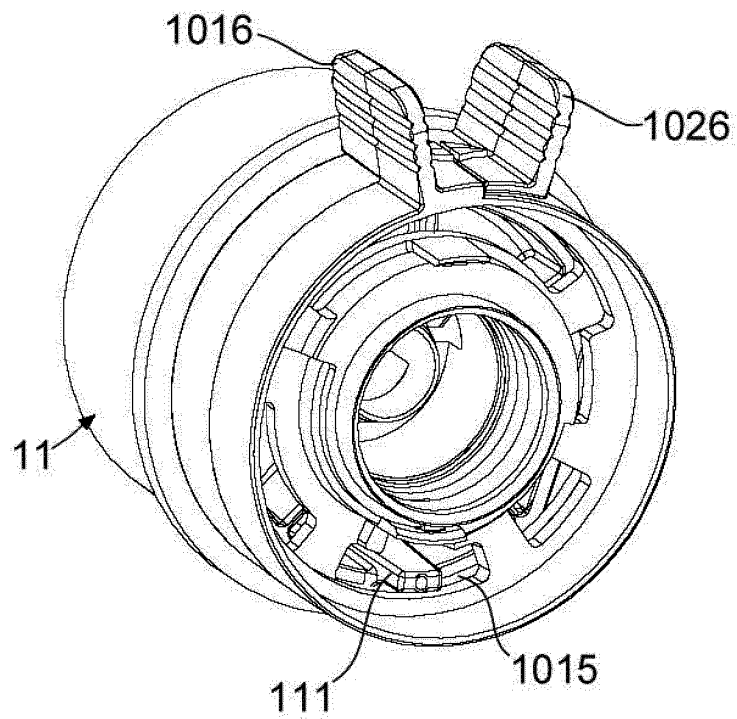


FIG. 14

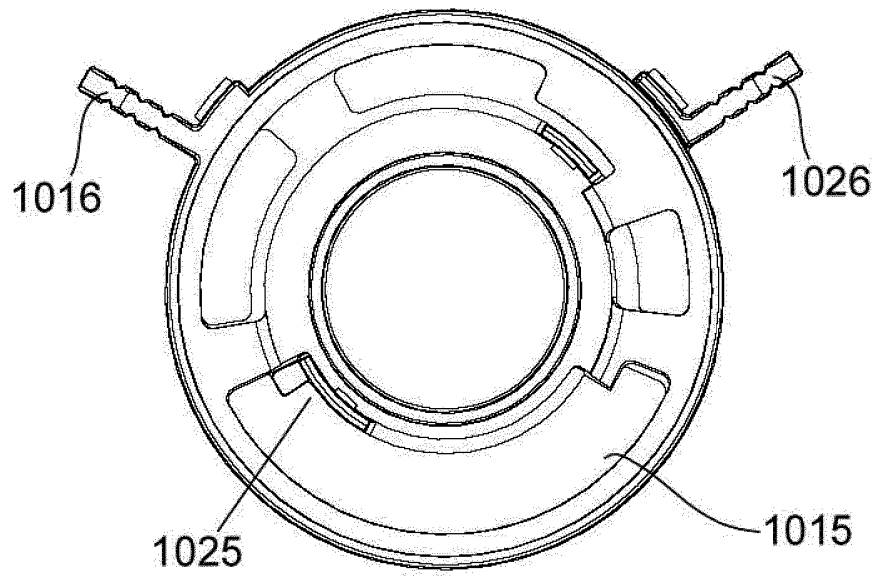


FIG. 15

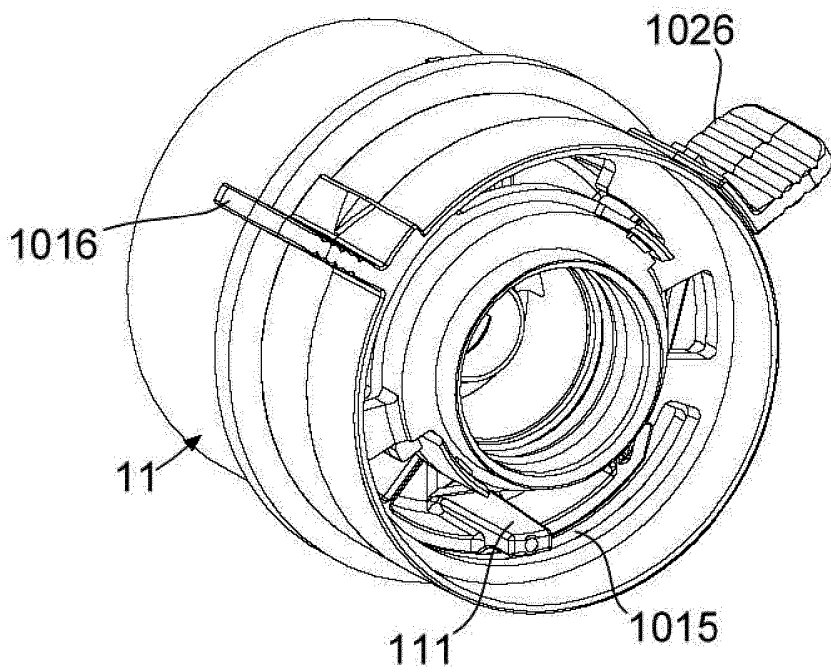


FIG. 16

REFERENCES CITED IN THE DESCRIPTION

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