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(54) REFLECTOR FOR LIGHTING DEVICES

(57) A reflector (1) for lighting devices comprises a main body (2) having a cavity (3) and a central axis (X-X); the main body (2) comprises a base (4) and a side wall (5) connected to the base (4), the base (4) and the side wall (5) defining the cavity (3); the side wall (5) is defined by a plurality of segments (6); the side wall (5) has an at least partially reflecting inner surface (5a) and an outer surface (5b); each segment (6) has a first end (7) connected to the base (4) and a second end (8) opposite said first end (7); the reflector (1) comprises a locking device (10) fixed to said second ends (8) and designed to retain said segments (6); the locking device (10) comprises a pair of half-pieces (11, 12) connected to each other and designed to maintain adjacent said second ends (8) of said segments (6).

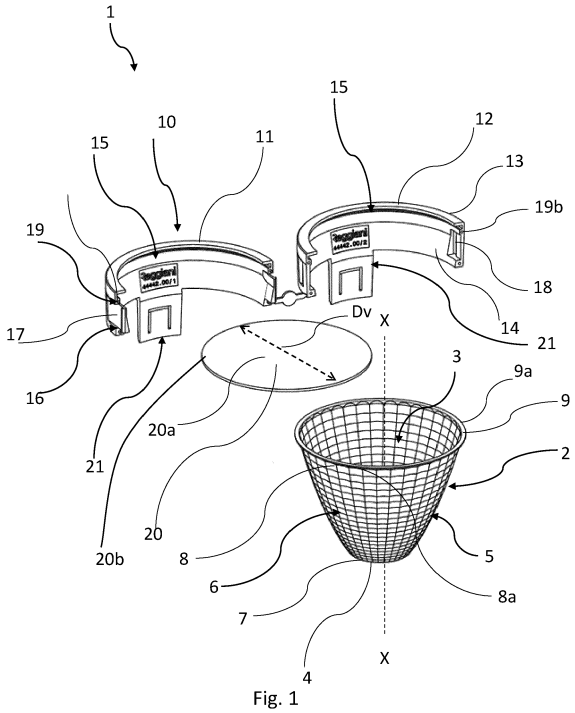

Fig. 1

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Description

Technical Field

[0001] The present invention relates to a reflector for lighting devices according to the preamble of claim 1.

[0002] In particular, in accordance with the present invention, the reflector can be used in the field of lighting technology.

State of the Art

[0003] A reflector comprising a main body is known from the prior art. This main body has a cavity housing a light source, for example a light bulb.

[0004] More in detail, the main body comprises a substantially circular and flat base. The main body also has a central axis, perpendicular to the base and substantially passing through its centre.

[0005] The main body further comprises a side wall that, together with the base, defines the aforementioned cavity. The side wall has a substantially truncated conical shape, which extends along the central axis. The side wall also has an at least partially reflecting inner surface, which concentrates the light coming from the light source towards the object to be lightened.

[0006] It is also known to assemble the reflector described above starting from a substantially flat open configuration.

[0007] In this configuration, the base is coplanar to a plurality of segments, which radially branch off from it. Each segment is separated from the adjacent one by a gap. In detail, each segment has a first end connected to the base and a second end opposite the first.

[0008] To assemble the reflector, the segments are bent with respect to their first end so as to close the gaps between them.

[0009] The segments are then welded together to define the side wall described above. In particular, in the closing configuration, the second ends of each segment define a substantially circular edge, opposite the base. Each segment has a flange arranged at the second end. This flange develops in the opposite direction with respect to the cavity.

[0010] US 20140169002, in the name of Jordan Reflektoren GmbH & Co. KG, describes a reflector that is also part of the prior art. Instead of welding, the document US '002 shows a locking ring that tightens the segments together. More particularly, the locking ring slides along the longitudinal axis starting from the base and is locked by the flange. The locking ring is retained by interference with the flange and the side wall. The locking ring is also fixed to the flange by welding, mechanical coupling or by means of an adhesive layer. The document also discloses a possible tightening of the reflector in a closed configuration through a housing substantially complementary to the reflector.

[0011] EP 2343477, in the name of Jordan Reflektoren GmbH & Co. KG, discloses a reflector support body having substantially the same truncated conical shape as the side wall of the reflector. In particular, this support body is inserted from the base of the reflector and fixed thereto by interference.

[0012] In particular, the document EP '477 mainly describes two types of connection by interference:

- a deformation of the reflector at the base of the reflector. More in detail, this deformation allows hooking the reflector to the support body;
- a protection plate or protection slide, positioned at the edge of the reflector and retained by the support body. More in detail, the reflector is contained between the support body and the protective plate or the protection slide.

Prior art problem

[0013] Disadvantageously, the locking ring and the known support body must be inserted from the base of the reflector.

[0014] In particular, the locking ring and the support body prevent an easy interchangeability between the various components involved.

[0015] Furthermore, the locking ring is difficult to remove, especially if it is welded to the flange.

[0016] Disadvantageously, the reflector is not designed for a quick and safe mounting and/or dismounting of the reflector to/from the spotlight.

[0017] Disadvantageously, the protection plate or the protection slide are necessary elements for supporting the reflector, without which the reflector would not be contained in the support body.

Object of the Invention

[0018] In this context, the technical object of the present invention is to provide a reflector and a method for assembling a reflector that overcome the aforesaid drawbacks of the prior art.

[0019] In particular, it is an object of the present invention to provide a reflector allowing a considerable simplification of assembly, disassembly and interchangeability of the various components.

[0020] The specified technical object and the specified objects are substantially achieved by a reflector and by a method related to the positioning of a slide on the reflector comprising the technical characteristics and the steps disclosed in one or more of the appended claims.

Advantages of the invention

[0021] The present invention relates to a reflector for lighting devices. This reflector comprises a main body having a cavity and a central axis. The main body comprises a base and a side wall connected to each other. In particular, the base and the side wall define the cavity

of the central body. The side wall is defined by a plurality of segments and has an inner surface and an outer surface. The inner surface is at least partially reflecting. Each segment has a first end, which is connected to the base and a second end opposite the first end.

[0022] The reflector further comprises a locking device. This locking device is designed to retain the segments by fixing itself to the second ends.

[0023] The locking device is characterized in that it comprises a pair of half-pieces connected to each other and designed to maintain adjacent said second ends of said segments.

[0024] The reflector according to the present invention solves the technical problem concerning the tightening of the segments, since the half-pieces are designed to lock the central body in a convenient and easily reversible manner. In particular, the plurality of segments is retained by the locking device so that they are adjacent to each other, without needing any welding or connection by interference.

[0025] Advantageously, the reflector is provided with coupling systems to conveniently and quickly facilitate the assembly and disassembly of the reflector in a lighting device.

[0026] Advantageously, the reflector allows the convenient and fast assembly and disassembly of a protection slide. Furthermore, the protection slide is no longer needed as a support.

[0027] Advantageously, the central body of the reflector can have any shape and can be retained by the locking device.

[0028] Advantageously, the reflector reduces the components required for the spotlight and ensures a comfortable and secure connection between the reflector and an electrical power supply network necessary for the lighting operation.

BRIEF DESCRIPTION OF THE FIGURES

[0029] Further characteristics and advantages of the present invention will become clearer from the following indicative, and therefore non-limiting, description of a preferred but not exclusive embodiment of a reflector for lighting devices, as shown in the accompanying drawings, in which:

- Figure 1 is an exploded perspective view of a reflector for lighting devices according to a first embodiment of the present invention;
- Figure 2 is a perspective view of the reflector of Figure 1 in a partially assembled configuration;
- Figure 3 is a perspective view of the reflector of Figure 1 in an assembled configuration;
- Figure 4 is an exploded perspective view of a reflector for lighting devices according to a second embodiment of the present invention;
- Figure 5 is a perspective view of the reflector of Figure 4 in a partially assembled configuration;
- Figure 6 is a perspective view of the reflector of Figure 4 in an assembled configuration;

  Figure 7 is a top view of a central body of the reflectors of Figure 1 and Figure 4 in an open configuration;
- Figure 8 is a sectional view of a detail of the reflectors of Figure 1 and of Figure 4; and
- Figure 9 is a top view of the reflectors of Figure 1 and of Figure 4 with some parts removed to allow a clearer view of other parts.

DETAILED DESCRIPTION

[0030] Even if not explicitly mentioned, the individual characteristics described with reference to the specific embodiments must be meant as ancillary and/or interchangeable with other characteristics described with reference to other embodiments.

[0031] With reference to the accompanying figures, the reference number 1 indicates a reflector for lighting devices according to the present invention.

[0032] The reflector 1 comprises a hollow central body 2, substantially extending along a central axis X-X.

[0033] The central body 2 comprises a base 4 and a side wall 5 connected to each other. The central axis X-X is substantially perpendicular to the base 4 and passing through the centre thereof.

[0034] More in detail, the base 4 and the side wall 5 define a cavity 3.

[0035] The central body 2, as shown in Figure 1, has a substantially truncated conical shape. The central body 2 is designed to house in the cavity 3 a light source, which can be of any type known to the person skilled in the art.

[0036] The central body 2 has an opening 2a to allow the light coming from the light source to spread outside the reflector 1. More in detail, the opening 2a is opposite the base 4 and has a substantially circular shape as shown in Figure 1. In further embodiments not shown, the opening 2a may have different shapes known to the person skilled in the art.

[0037] The side wall 5 has an inner surface 5a and an outer surface 5b. In particular, the inner surface 5a is at least partially reflecting.

[0038] More in detail, the side wall 5 is defined by a plurality of segments 6 adjacent to one another. In particular, each segment 6 has a first end 7 connected to the base 4 and a second end 8 opposite said first end 7.

[0039] Each segment 6 has a flange 8a at the second end 8.

[0040] Each flange 8a, as shown in Figures 1 and 4, extends outside the cavity 3 of the central body 2, in particular for a length of a few millimetres. In accordance with the present invention, each flange 8a is formed by bending the respective segment 6 at the second end 8.

[0041] More in detail, the flanges 8a of each segment 6 arranged next to each other define an edge 9. This edge 9 has a supporting surface 9a. The edge 9 has an inner diameter Di. The edge 9 defines the aforementioned opening 2a of the central body 2.

[0042] In accordance with alternative and not shown embodiments, the segments 6 may lack the aforementioned flanges 8a.

[0043] The supporting surface 9a has a substantially circular crown shape. In particular, the supporting surface 9a has the inner diameter Di of the edge 9, as previously stated, and an outer diameter De, connected to the length of the flange 8a. Even more in detail, the supporting surface 9a is substantially parallel to the base 4.

[0044] The base 4 has a substantially circular shape and a base diameter Db.

[0045] As shown in Figure 9, the inner diameter Di is substantially larger than the base diameter Db, having a ratio between the inner diameter Di and the base diameter Db higher than 1. In embodiments not shown, the ratio between the inner diameter Di and the diameter base Db may, for example, be smaller than or equal to 1.

[0046] In further embodiments, not shown, the base 4 may have different shapes known to the person skilled in the art and not further described here.

[0047] The base 4 comprises at least one hole 4a, shown in Figure 7, for connecting the light source, located inside the cavity 3, to an energy source also not shown.

[0048] More in detail, the reflector 1 comprises a locking device 10 for retaining the segments 6 by fixing itself at the second ends 8. In other words, the locking device 10 serves for locking the central body 2.

[0049] The locking device 10 comprises a pair of half-pieces 11, 12, connected to each other and designed to retain the second ends 8 of each segment 6. More in detail, the half-pieces 11, 12 are designed to couple reversibly to each other by tightening around the edge 9, thus retaining the segments 6 close to each other and fixing themselves at the second ends 8. In particular, the half-pieces 11, 12, as shown in Figures 1 and 4, are substantially semicircular.

[0050] Each half-piece 11, 12 has an upper portion 13 designed to retain the second ends 8 close to each other. In other words, the upper portion 13 is that portion of each half-piece 11, 12 that mates with the second ends 8, thus keeping the segments 6 close to each other to define the side wall 5 of the central body 2 and the edge 9.

[0051] Each half-piece 11, 12 has a lower portion 14 designed to surround at least part of the side wall 5. In other words, the lower portion 14 is that portion of each half-piece 11, 12 consecutive to the upper portion 13, whose function is at least partially overlapping the outer surface 5b.

[0052] As shown in Figures 2 and 5, the upper portion 13 is designed to retain the flanges 8a and the lower portion 14 faces the outer surface 5b, preferably at a distance of a few millimetres.

[0053] In further embodiments not shown, the lower portion 14 can be counter-shaped with respect to the side wall 5.

[0054] According to a first embodiment, shown in Figures 1 and 3, the lower portion 14 of the locking device 10 substantially covers a band, preferably of a few centimetres, of the outer surface 5b consecutive to the edge 9.

[0055] According to a second embodiment, shown in Figures 4 and 6, the locking device 10 substantially affects the entire central body 2. In particular, the lower portion 14 substantially covers the entire outer surface 5b.

[0056] In both the aforementioned embodiments, each half-piece 11, 12 comprises a housing 15 designed to house and retain the flanges 8a. More in detail, this housing 15 has a substantially semicircular perimeter 15a and is complementary to the outer profile of the edge 9. In particular, the housings 15 take a circular shape after that the half-pieces 11, 12 have been connected to each other.

[0057] The housing 15 is formed in the upper portion 13 of each half-piece 11, 12 and has a substantially C-shaped section, as shown in Figure 8. In other words, the function of the housing 15 is retaining the flanges 8a close together and preventing the movement of the central body 2 along the central axis X-X with respect to the locking device 10.

[0058] The reflector 1 comprises a protection slide 20 designed to cover at least partially the opening 2a, shown for example in Figures 2 and 5. The protection slide 20 has a central portion 20a, arranged at the central axis X-X, and a contour portion 20b external to the central portion 20a. The protection slide 20 has a substantially circular shape. In particular, the protection slide 20 has a slide diameter Dv larger than the inner diameter Di of the edge 9 and preferably smaller than or equal to the outer diameter De of the supporting surface 9a.

[0059] The protection slide 20 is designed to be tightened by the half-pieces 11, 12. In particular, as shown in Figures 2 and 5, the protection slide 20 is positioned on the support surface 9a defined by the flanges at the contour portion 20b. More in detail, the contour portion 20b is designed to be inserted and partially retained in the housing 15 together with the flanges 8a.

[0060] In the embodiments not shown in which the segments are flangeless, the half-pieces directly retain the protection slide 20 by interference, thus preventing the movement of the central body along the central axis X-X.

[0061] With reference to Figures 1-6, the half-pieces 11, 12 comprise reversible coupling means 16 designed to fix the half-pieces 11, 12 to each other.

[0062] The reversible coupling means 16 comprise at least one cantilever element 17 and a slot 18. As shown in Figure 1, the cantilever element 17, formed on a half-piece 11, faces the respective slot 18 formed on the other half-piece 12. More in detail, the cantilever element 17 is designed to snap into the slot 18 and lock the two half-pieces 11, 12 to each other.

[0063] In more detail, the cantilever element 17 is preferably made in one piece from a free end of the half-circumference of a half-piece 11, 12. The cantilever element 17 is elastically deformable along a transverse direction Y-Y, substantially perpendicular to the central di-

rection X-X. In particular, the cantilever element is extendable and/or retractable along the Y-Y direction described above so as to lock/unlock in/from the respective slot 18. Even more in detail, the cantilever element 17 has a raised notch 17a designed to interfere with the slot 18, thus ensuring the locking of the half-pieces 11,12.

[0064] According to the embodiment shown in Figures 1-3, the half-pieces 11, 12 comprise a pair of cantilever elements 17 and a pair of respective slots 18. More in detail, the cantilever elements 17 are preferably formed on the same half-piece 11 and the slots 18 are formed on the other facing half-piece 12.

[0065] According to the embodiment shown in Figures 4-6, the half-pieces 11, 12 comprise two pairs of cantilever elements 17 and two pairs of respective slots 18. In particular, the cantilever elements 17 are preferably formed on the same half-piece 11 and the slots 18 are formed on the other facing half-piece 12. In particular, a first pair of cantilever elements 17 and respective slots 18 is preferably positioned at the height of the edge 9. A second pair of cantilever elements 17 and respective slots 18 is preferably positioned at the height of the base 4.

[0066] The half-pieces 11, 12 comprise guide means 19 formed on the free ends of the half-circumferences. These guide means 19 have the function of ensuring and facilitating the alignment between the half-pieces 11, 12 in block around the second ends 8. In other words, the guide means 19 are designed to avoid the relative movement of a half-piece 11, 12 with respect to the other along the central axis X-X.

[0067] The guide means 19 comprise at least one protruding guide element 19a, formed on a half-piece 11, 12, and at least one hole 19b, designed to receive the guide element 19a and formed on the facing half-piece 11, 12.

[0068] In the embodiment shown in Figures 1-3, the half-pieces 11, 12 comprise two pairs of guide elements 19a and two pairs of respective holes 19b, preferably positioned at the pair of cantilever elements 17 and at the pair of respective slots 18.

[0069] In the embodiment shown in Figures 4-6, the half-pieces 11, 12 comprise two pairs of guide elements 19a and two pairs of respective holes 19b, preferably positioned one at the edge 9 and one at the base 4.

[0070] Each half-piece 11, 12 comprises reversible connecting means 21. These reversible connecting means 21 are designed to fix said central body 2 to a spotlight, not shown. In particular, as shown in Figures 3 and 6, these reversible connecting means are positioned in the lower portion 14 of the half-pieces 11, 12. In other words, the reversible connecting means 21 allow securing the reflector 1 to the spotlight, thus ensuring a stable position and, if necessary, an easy removal from the spotlight.

[0071] According to the embodiment shown in Figures 1-3, the connecting means 21 comprise a pair of tabs 22, extending away from the lower portion 14. In particular, the tabs 22 extend towards the base 4. Each tab 22 comprises a protruding element 23, which is elastically deformable and is designed to mate with a seat (not shown) formed on the spotlight. In particular, this protruding element 23 is extendable and/or retractable along an H-H direction perpendicular to the X-X direction so as to lock each tab 22 in the seat formed on the spotlight. As shown in particular in Figure 3, the half-pieces 11, 12 have the pair of tabs 22 opposite each other with respect to the central axis X-X. In other words, the tabs 22 are preferably positioned in diametrically opposed areas when the half-pieces 11, 12 close to lock the flanges 8a.

[0072] According to the embodiment of Figure 6, the connecting means 21 are positioned in the lower portion 14, in particular at the base 4. In particular, the connecting means 21 comprise a pair of fins 24, preferably made by moulding, designed for coupling to guides arranged on a spotlight to lock the reflector 1. More in detail, the fins 24 extend away from the side wall 5. As shown in particular in Figure 6, the half-pieces 11, 12 have the pair of fins 24 opposite to each other with respect to the central axis X-X. In other words, the fins 24 are preferably positioned in diametrically opposed areas when the half-pieces 11, 12 close to lock the flanges 8a.

[0073] The present invention further relates to a method for assembling the reflector 1. In particular, the method in question comprises a step for predisposing the central body 2 in an open configuration in which the segments 6 are substantially coplanar to the base 4, as shown in Figure 7. More in detail, the segments 6, connected to the base 4, are substantially coplanar to the base 4 itself. Said segments 6 extend away from the base 4 and are angularly spaced with respect to the base 4.

[0074] In alternative embodiments, not shown, the number of segments 6 may be any, for example eight, ten, sixteen or any number necessary for the purposes of the device or based on the equipment used to manufacture the segments 6.

[0075] In the open configuration, the second ends 8 of each segment 6 can be bent, by means of a processing technique known to the person skilled in the art and not described here, to form the flanges 8a described above.

[0076] The method further comprises a step of closing the segments 6, either manually or through tools known to the person skilled in the art and not described.

[0077] In particular, the segments 6 are brought closer by bending them at the first end 7. More in detail, the present closing step of the segments 6 defines the side wall 5 and the second ends define the edge 9. Then the segments 6 are tightened by means of the half-pieces 11, 12 of the locking device 10. The supporting surface 9a, formed of the flanges 8a, is partially inserted into the housing 15. As shown in Figures 2 and 5, a half-piece 11 houses a first half-circumference of the supporting surface 9a. Then, the other half-piece 12 locks the flanges 8a by coupling to the half-piece 11 in which the supporting surface 9a is positioned. Between the closing step of the segments 6 and the fixing step, it is further provided

a positioning step of the protection slide 20. More in detail, the protection slide 20 is positioned on the flanges 8a, in the manner described above, and then tightened together with the segments 6 between the pair of half-pieces 11, 12.

[0078] After having tightened the segments 6 by means of the locking device 10, as shown in Figures 2 and 5, the reflector 1 is assembled.

[0079] The method further comprises an optional step of mounting the reflector 1 on the spotlight by means of the connecting means 21 described above.

[0080] Obviously, a person skilled in the art, in order to satisfy contingent and specific needs, may make numerous modifications to the variants described above, all however contained in the scope of protection as defined by the following claims.

Claims

1. Reflector (1) for lighting devices comprising:

- a main body (2) having a cavity (3) and a central axis (X-X); said main body (2) comprising a base (4) and a side wall (5) connected to said base (4), said base (4) and said side wall (5) defining said cavity (3); said side wall (5) being defined by a plurality of segments (6); said side wall (5) having an at least partially reflecting inner surface (5a) and an outer surface (5b); each segment (6) having a first end (7) connected to the base (4) and a second end (8) opposite said first end (7);
- a locking device (10) fixed to said second ends (8) and designed to retain said segments (6);

wherein said locking device (10) comprises a pair of half-pieces (11, 12) connected to each other and designed to maintain adjacent said second ends (8) of said segments (6), and
wherein each segment (6) comprises a flange (8a) arranged at said second end (8), **characterized in that** said upper portion (13) comprises a housing (15), said housing (15) being designed to house said flanges (8a) of said segments (6) and retain them.

2. The reflector (1) according to claim 1, wherein each of said half-pieces (11, 12) has an upper portion (13) and a lower portion (14); said upper portion (13) being designed to retain the second ends (8) of said segments (6); said lower portion (14) being designed to at least partially surround the side wall (5).

3. The reflector (1) according to claim 1, wherein said main body (2) has an edge (9) opposite said base (4) and defined by the flanges (8a) of the segments (6), said housing (15) having a perimeter (15a) substantially complementary to said edge (9).

4. The reflector (1) according to claim 1, wherein said locking device (10) comprises reversible coupling means (16) for fixing said half-pieces (11, 12) to each other.

5. The reflector (1) according to any one of the preceding claims, wherein said pair of half-pieces (11, 12) comprises reversible connecting means (21) for fixing said main body (2) to a spotlight, said reversible connecting means (21) being preferably positioned in the lower portion (14) of said half-pieces (11, 12).

6. The reflector (1) according to any one of claims 1 to 4, **characterized in that** it comprises a protection slide (20); said protection slide (20) being tightened by said pair of half-pieces (11, 12) and being partially inserted into said housing (15).

7. The reflector (1) according to claim 6, wherein said protection slide (20) has a central portion (20a) located substantially at the central axis (X-X) and a contour portion (20b) external to said central portion (20a) and at least partially inserted into said housing (15).

8. Kit for assembling a reflector (1) according to any one of the preceding claims 1-7, **characterized in that** it comprises:

- a main body (2) comprising a base (4) and a plurality of segments (6) connected to said base (4) and substantially coplanar to said base (4), said segments (6) extending away from said base (4) and being angularly evenly spaced with respect to said base (4), each segment (6) having a first end (7) connected to the base (4) and a second end (8) opposite said first end (7);
- a locking device (10) comprising two half-pieces (11, 12) that can be connected to each other;
- a protection slide (20) having a central portion (20a) and a contour portion (20b) external to said central portion (20a).

9. Method for assembling a reflector (1) according to any one of the preceding claims 1-7, **characterized in that** it comprises the steps of:

- predisposing a main body (2) comprising a base (4) and a plurality of segments (6) connected to said base (4) and substantially coplanar to said base (4), said segments (6) extending away from said base (4) and being angularly evenly spaced with respect to said base (4), each segment (6) having a first end (7) connected to the base (4) and a second end (8) opposite said first end (7);
- closing the segments (6) by bringing said second ends (8) together to define said side wall (5);

- tightening said segments (6) between the pair of half-pieces (11, 12) of the locking device (10).

10. The method according to claim 9, **characterized in that** it comprises, after the closing step of the segments (6), the further steps of:

- positioning a protection slide (20) in said housing (15), thus closing the cavity (3);
- tightening said protection slide (20) together with said segments (6) between the pair of half-pieces (11, 12) of the locking device (10).

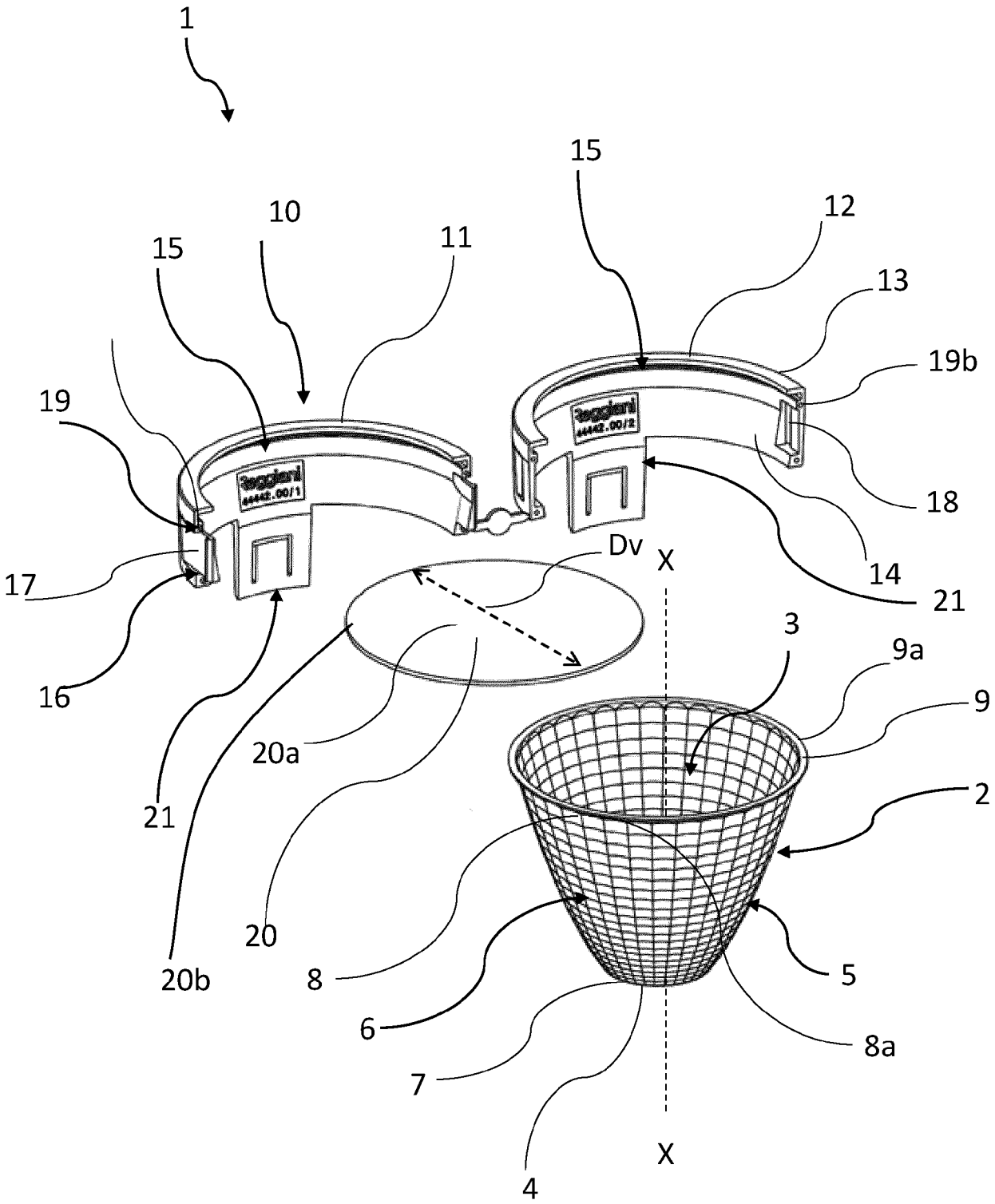
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Fig. 1

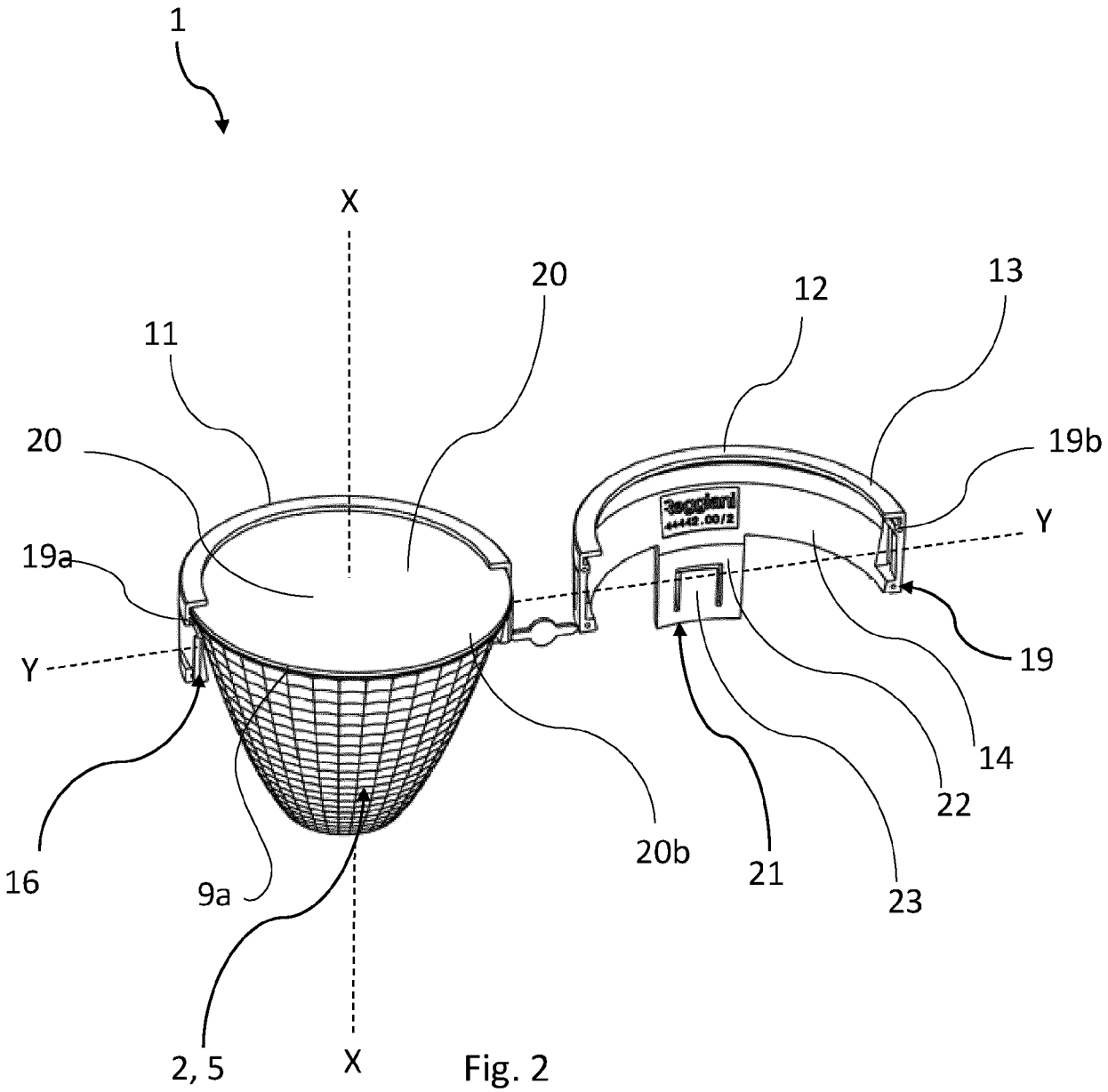

Fig. 2

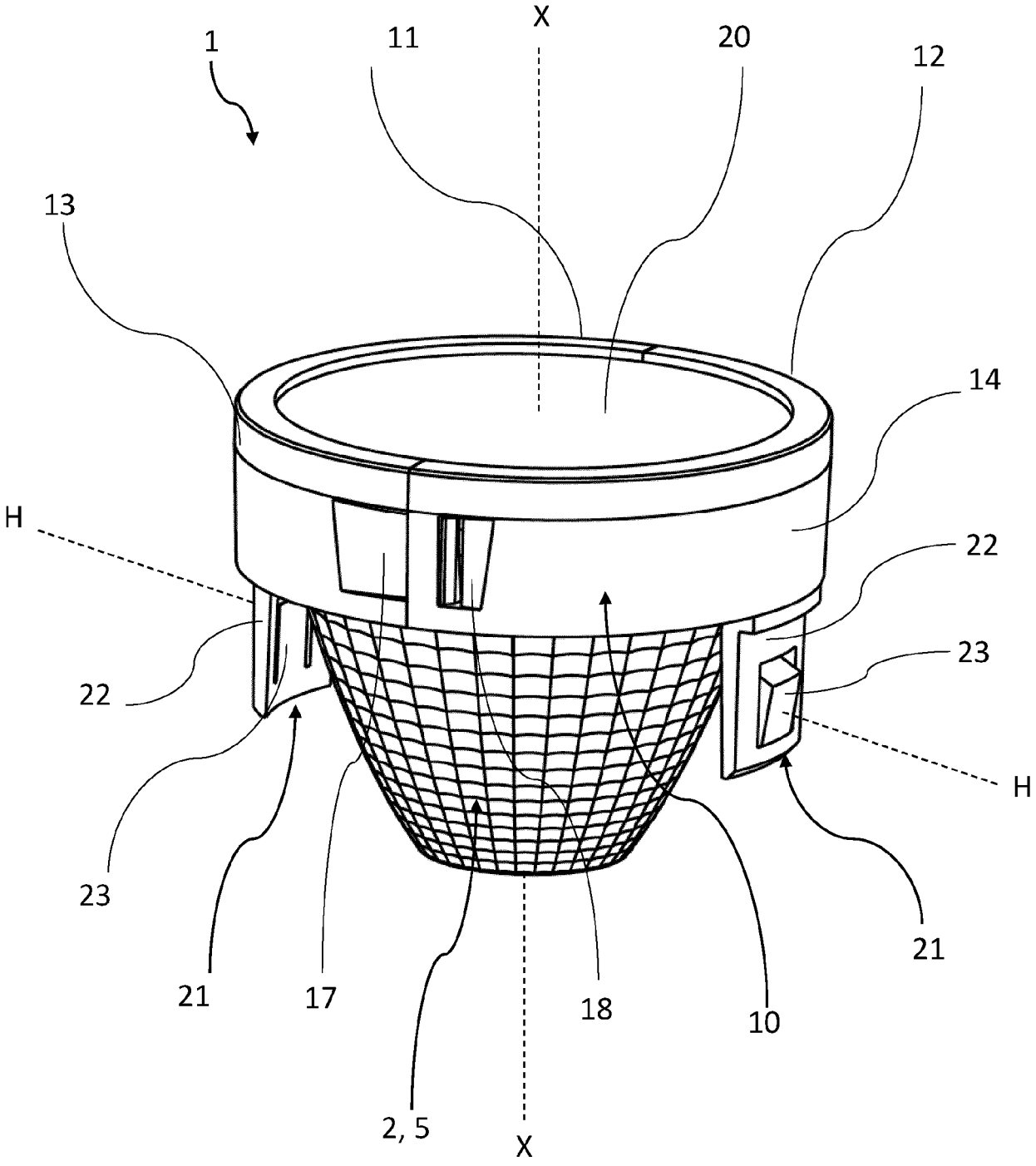

Fig. 3

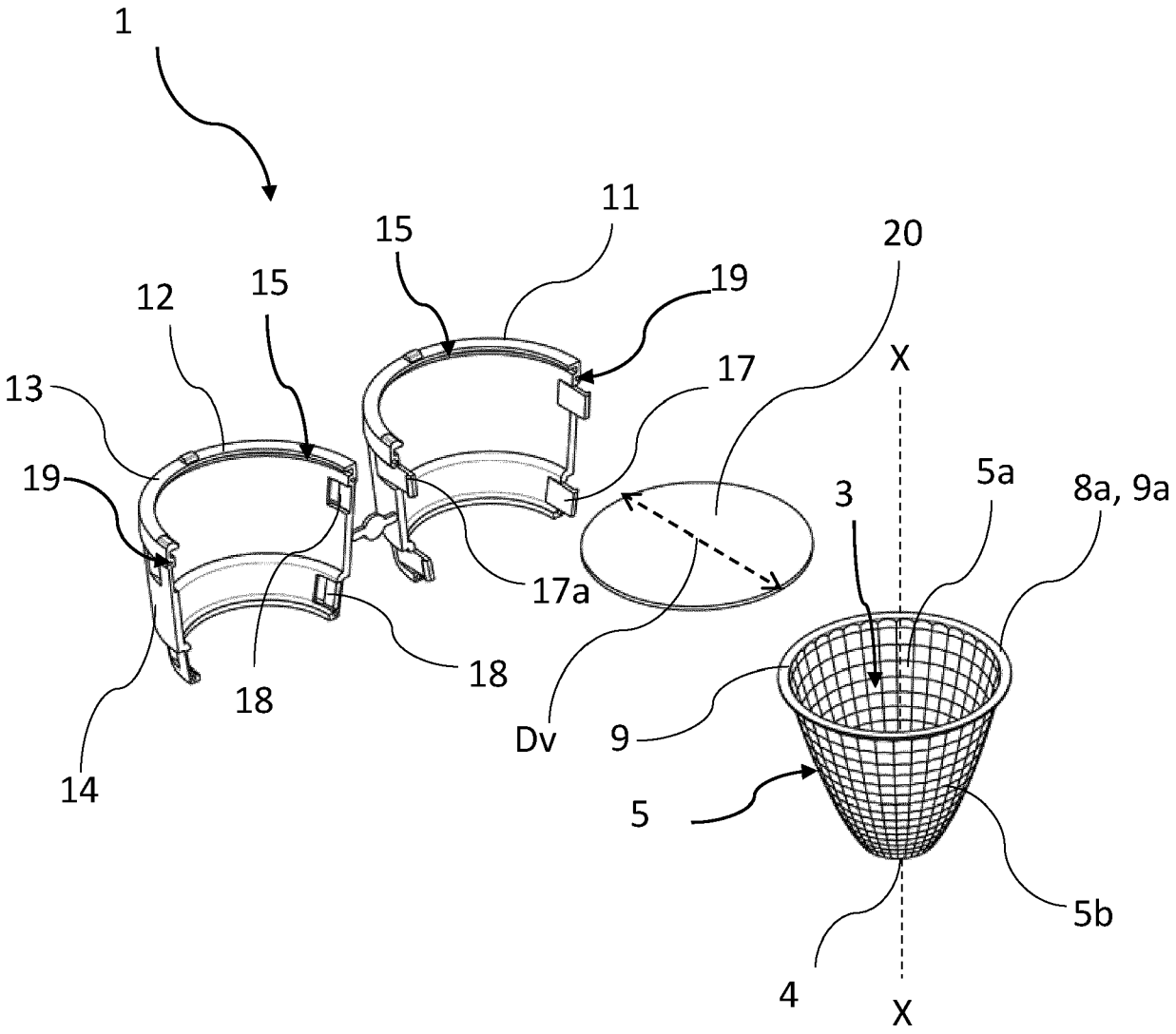

Fig. 4

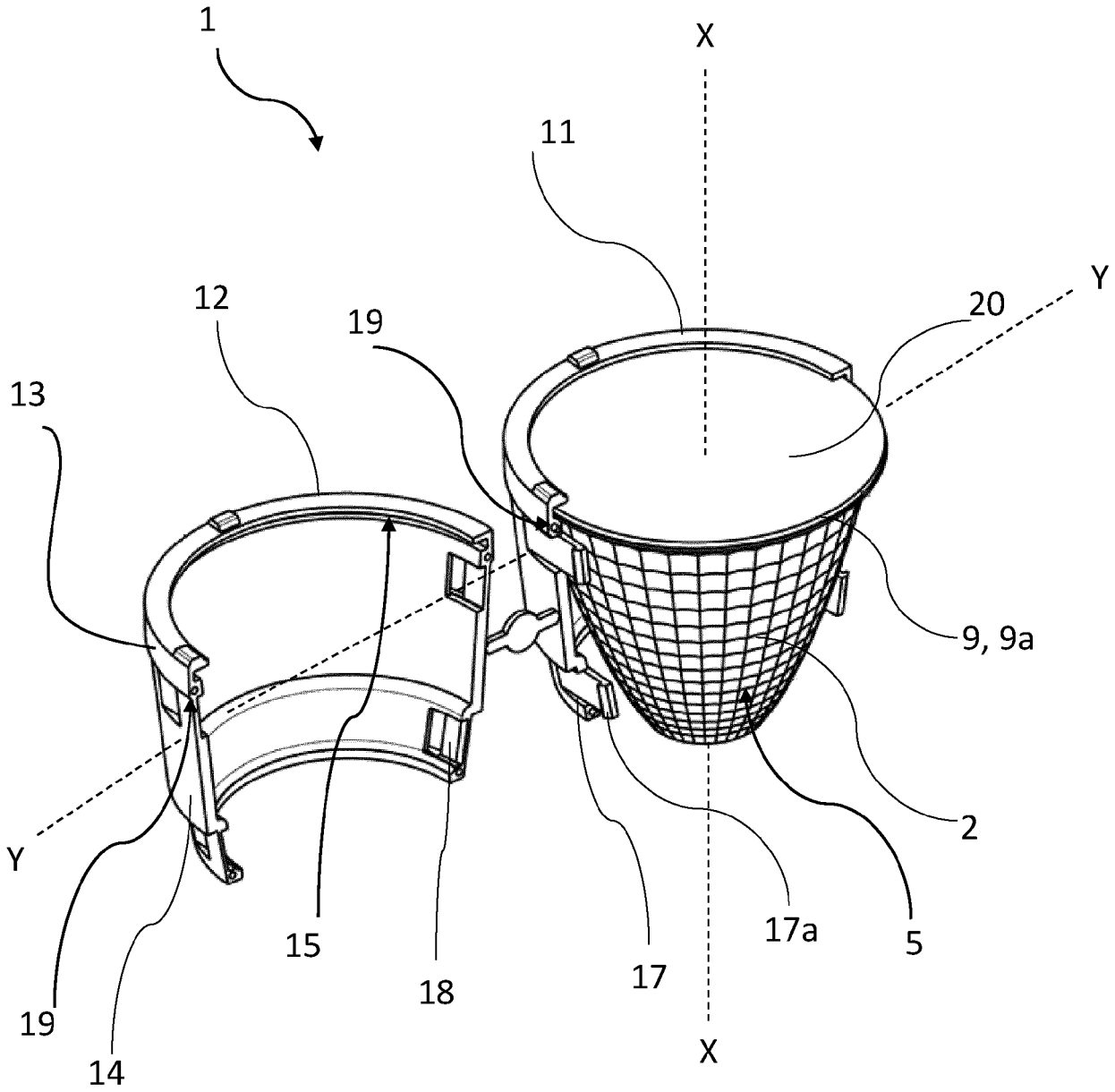

Fig. 5

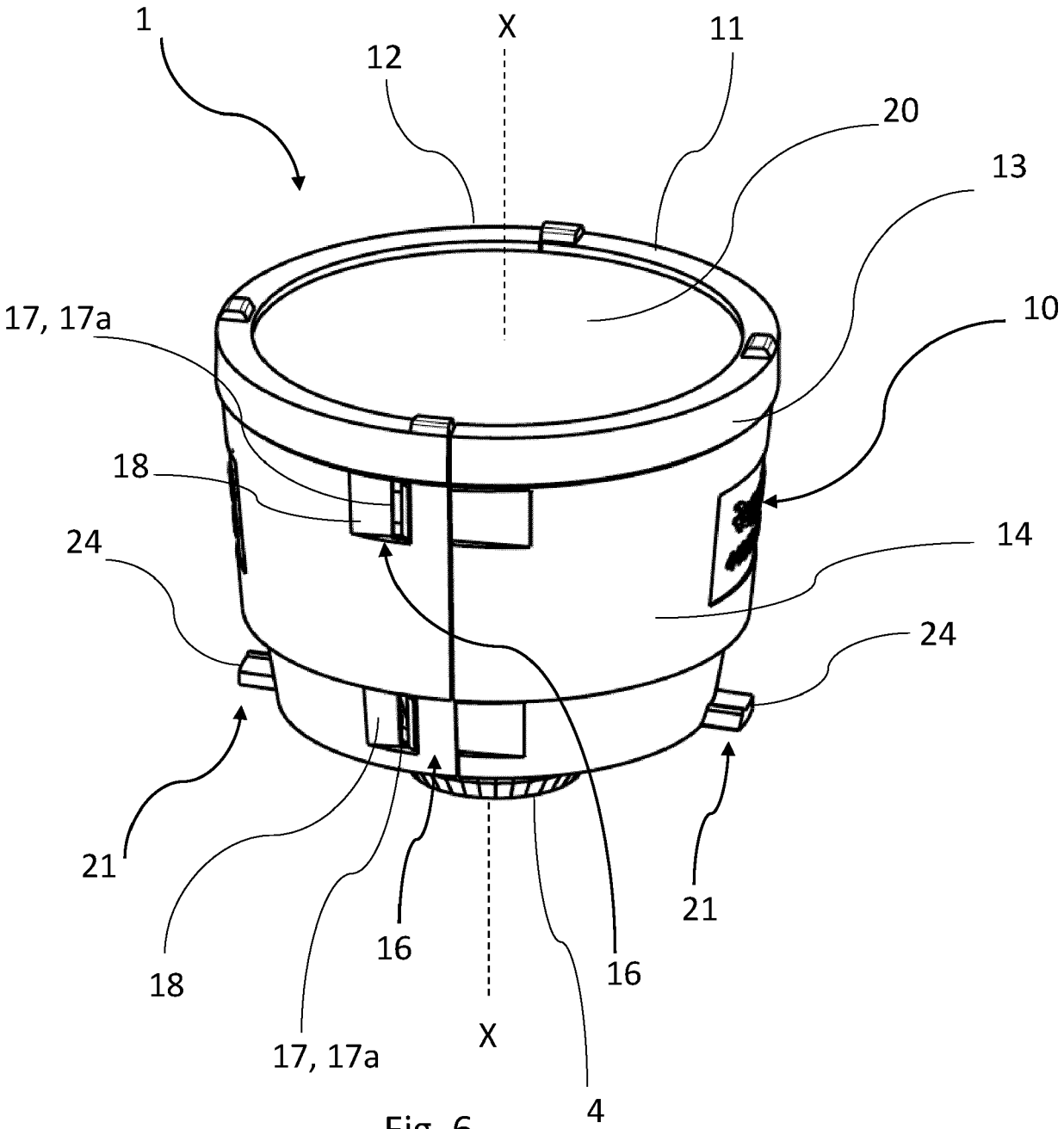

Fig. 6

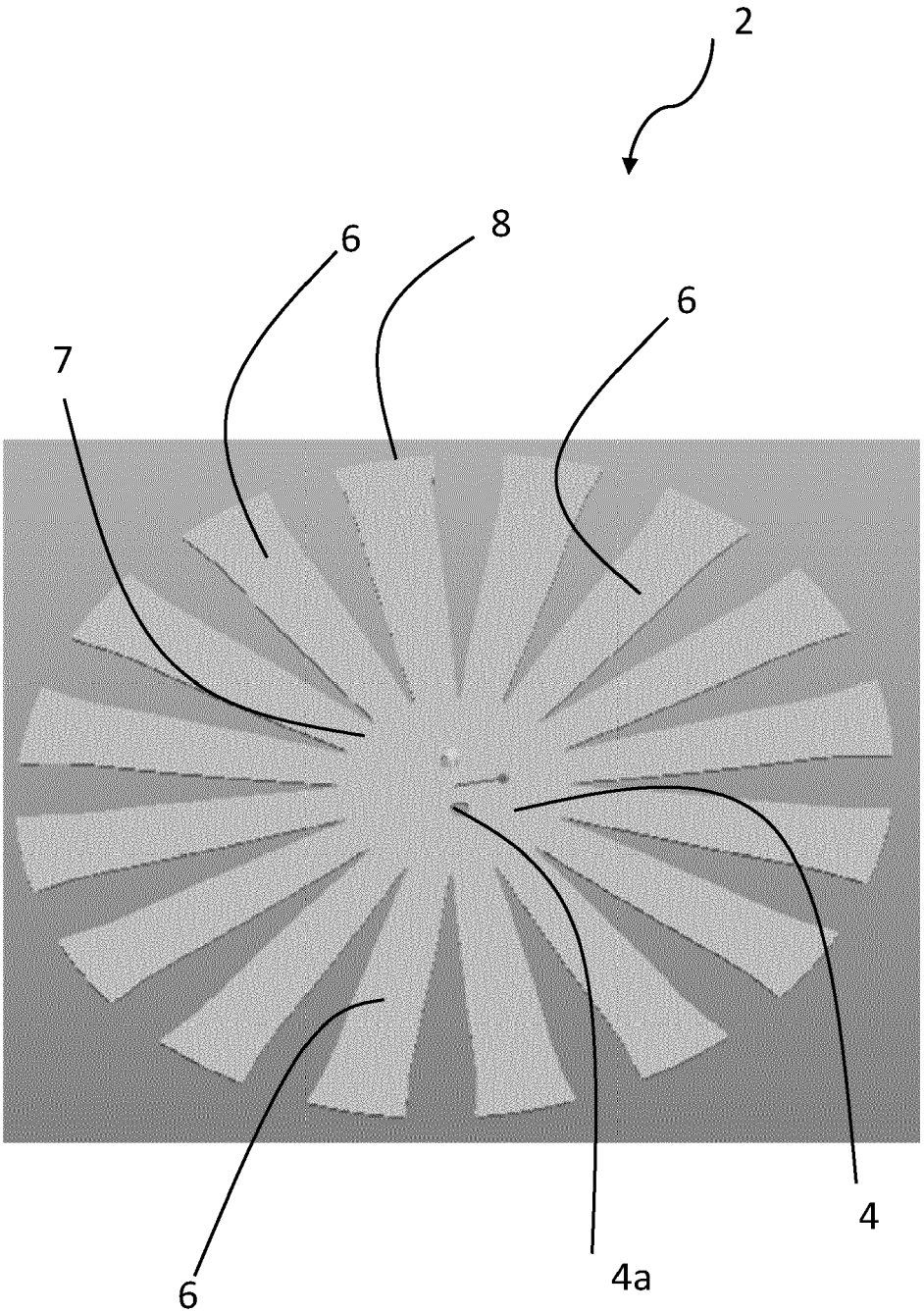

Fig. 7

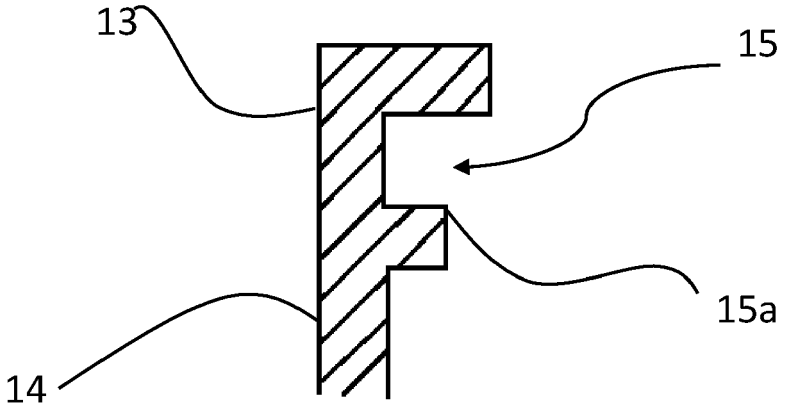

Fig. 8

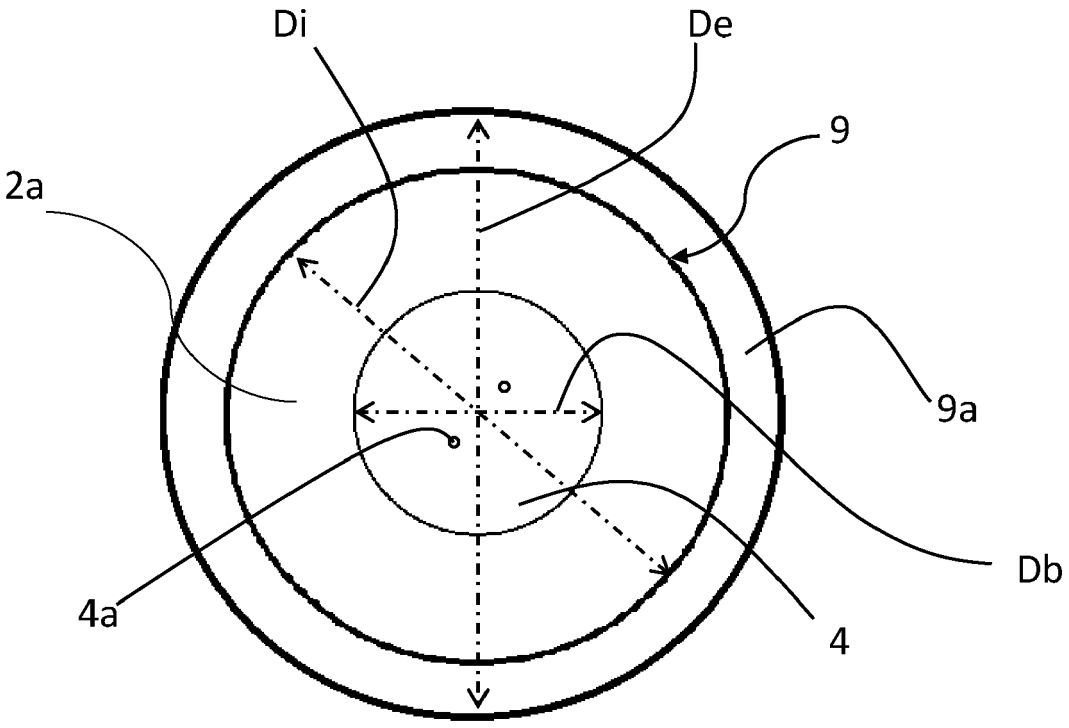

Fig. 9

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EUROPEAN SEARCH REPORT

Application Number
EP 19 15 3881

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F21V

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	22 March 2019	Allen, Katie

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