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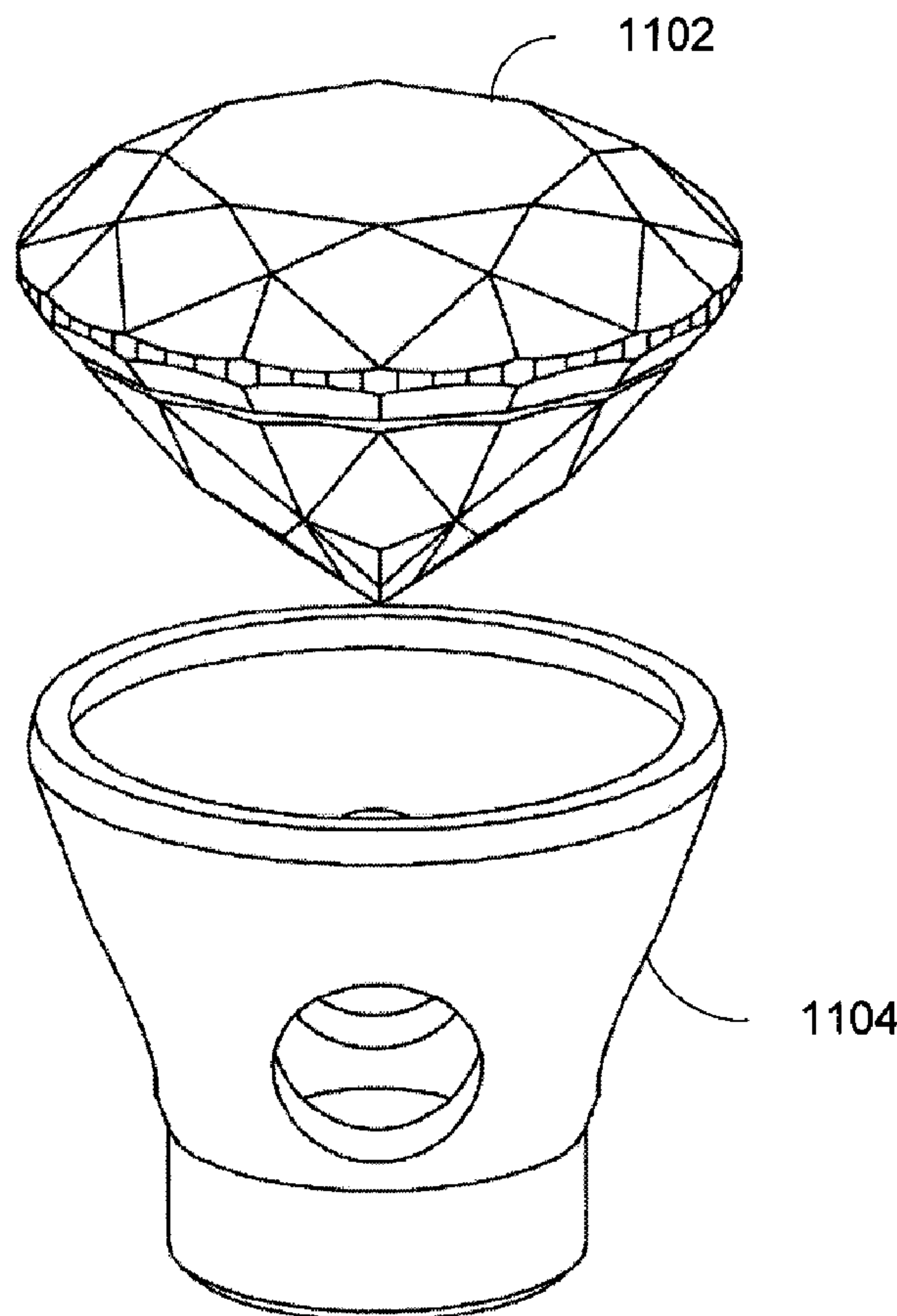
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(54) Titre : COLETTE DE MONTAGE EN ALLIAGE A MEMOIRE DE FORME AVEC GEMME RAINURE

(54) Title: SHAPE MEMORY ALLOY MOUNTING COLLET WITH GROOVED GEMSTONE



(57) Abrégé/Abstract:

A jewelry article comprising: a gemstone and a shape memory alloy collet. The gemstone comprises a girdle dividing the gemstone into a pavilion and a crown having a table surface; and a continuous groove located in the pavilion and parallel to the girdle, the

(57) **Abrégé(suite)/Abstract(continued):**

continuous groove has a first surface and a second surface, the first surface is substantially parallel to the table surface, the first surface and the second surface of the groove form a first angle. The shape memory alloy collet has a mounting rim, the mounting rim has an inner surface and a top surface defining an opening of the shape memory alloy collet, the inner surface and the top surface form a second angle, the second angle corresponds substantially to the first angle, and a profile of the mounting rim corresponds substantially to a profile of the continuous groove.

ABSTRACT

A jewelry article comprising: a gemstone and a shape memory alloy collet. The gemstone comprises a girdle dividing the gemstone into a pavilion and a crown having a table surface; and a continuous groove located in the pavilion and parallel to the girdle, the continuous groove has a first surface and a second surface, the first surface is substantially parallel to the table surface, the first surface and the second surface of the groove form a first angle. The shape memory alloy collet has a mounting rim, the mounting rim has an inner surface and a top surface defining an opening of the shape memory alloy collet, the inner surface and the top surface form a second angle, the second angle corresponds substantially to the first angle, and a profile of the mounting rim corresponds substantially to a profile of the continuous groove.

SHAPE MEMORY ALLOY MOUNTING COLLET WITH GROOVED GEMSTONE

BACKGROUND OF THE INVENTION

[0001] The present invention relates to jewelry, and more specifically, to shape memory alloy mounting collet.

[0002] Gemstones are traditionally set in a collet, also known as a setting or a basket, which is fixedly attached to a piece of jewelry. Various collets are available and may form part of 'jewelry findings' as understood by a person skilled in the art. Jewelry findings may include, but not limited to, items like clasps, butterflies, pins, jump rings, and lockets.

[0003] There are currently several ways of setting gemstones in jewelry. As shown in FIGS. 1(a)-(e), for round gemstones there are mainly five ways of setting them in jewelry. In four of these cases a collet is used. In FIGS. 1(a) and (b), a gemstone is mounted in a four-prong collet and a six-prong collet, respectively. In FIGS. 1(c) and (d), a gemstone is mounted in a bezel collet and a half-bezel collet, respectively. FIG. 1 (e) illustrates a setting where a collet is absent and the gem is held in place by means of a tensioned hoop, which takes on the form of a ring shank.

[0004] US Patent 795,109 to Dover describes a typical bezel setting where part of the gemstone is covered.

[0005] US Patent 5,115,649 to Amber describes a method and apparatus for invisibly setting round diamonds. The diamonds are provided with grooves cut in the pavilion below the girdle of the diamond, and a round barrel is provided which has ridges projecting inwardly from the inner wall of the barrel. The diamond is rotated into the barrel to interlock the ridges within the grooves formed in the diamond to hold the barrel and diamond securely together. However, during the wear of the jewelry the valuable gemstone may become unscrewed and lost.

[0006] US Patent. 4,738,240 to Aich describes a dihedron notch on the edges of a pyramid shaped diamond. One of the two surfaces of the dihedron is parallel to an inclined polished table to minimize the grey reflections to the polished table of a diamond. This approach has the disadvantage that only a pyramid shaped diamond can be applied and the polished table needs to be inclined by about 7° to the natural table.

[0007] Therefore, there is a need to holding a round gemstone securely in place in jewelry in a way that allows the full diameter of the gemstone to be visible. There is further a need to a gemstone that can be easily mounted onto a collet.

SUMMARY OF THE INVENTION

5 [0008] According to one aspect of the invention there is provided a jewelry article comprising: a gemstone and a shape memory alloy collet. The gemstone comprises a girdle dividing the gemstone into a pavilion and a crown having a table surface; and a continuous groove located in the pavilion and parallel to the girdle, the continuous groove has a first surface and a second surface, the first surface is substantially parallel to the table surface, the first surface and the second surface of the groove form a first angle. The shape memory alloy collet has a mounting rim, the mounting rim has an inner surface and a top surface defining an opening of the shape memory alloy collet, the inner surface and the top surface form a second angle, the second angle corresponds substantially to the first angle, and a profile of the mounting rim corresponds substantially to a profile of the continuous groove.

15 [0009] In accordance with another aspect of the invention there is provided a gemstone comprising: a girdle dividing the gemstone into a pavilion and a crown having a table surface; and a continuous groove located in the pavilion and parallel to the girdle. The continuous groove has a first surface and a second surface, the first surface is substantially parallel to the table surface, the first surface and the second surface of the groove form a first angle which corresponds substantially to a second angle formed by an inner surface and a top surface of a mounting rim of a shape memory alloy collet. The inner surface and the top surface define an opening of the shape memory alloy collet, wherein a profile of the mounting rim corresponds substantially to a profile of the continuous groove.

25 [0010] In accordance with yet another aspect of the invention there is provided a shape memory alloy collet comprising: a mounting rim, the mounting rim has an inner surface and a top surface defining an opening of the shape memory alloy collet. The inner surface and the top surface form a second angle, the second angle corresponds substantially to a first angle formed by a first surface and a second surface of a continuous groove located in a pavilion and parallel to a girdle of a gemstone. The gemstone has a crown including a table surface; wherein the first surface is substantially parallel to the table surface, and a profile of the mounting rim corresponds substantially to a profile of the continuous groove.

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[0011] Preferably, the gemstone has a round shape.

[0012] Preferably, the shape memory alloy collet is a titanium alloy collet.

[0013] Preferably, the first angle is between 75 and 85 degrees.

[0014] Preferably, the first angle is 80 degrees.

[0015] Preferably, the shape memory alloy collet has a plurality of holes for cleaning an interior of the shape memory alloy collet.

[0016] Preferably, the gemstone is selected from the group consisting of diamond, ruby, sapphire and alexandrite.

[0017] Preferably, a diameter of the round shape gemstone is at least 10% greater than the opening of the shape memory alloy collet.

[0018] Preferably, a wall of the shape memory alloy collet is thicker at a bottom end.

[0019] Preferably, a diameter of the shape memory alloy collet at a bottom end is less than that at the mounting rim.

BRIEF DESCRIPTION OF THE DRAWINGS

[0020] These and other features of the invention will become more apparent from the following description in which reference is made to the appended drawings wherein:

FIG. 1(a) illustrates a prior art mounting of a gemstone in a four-prong collet;

FIG. 1(b) illustrates a prior art mounting of a gemstone in a six-prong collet;

FIG. 1(c) illustrates a prior art mounting of a gemstone in a bezel collet;

FIG. 1(d) illustrates a prior art mounting of a gemstone in a half-bezel collet;

FIG. 1(e) illustrates a prior art mounting of a gemstone in a tensioned hoop in a form of a ring shank;

FIG. 2 (a) is a sectional view of a shape memory alloy mounting collet in accordance with one embodiment of the present invention;

FIG. 2 (b) is an enlarged view of the mounting rim of the shape memory alloy mounting collet;

FIG. 3 is a top view of the shape memory alloy mounting collet;

FIG. 4 is a top perspective view of the shape memory alloy mounting collet;

FIG. 5 is a bottom view of the shape memory alloy mounting collet;

FIG. 6 is a bottom perspective view of a round grooved gemstone with a continuous groove in accordance with one embodiment of the present invention;

FIG. 7 (a) illustrates the grooved gemstone in a sectional view;

FIG. 7 (b) shows the detail of the groove;

FIG. 7 (c) shows the angle of the groove and the direction of inclination;

FIG. 8 is a top view of the grooved gemstone in accordance with one embodiment of the present invention;

FIG. 9 is a bottom perspective view of the grooved gemstone;

FIG. 10 is a bottom view of the grooved gemstone;

FIG. 11 shows the mounted grooved gemstone in the shape memory alloy mounting collet;

FIG. 12 shows the mounted grooved gemstone in the shape memory alloy mounting collet in a perspective view;

FIG. 13 shows an exploded view of the grooved gemstone and the shape memory alloy mounting collet;

FIG. 14 is a top perspective view of the assembled grooved gemstone and shape memory alloy collet; and

FIG. 15 is a bottom view of the mounted grooved gemstone in the shape memory alloy collet.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

5 [0021] Reference will now be made in detail to some specific embodiments of the invention including the best modes contemplated by the inventors for carrying out the invention. Examples of these specific embodiments are illustrated in the accompanying drawings. While the invention is described in conjunction with these specific embodiments, it will be understood that it is not intended to limit the invention to the described embodiments. On the contrary, it is intended to cover alternatives, modifications, and equivalents as may be included within the spirit and scope of the invention as defined by the appended claims. In the following description, numerous specific details are set forth in order to provide a thorough understanding of the present invention. The present invention may be practiced without some or all of these specific details. In other instances, well-known process operations have not been described in detail in order not to unnecessarily obscure the present invention.

10 [0022] In this specification and the appended claims, the singular forms "a," "an," and "the" include plural references unless the context clearly dictates otherwise. Unless defined otherwise, all technical and scientific terms used herein have the same meaning as commonly understood to one of ordinary skill in the art to which this invention belongs.

15 [0023] The present invention encompasses a method and a collet for holding a round gemstone securely in place in jewelry in a way that allows the full diameter of the gemstone to be visible. The mounting mechanism is by way of a shape memory alloy collet, for example but not limited to, a titanium alloy that snaps onto a grooved gemstone. The collet with the mounted gemstone may be then fixedly attached to a piece of jewelry.

20 [0024] The present invention differs from the prior art in that a conical collet made of a shape memory alloy, for example but not limited to, titanium alloy with shape memory is being used. Unlike with the prior art device where a deformable metal is used, the shape memory alloy, for example but not limited to, titanium alloy deforms slightly during the mounting process, but regains its original shape after fitting the gemstone into the collet.

25 [0025] A shape memory alloy is an alloy which upon being thermally treated becomes fixed in a given shape due to crystalline alignment, yet is relatively easily deformable. One example of shape memory alloy is the alloy of titanium and nickel. Other shape memory alloys may include, but

not limited to, copper-aluminum-nickel, gold-cadmium, copper-zinc aluminum, silver cadmium, silver-zinc, copper-aluminum and copper-zinc.

[0026] The mounting groove of the present invention is a continuous groove. In the described embodiment, the continuous groove is circular, corresponding to the shape of the gemstone. The continuous groove in the gemstone has the same profile as the mounting receptacle of the shape memory alloy collet, for example, titanium alloy collet. In the described embodiment, the shape is conical. This method of mounting gemstones allows for gemstones to be mounted in a secure way. The shape memory alloy collet containing the gemstone may then be fixedly attached to jewelry by means of laser welding or other mechanical means.

[0027] FIGS. 2-5 are different views of the shape memory alloy collet in accordance with one embodiment of the present invention. FIG. 2 (a) is a sectional view of a shape memory alloy, for example, titanium alloy mounting collet 200. The shape memory alloy mounting collet 200 provides a mounting rim 202 which is inclined towards the center at a certain angle 204, that is, the angle formed by the inner surface 206 of the mounting rim 202 and the top surface 208 forming an opening of the mounting collet, as illustrated in FIG. 2 (b). The angle 204 is preferably at 75-85 degrees, more preferably at 80 degrees. The shape memory alloy mounting collet may also comprise a plurality of holes 210 to facilitate cleaning. Preferably, the mounting collet wall is thicker at the bottom end 212 where the diameter is less than at the mounting rim 202. This prevents any unplanned temporary deformation during the mounting process.

[0028] FIG. 3 is a top view of the shape memory alloy mounting collet, while FIG. 4 is a top perspective view. FIG. 5 is a bottom view of the shape memory alloy mounting collet. Although four holes 210 to facilitate the cleaning process are indicated in FIGS. 3-5, it should be understood by a person skilled in the art that other appropriate number of holes may be provided, as determined by factors, for example but not limited to, the size of the mounting collet.

[0029] FIG. 6 is a bottom perspective view of a round grooved gemstone 600 with a continuous groove 602 in accordance with one embodiment of the present invention.

[0030] FIG. 7 (a) illustrates the grooved gemstone 600 in a sectional view. The groove 702 is continuous and cut parallel with the table surface 704 of the gemstone 700. A gemstone 700 generally has a girdle 706, dividing the gemstone into a crown 705 and a pavilion 707. The

continuous groove 702 is located in the pavilion 707 and offset sufficiently away from the girdle 706 to reveal the full diameter of the grooved gemstone 700 once mounted in the shape memory alloy mounting collet. FIG. 7 (b) shows the detail of the groove and FIG. 7 (c) shows the angle of the groove and the direction of inclination. Preferably, the groove 702 has two groove surfaces 708, 710. Groove surface 708 is substantially parallel to the plane defined by the table surface 704. Groove surface 710 forms an angle with the groove surface 708. Preferably, the angle is between 75 to 85 degrees, more preferably, the angle is 80 degrees. Advantageously, the angle formed by the surfaces 708, 710 of the groove 702 corresponds to the angle 204 of the mounting rim 202 of the shape memory alloy collet.

[0031] FIG. 8 is a top view of the grooved gemstone 700 in accordance with one embodiment of the present invention. FIG. 9 is a bottom perspective view of the grooved gemstone 700 and FIG. 10 is a bottom view of the grooved gemstone 700. The gemstone 700 was designed to ensure maximum light return and a five-tier faceting technique is used on the bottom/pavilion of the gemstone to facilitate the cutting of the mounting groove as well as providing ample faceting to reflect as much light as possible. Design patent US D656,061S to one of the present inventors was adapted for this purpose.

[0032] FIG. 11 shows the mounted grooved gemstone 1102 in the shape memory alloy mounting collet 1104. FIG. 12 shows the mounted grooved gemstone 1102 in the shape memory alloy collet 1104 in a perspective view. Preferably, the diameter of the grooved gemstone 1102 is 10% greater than the widest diameter of the opening of the shape memory alloy mounting collet to hide the mounting collet from view in the perpendicular or slightly tilted line of sight. FIG. 13 shows an exploded view of the grooved gemstone 1102 and the shape memory alloy mounting collet 1104.

[0033] FIG. 14 is a top perspective view of the assembled grooved gemstone and shape memory alloy collet. FIG. 15 is a bottom view of the mounted grooved gemstone in the shape memory alloy collet.

[0034] In general, the size of the groove in the gemstone matches that of the rim of the shape memory alloy mounting collet. Once the grooved gemstone is pressed into the mounting collet, the groove in the gemstone is biased toward the profile of the rim of the collet. The collet rim and gemstone groove is of the same size, resulting in a secure interference fit once the grooved gemstone is snapped into place.

[0035] The illustrated embodiment utilizes a round gemstone and a corresponding shape memory alloy mounting collet. It should be apparent to a person skilled in the art that other shapes, for example but not limited to, pyramid or oval shape, may also be used without departing from the scope of the invention.

5 [0036] In general, a continuous groove is cut into the gemstone to be mounted into the corresponding shape memory alloy mounting collet. Preferably, the groove is cut into the gemstone just below the girdle on the pavilion, also known as the bottom of the gemstone. Once the gemstone is prepared, a shape memory alloy mounting collet is pressed onto the gemstone to snap into place into the continuous groove of the gemstone. The continuous groove of the gemstone and the protruding rim of the collet are of the same size resulting in a very secure interference fit. 10 This method of setting gemstones is particularly suited for gemstones with a hardness of greater than 9 on the Mohs hardness scale, for example diamonds, rubies, sapphire and alexandrite.

15 [0037] The continuous groove in the gemstone is cut to conform to the shape of the mating area of the shape memory alloy mounting collet. The continuous groove of the gemstone is cut by laser or diamond impregnated profiling wheels. The protruding rim of the shape memory alloy mounting collet is advantageously biased toward the continuous groove of the gemstone, once in place. Gemstones mounted by means of this method appear to be 'floating' as the method of setting is out of sight or invisible if viewed perpendicularly. Due to the shape of the collet, the 20 jewelry piece has to be tilted significantly in order for the collet to be seen. An additional advantage of this method of setting is that the full diameter of the gem is visible without any metal covering parts of the crown of the gemstone.

25 [0038] The shape memory alloy mounting collets may be anodized to match the particular color of the precious metal of the jewelry piece into which the mounted gemstone would be fitted. The toughness of shape memory alloy, for example titanium alloy, is a well-known fact and setting gemstones this way ensures that the gems will not be lost due to prongs wearing off.

[0039] The present invention has been described with regard to one or more embodiments. However, it will be apparent to persons skilled in the art that a number of variations and modifications can be made without departing from the scope of the invention as defined in the claims.

What is claimed is:

1. A jewelry article comprising:

a gemstone comprising:

a girdle dividing the gemstone into a pavilion and a crown having a table surface; and

a continuous groove located in the pavilion and parallel to the girdle, the continuous groove having a first surface and a second surface, the first surface being substantially parallel to the table surface, the first surface and the second surface of the groove forming a first angle; and

a shape memory alloy collet having a mounting rim, the mounting rim having an inner surface and a top surface defining an opening of the shape memory alloy collet, the inner surface and the top surface forming a second angle,

wherein the second angle corresponds substantially to the first angle, and a profile of the mounting rim corresponds substantially to a profile of the continuous groove.

2. The jewelry article as claimed in claim 1, wherein the gemstone has a round shape.

3. The jewelry article as claimed in claim 1, wherein the shape memory alloy collet is a titanium alloy collet.

4. The jewelry article as claimed in claim 1, wherein the first angle is between 75 and 85 degrees.

5. The jewelry article as claimed in claim 1, wherein the first angle is 80 degrees.

6. The jewelry article as claimed in claim 1, wherein the shape memory alloy collet has a plurality of holes for cleaning an interior of the shape memory alloy collet and the gemstone.

7. The jewelry article as claimed in claim 1, wherein the gemstone is selected from the group consisting of diamond, ruby, sapphire and alexandrite.

8. The jewelry article as claimed in claim 2, wherein a diameter of the round shape gemstone is at least 10% greater than the opening of the shape memory alloy collet.

9. The jewelry article as claimed in claim 1, wherein a wall of the shape memory alloy collet is thicker at a bottom end.
10. The jewelry article as claimed in claim 1, wherein a diameter of the shape memory alloy collet at a bottom end is less than at the mounting rim.
11. A gemstone comprising:
 - a girdle dividing the gemstone into a pavilion and a crown having a table surface; and
 - a continuous groove located in the pavilion and parallel to the girdle, the continuous groove having a first surface and a second surface, the first surface being substantially parallel to the table surface, the first surface and the second surface of the groove forming a first angle;
 - wherein the first angle corresponds substantially to a second angle formed by an inner surface and a top surface of a mounting rim of a shape memory alloy collet, the inner surface and the top surface defining an opening of the shape memory alloy collet,
 - wherein a profile of the mounting rim corresponds substantially to a profile of the continuous groove.
12. The gemstone as claimed in claim 11, wherein the gemstone has a round shape.
13. The gemstone as claimed in claim 11, wherein the shape memory alloy collet is a titanium alloy collet.
14. The gemstone as claimed in claim 11, wherein the first angle is between 75 and 85 degrees.
15. The gemstone as claimed in claim 11, wherein the first angle is 80 degrees.
16. The gemstone as claimed in claim 11, wherein the gemstone is selected from the group consisting of diamond, ruby, sapphire and alexandrite.
17. The gemstone as claimed in claim 12, wherein a diameter of the round shape gemstone is at least 10% greater than the opening of the shape memory alloy collet.

18. A shape memory alloy collet comprising:

a mounting rim, the mounting rim having an inner surface and a top surface defining an opening of the shape memory alloy collet, the inner surface and the top surface forming a second angle, the second angle corresponding substantially to a first angle formed by a first surface and a second surface of a continuous groove located in a pavilion and parallel to a girdle of a gemstone, the gemstone having a crown including a table surface;

wherein the first surface is substantially parallel to the table surface, and a profile of the mounting rim corresponds substantially to a profile of the continuous groove.

19. The shape memory alloy collet as claimed in claim 18, wherein the gemstone has a round shape.

20. The shape memory alloy collet as claimed in claim 18, wherein the shape memory alloy collet is a titanium alloy collet.

Application number / numéro de demande: 2790467

Figures: _____

Pages: 1

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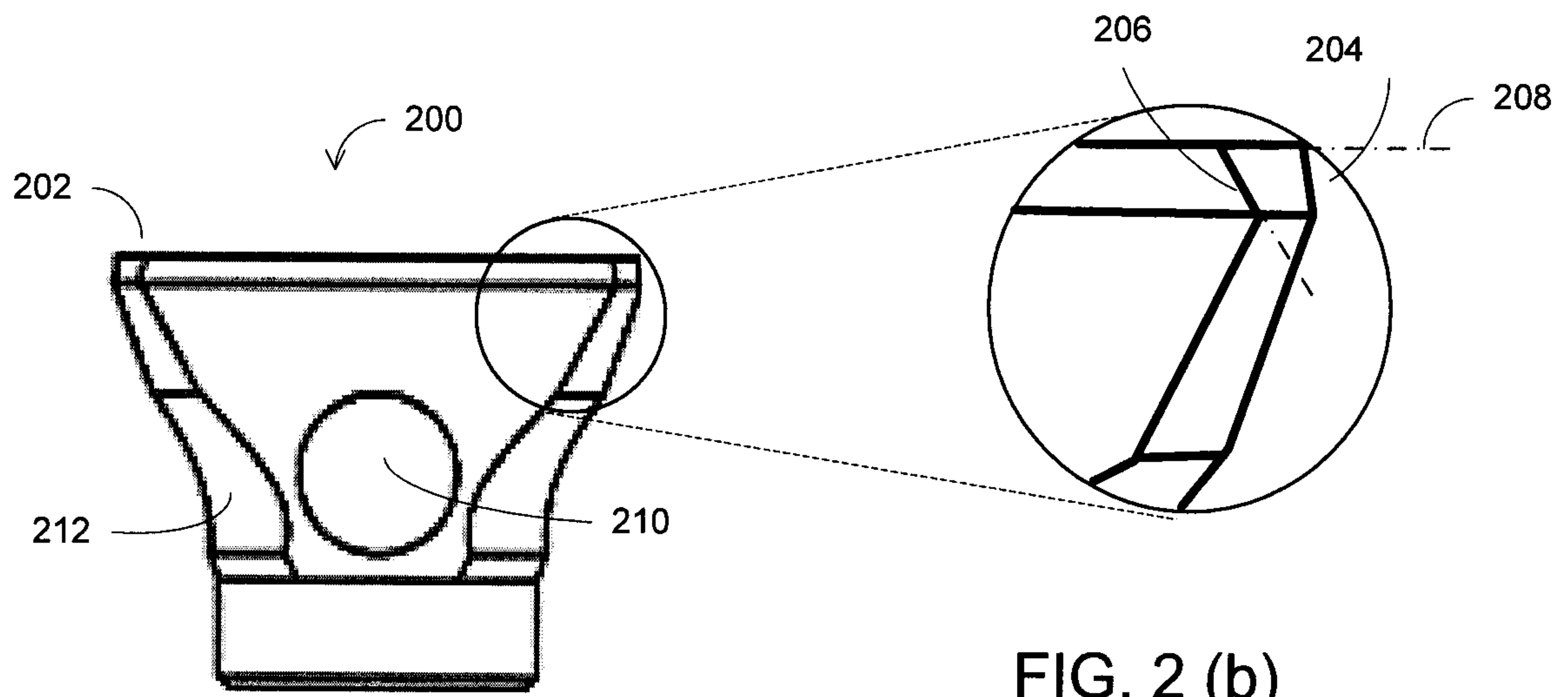


FIG. 2 (a)

FIG. 2 (b)

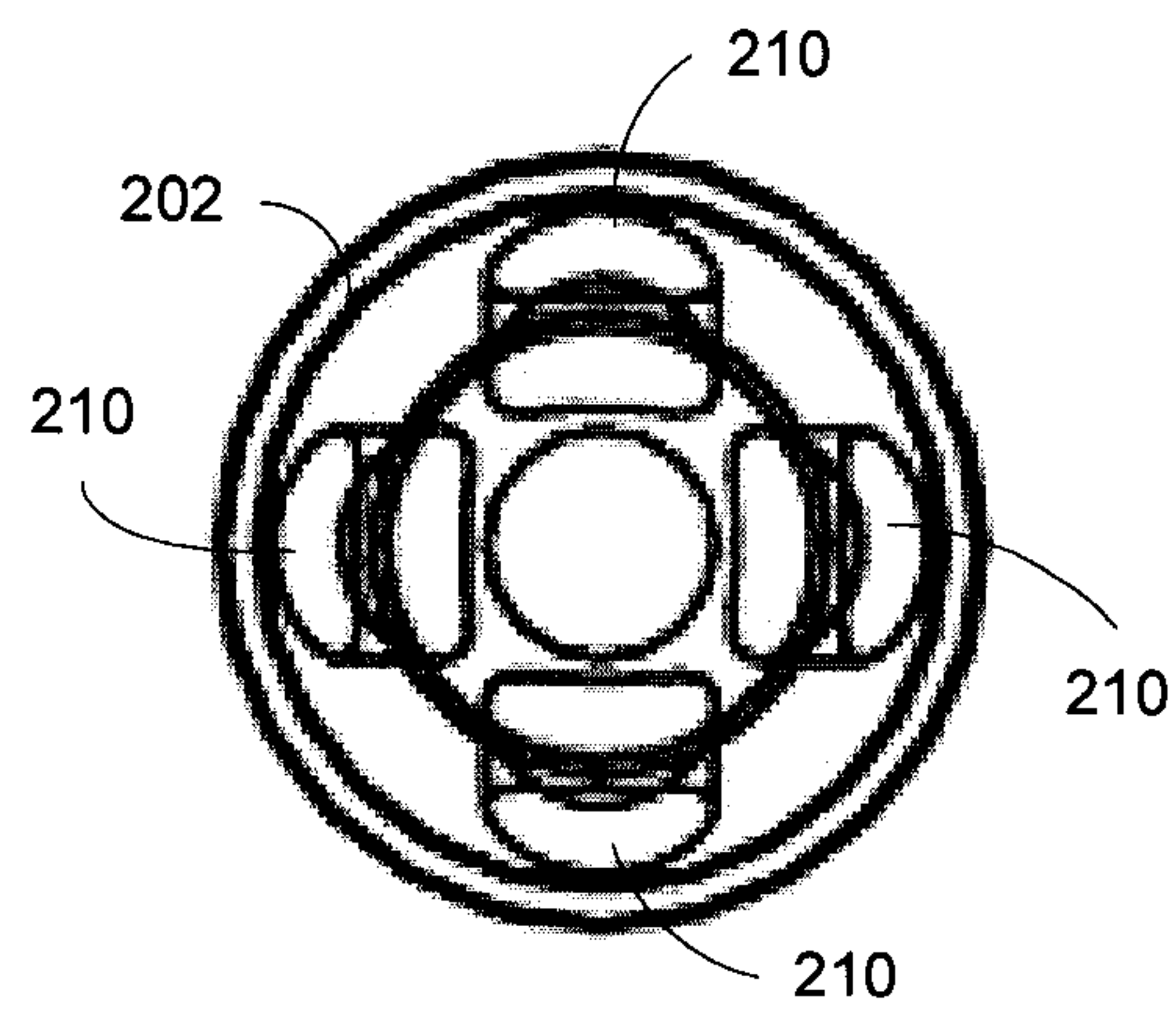


FIG. 3

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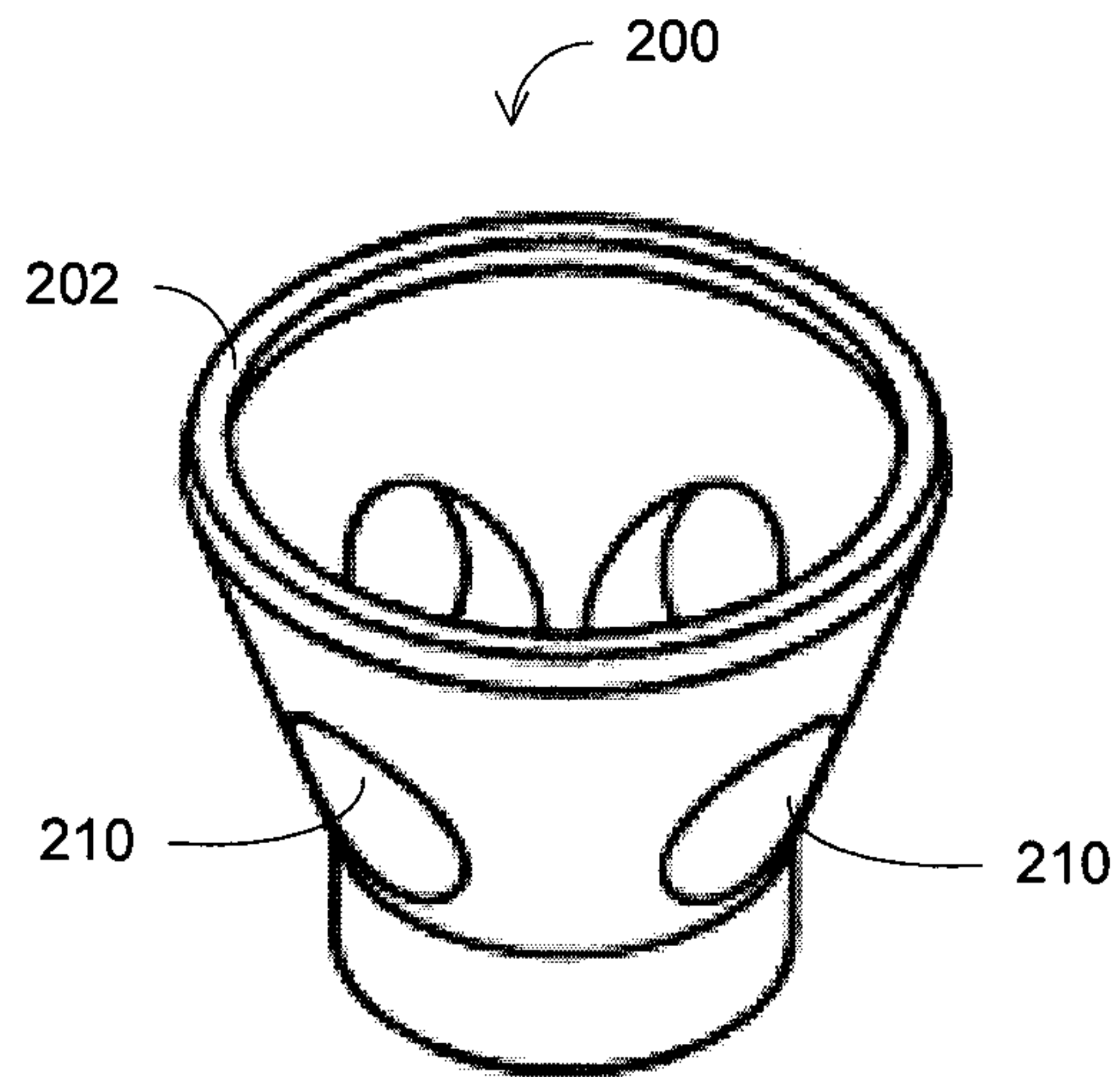


FIG. 4

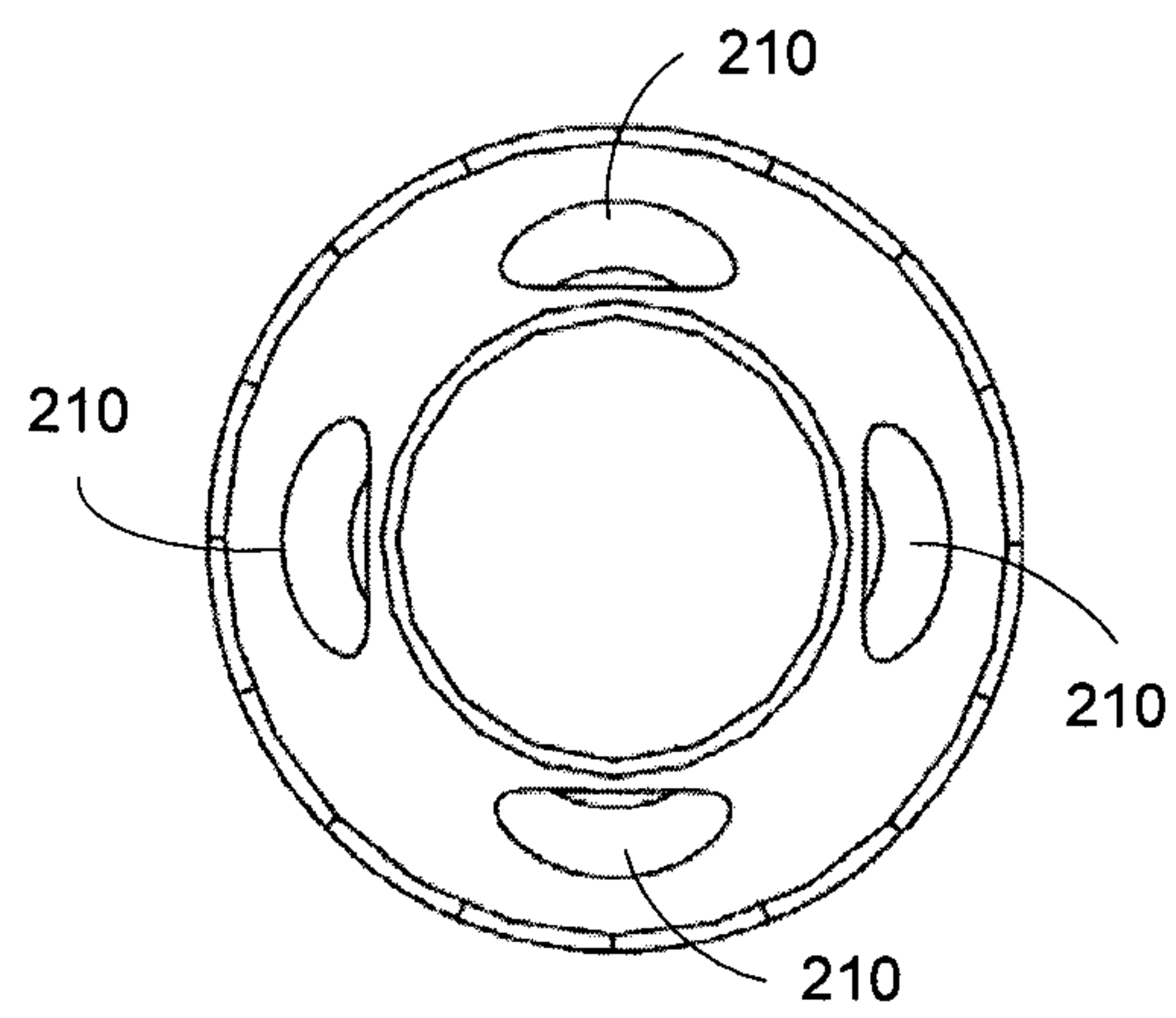


FIG. 5

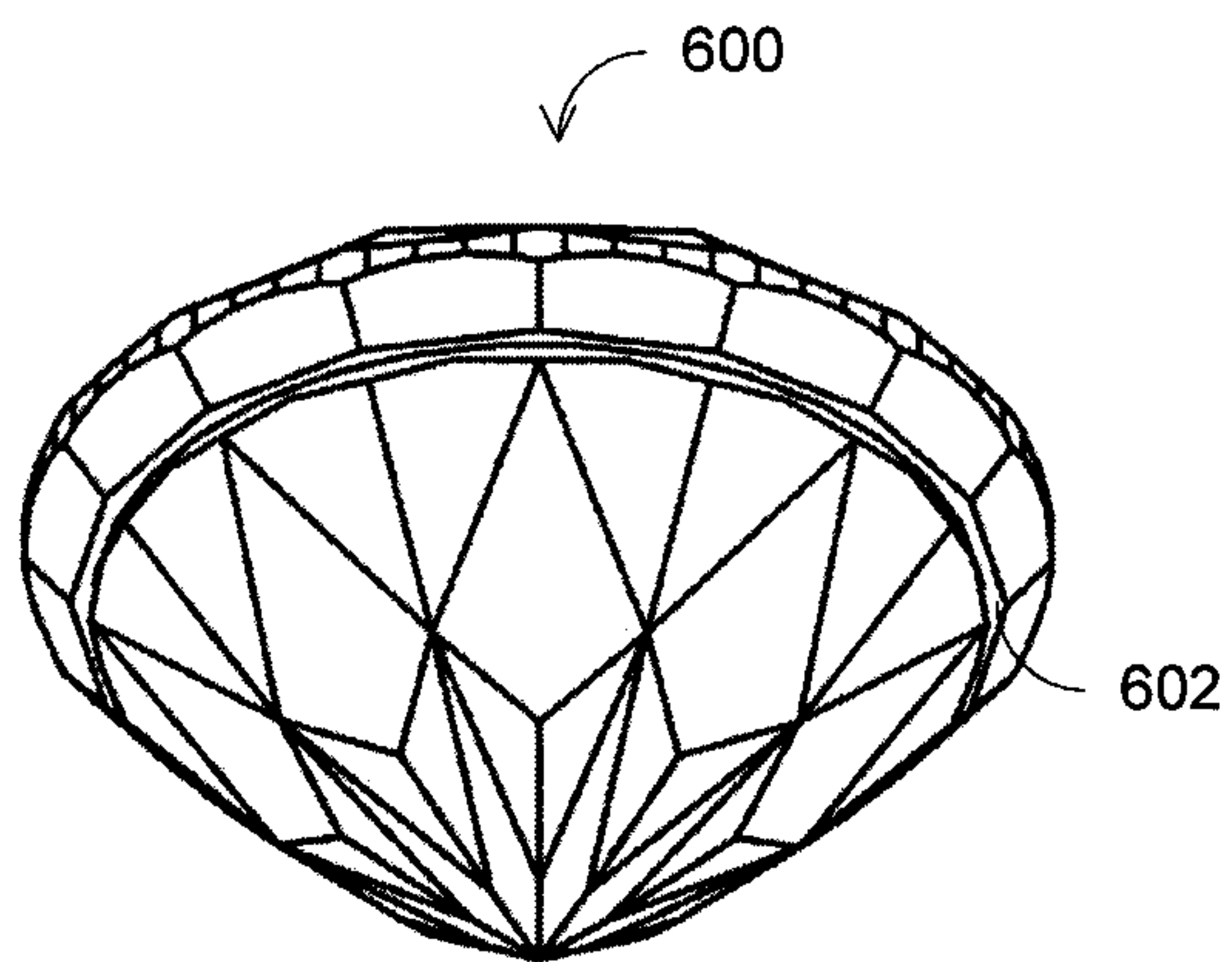


FIG. 6

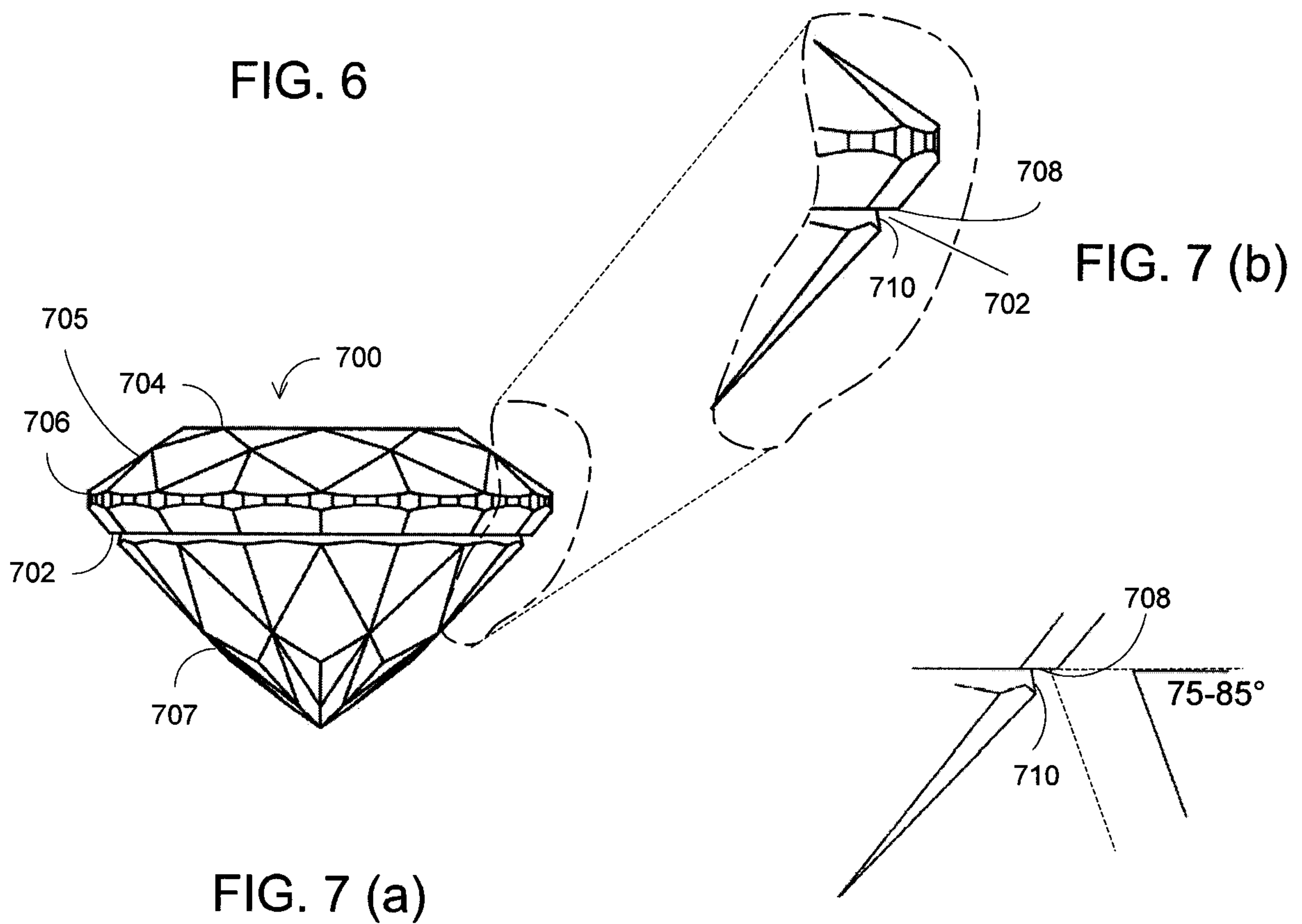


FIG. 7 (a)

FIG. 7 (b)

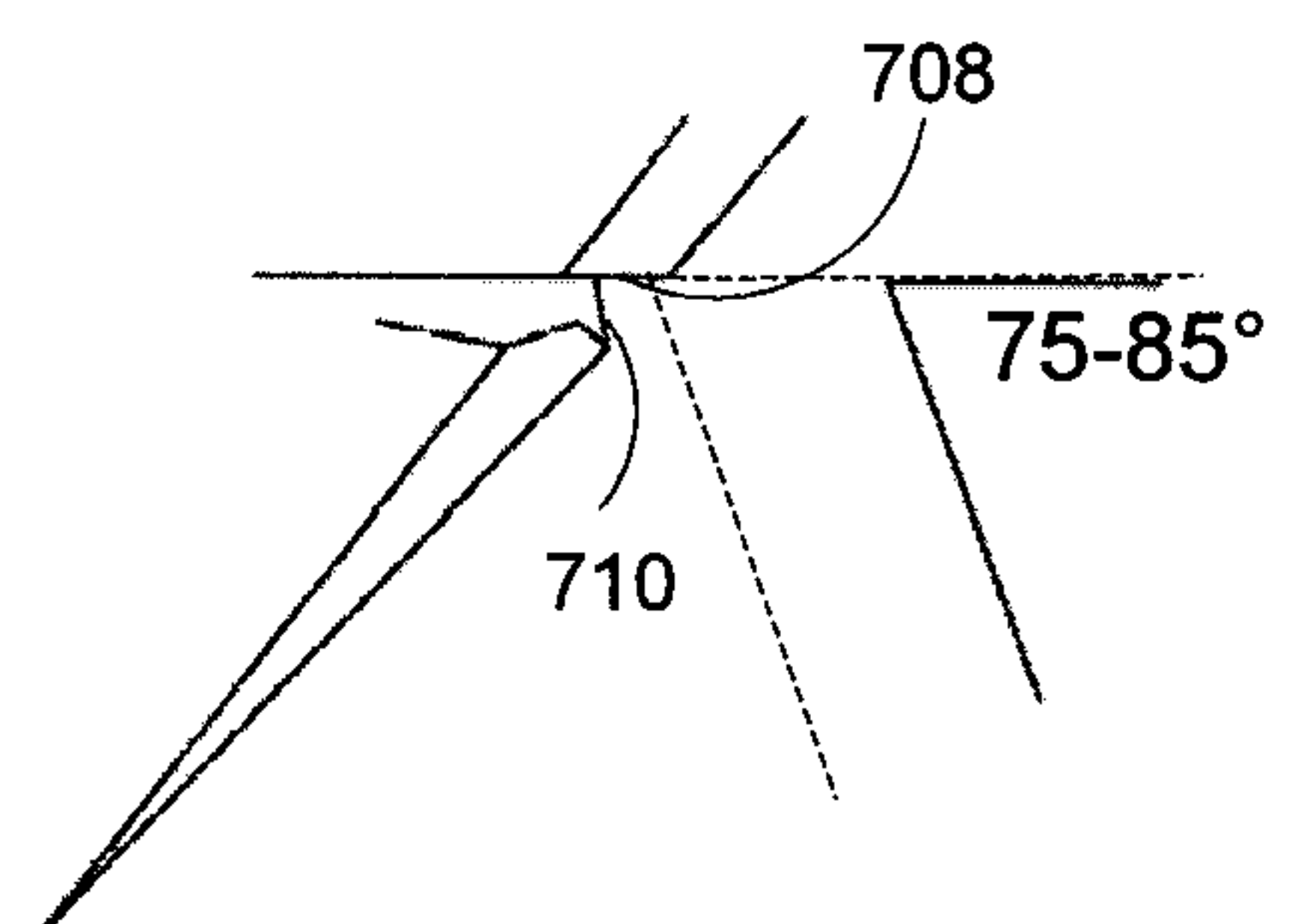


FIG. 7 (c)

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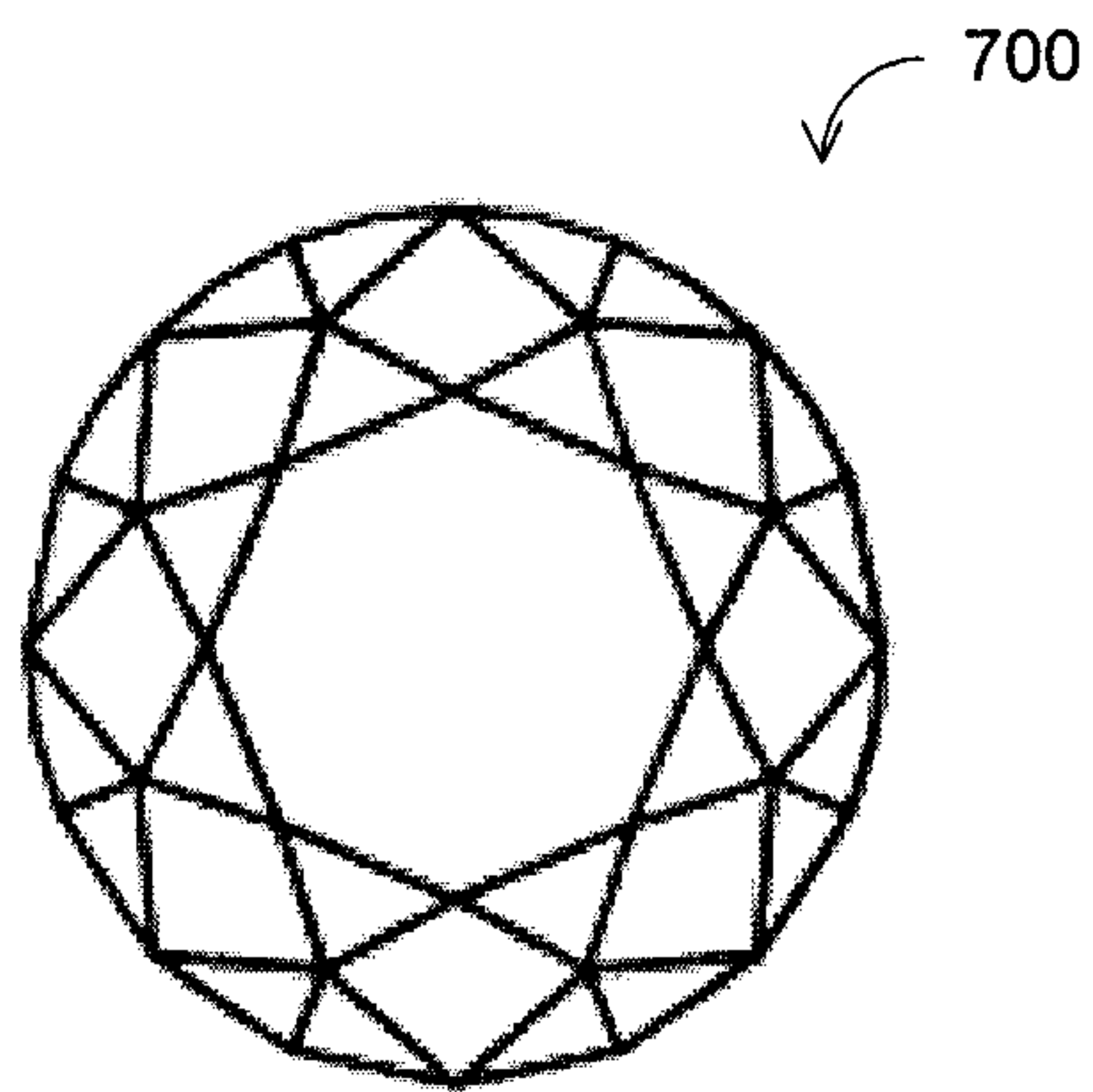


FIG. 8

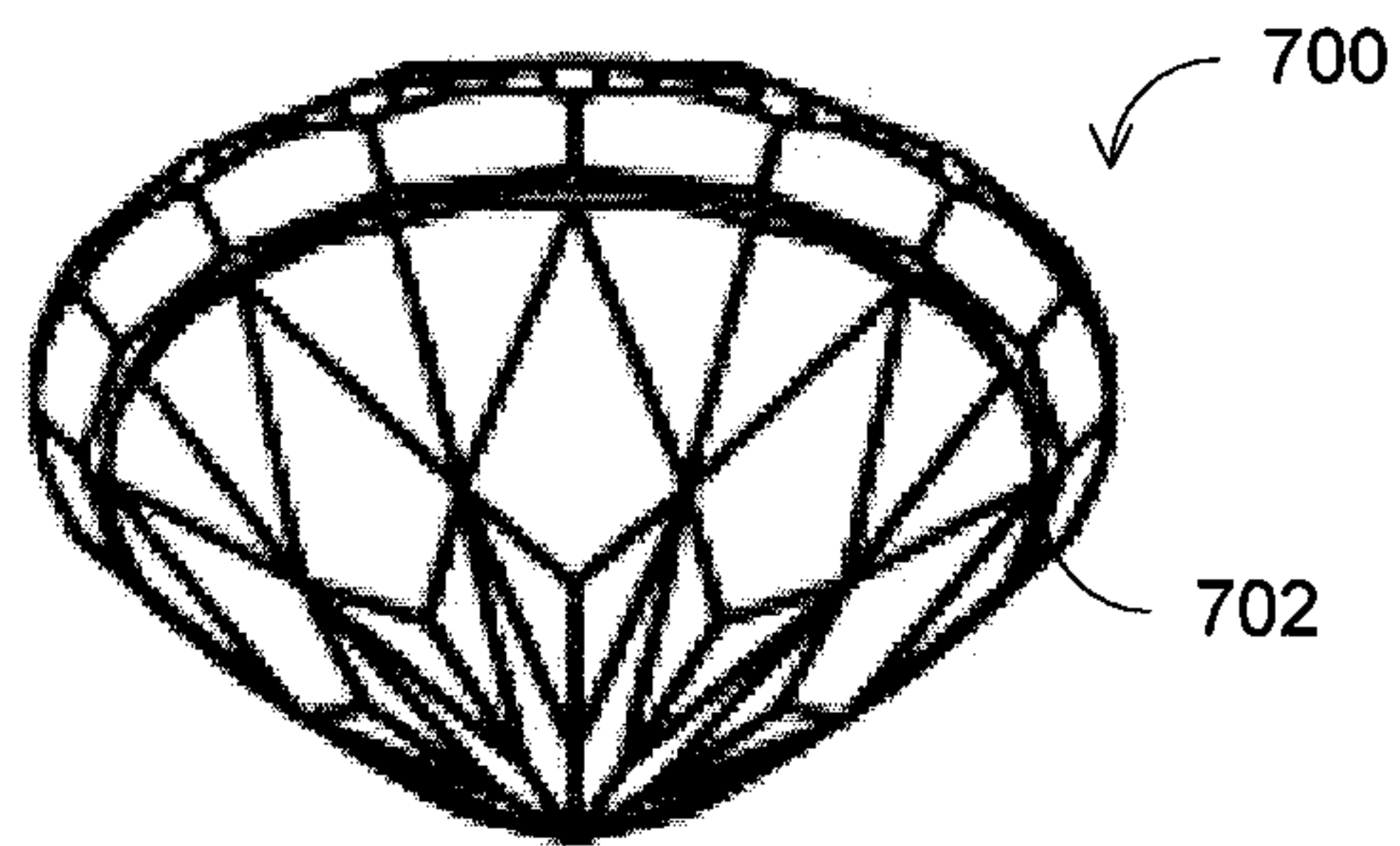


FIG. 9

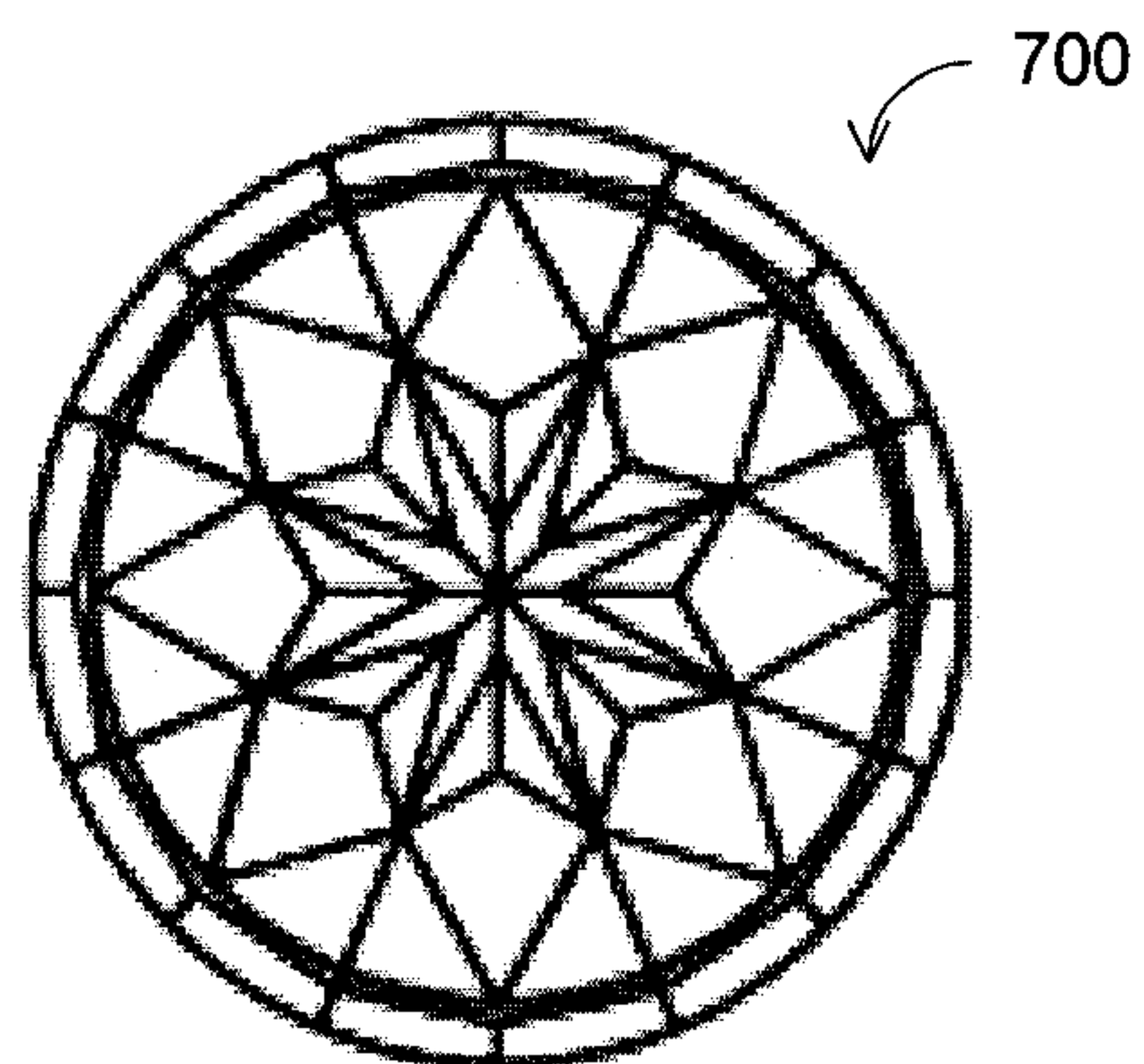


FIG. 10

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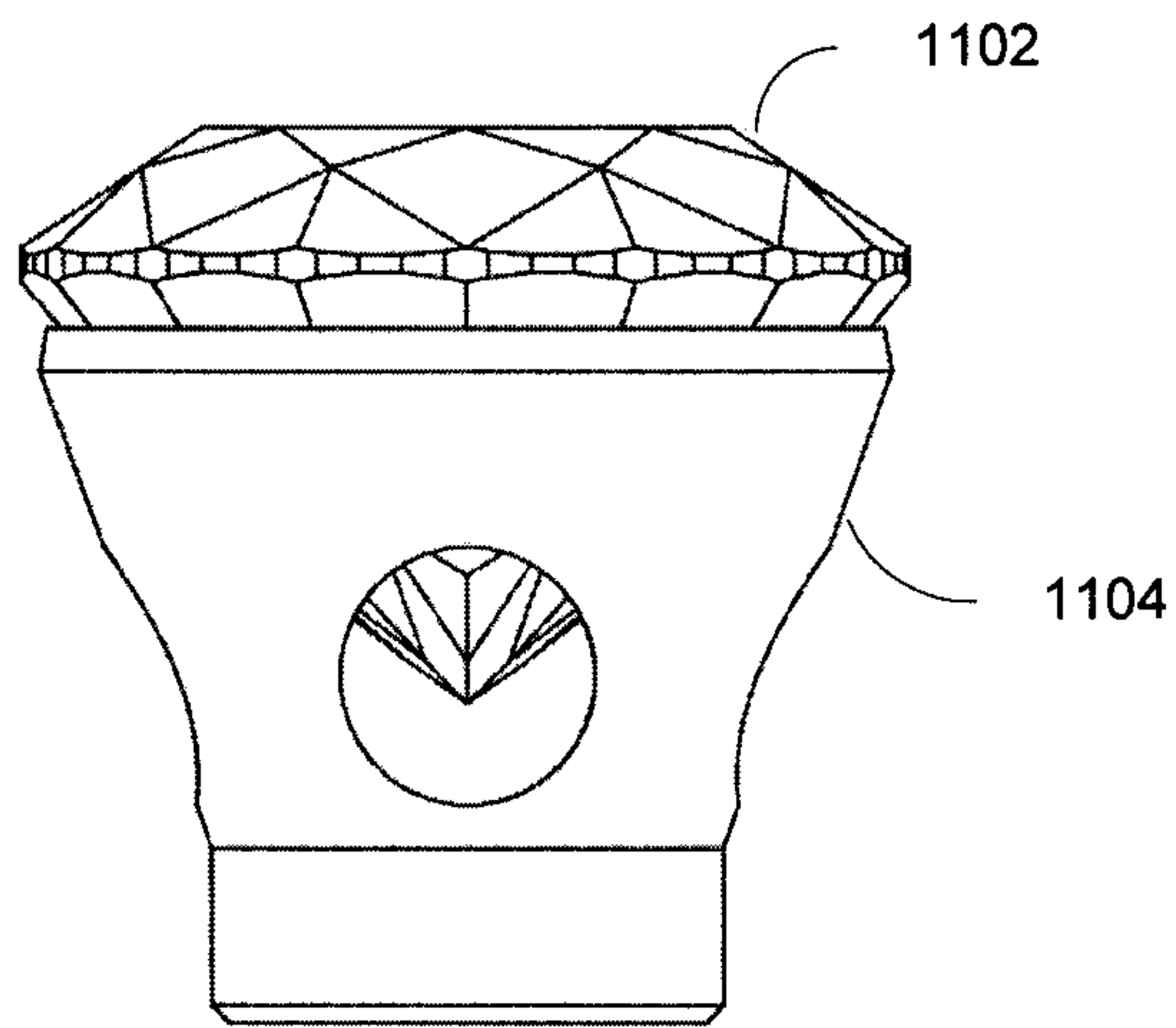


FIG. 11

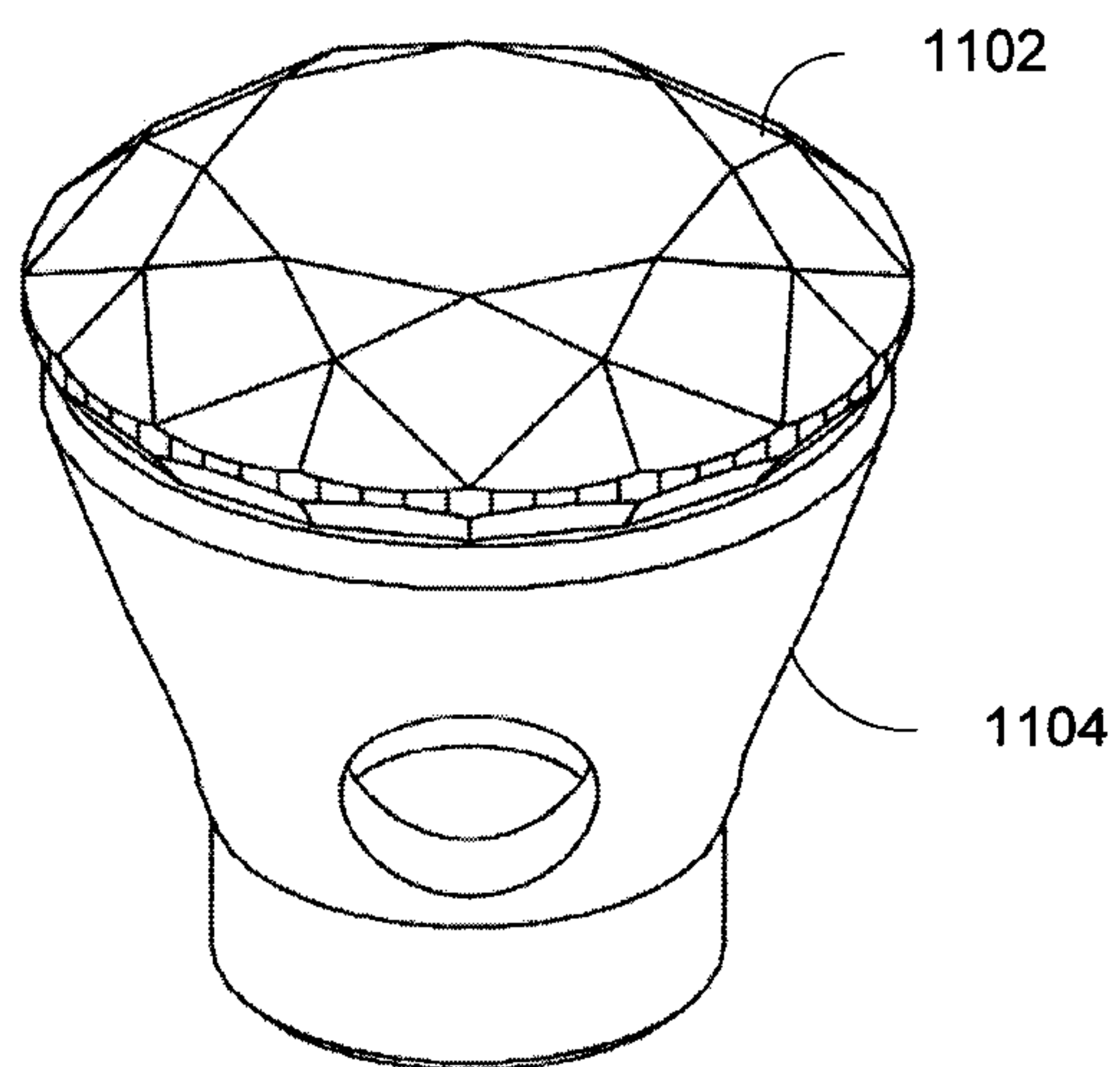


FIG. 12

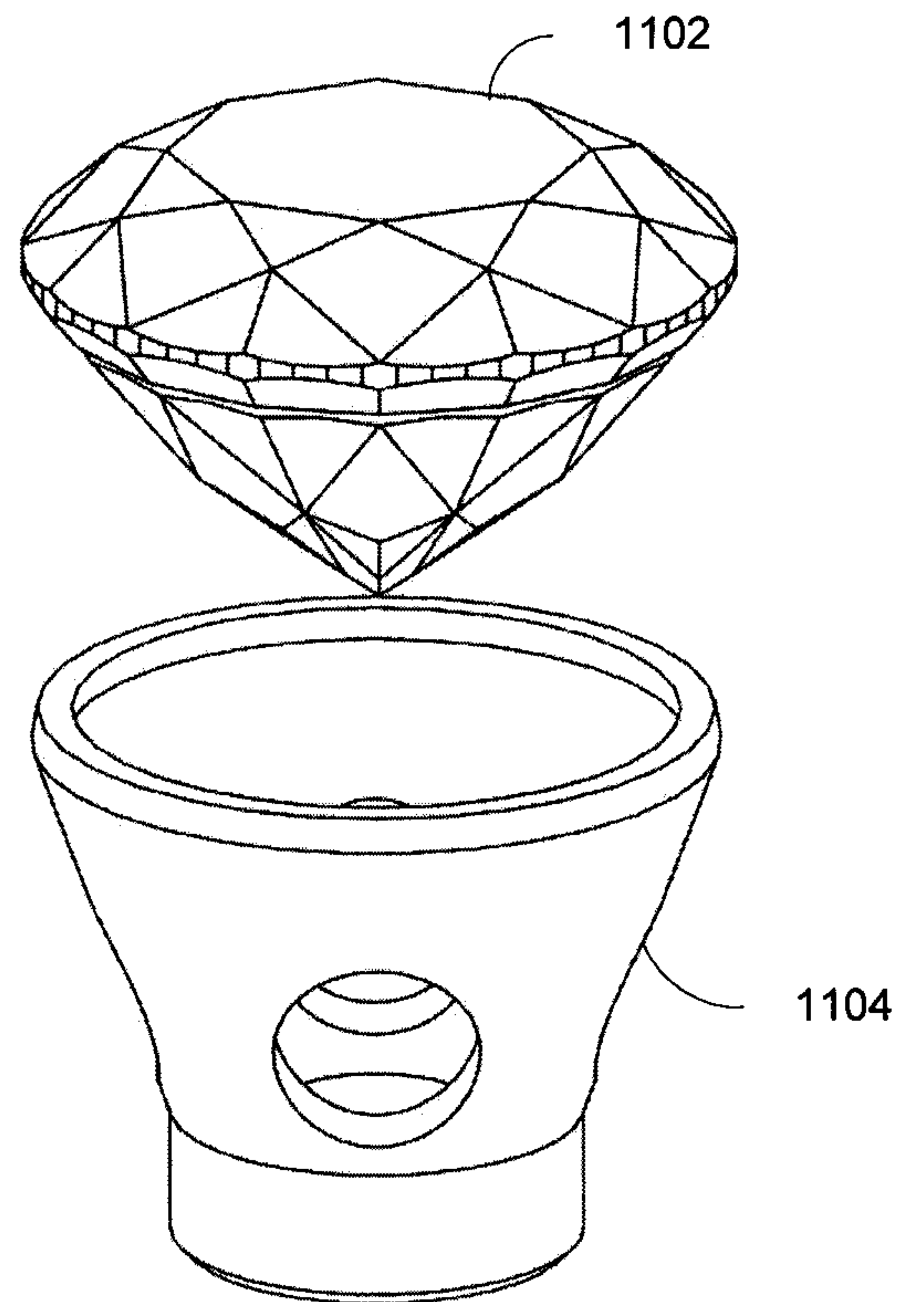


FIG. 13

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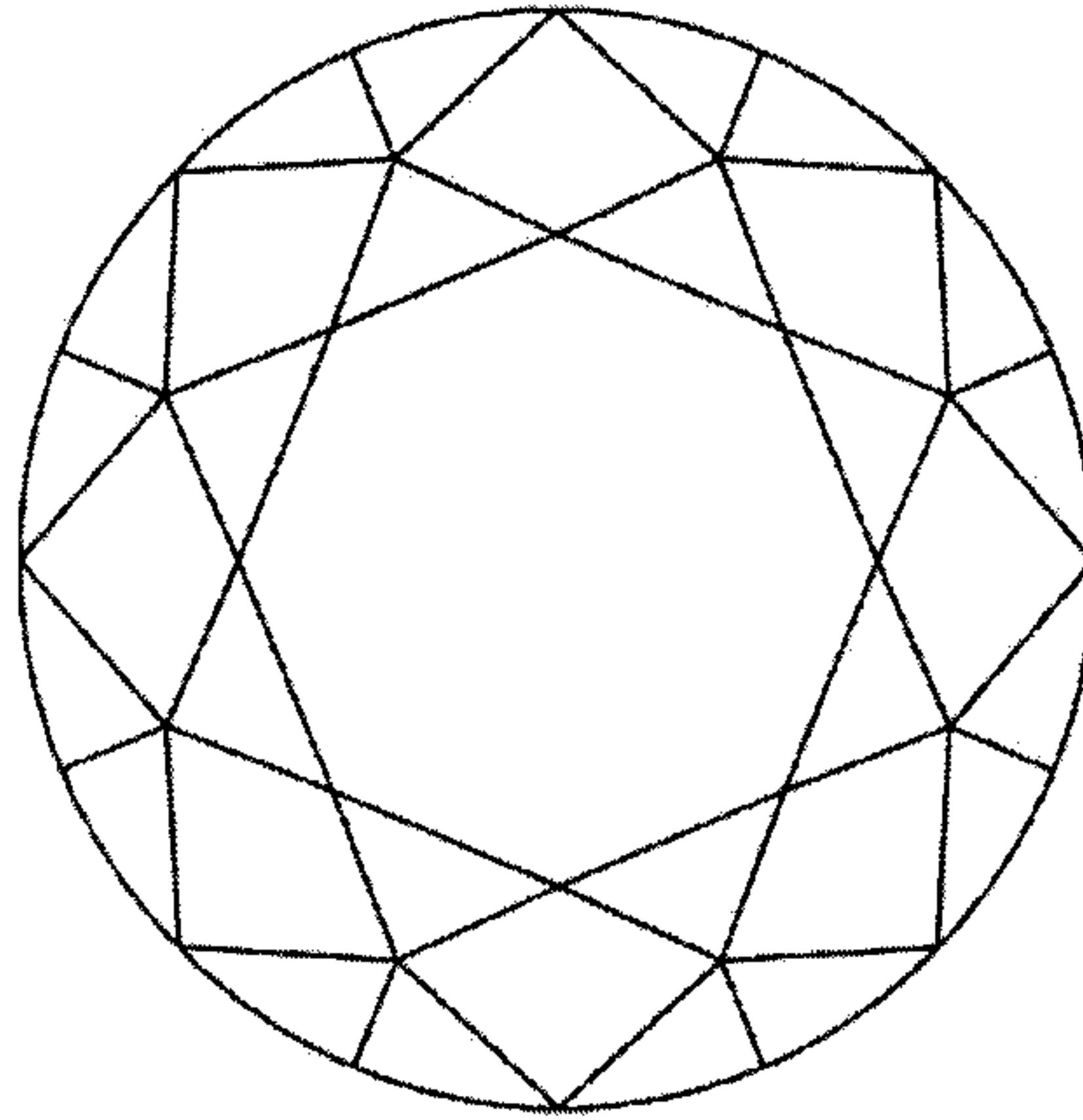


FIG. 14

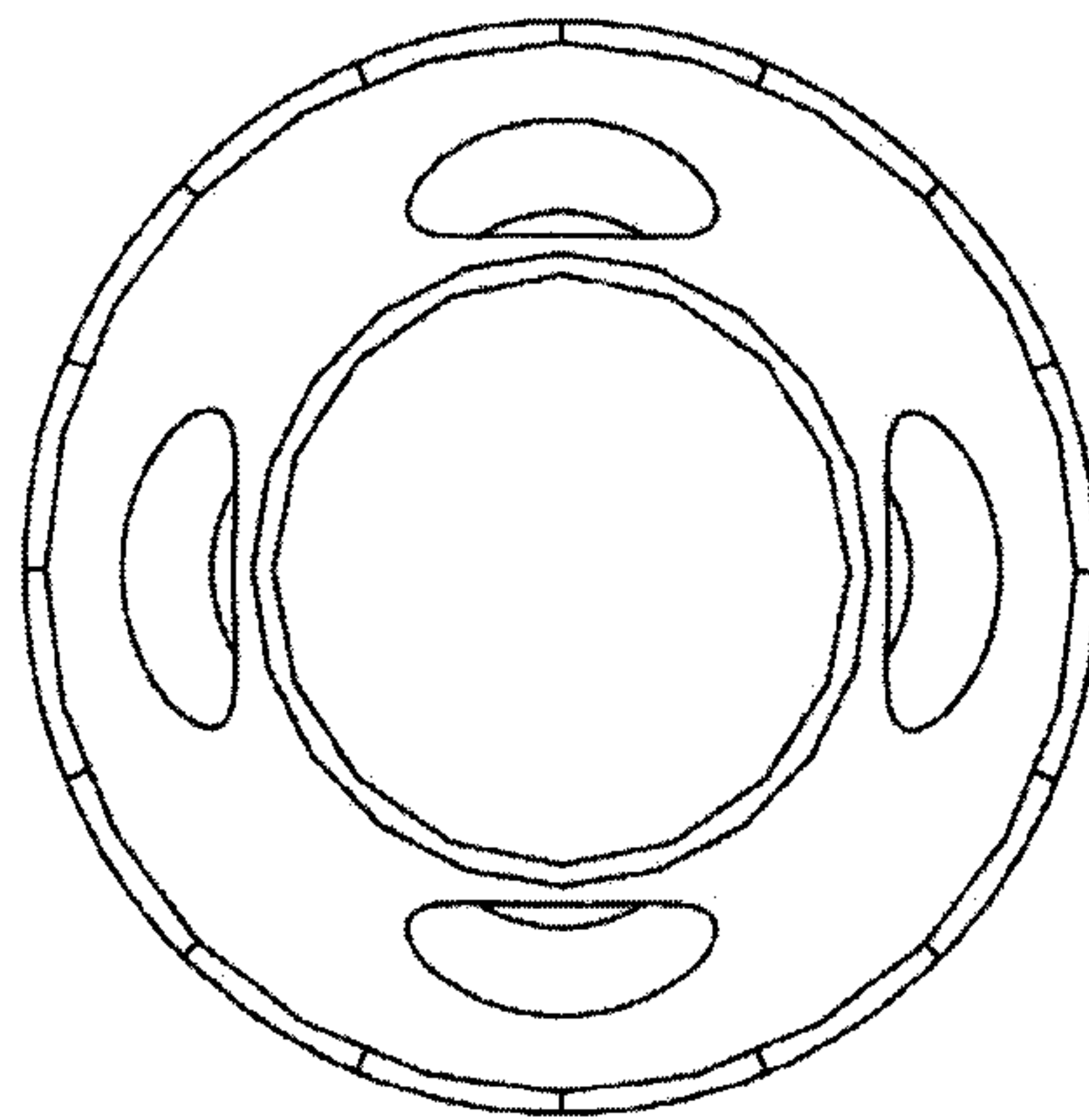
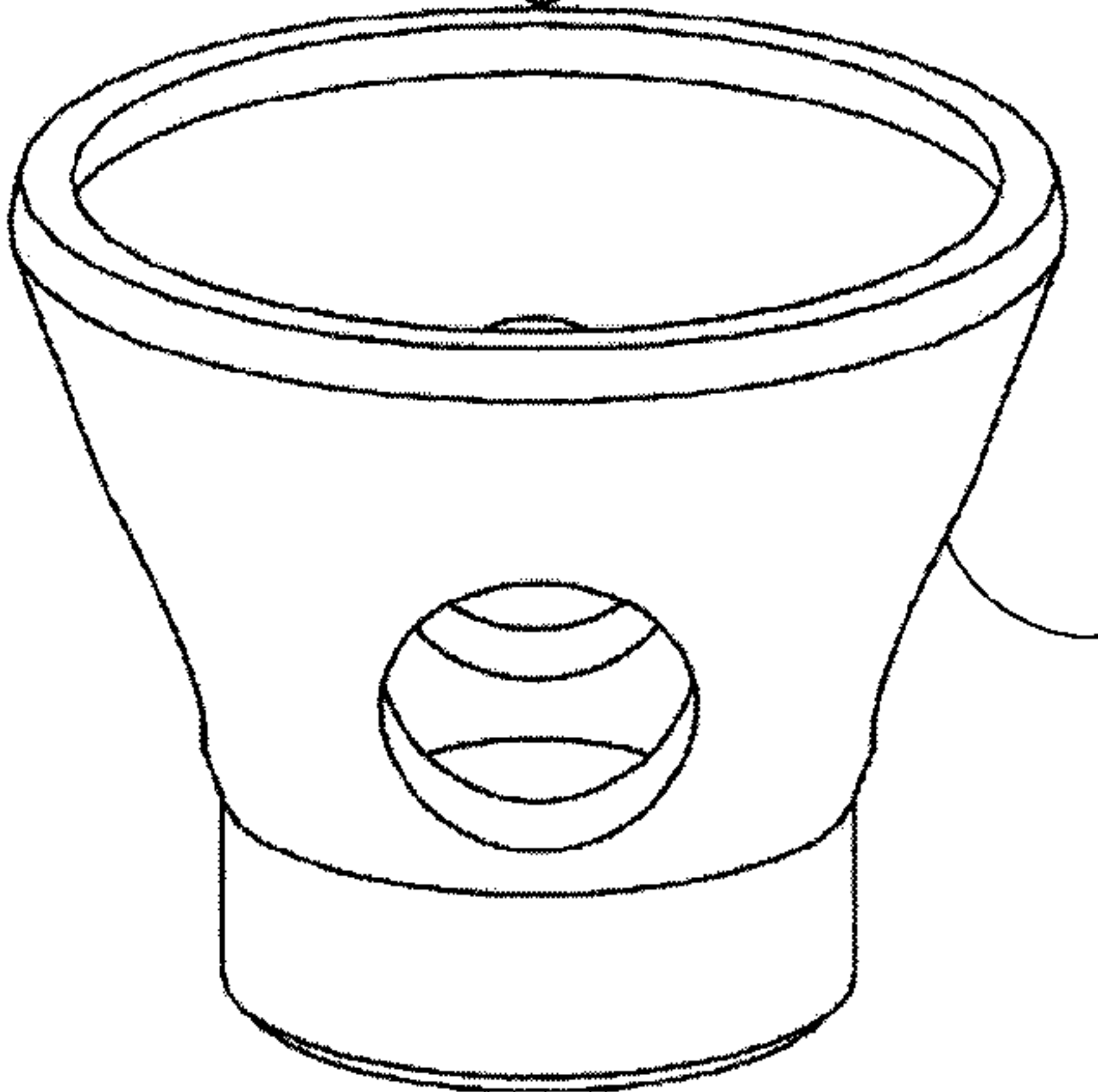
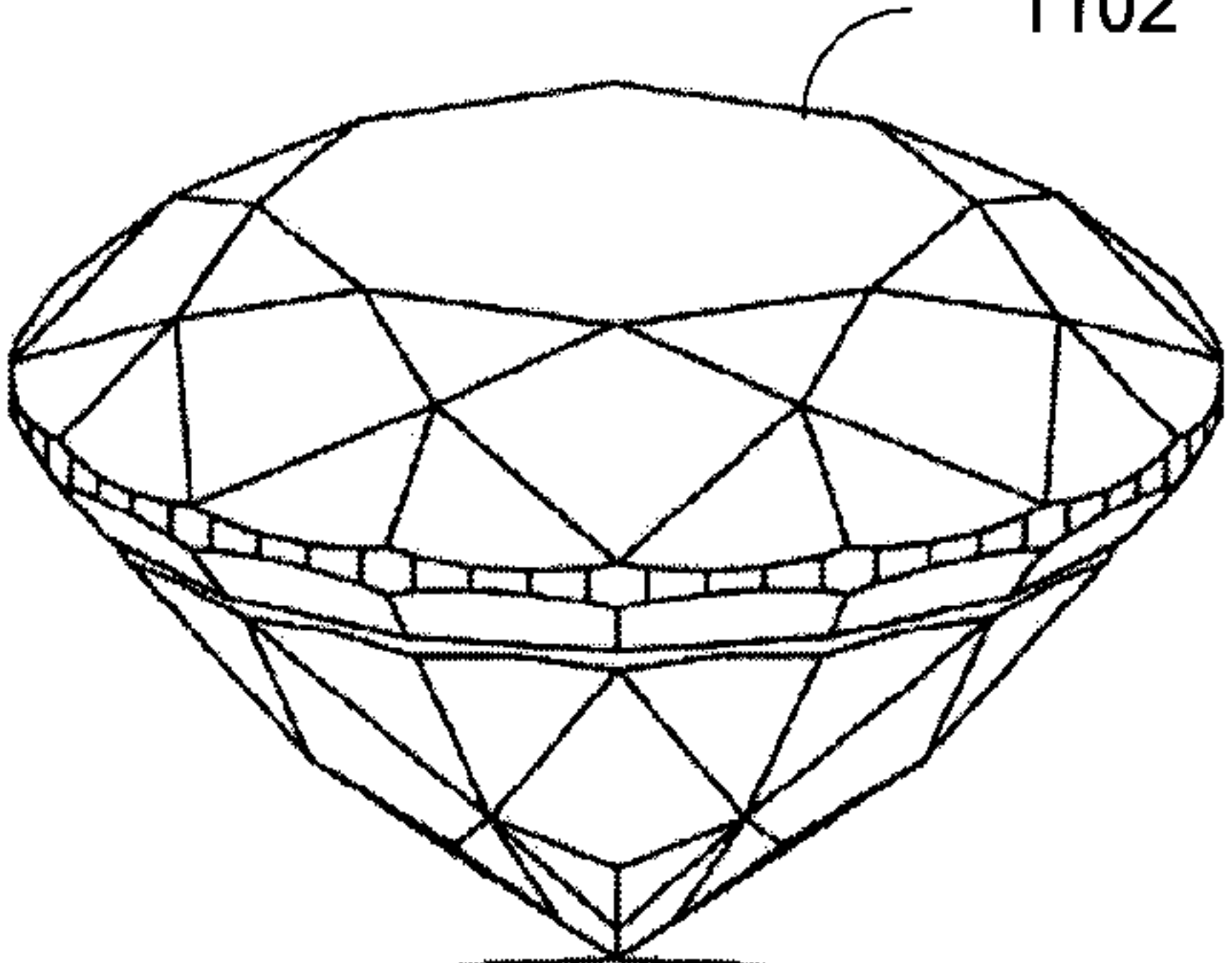


FIG. 15

1102



1104