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(54) **DISPENSER DEVICE OF A JET OF WATER**

(57) A dispensing device of jet of water comprises a dispensing chamber (100) of a flattened shape, a dispenser plate (14) in which a plurality of outlet holes (16) of the water are made, and an inner plate (18) which rests on the dispenser plate and from which a plurality of dis-

persing nozzles (20) extend. In the thickness of the inner plate (18) a plurality of concave truncated-pyramid portions (26) are made which promote the immediate and complete emptying of water from the dispensing chamber (14).

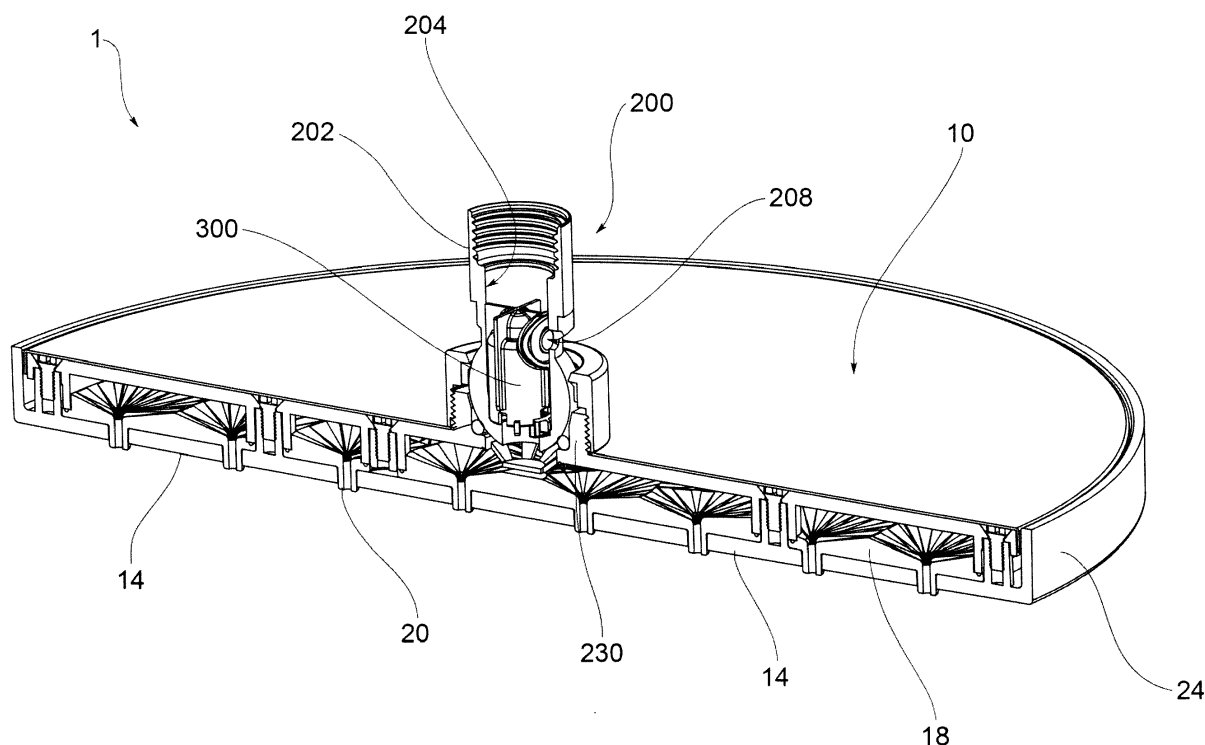


FIG.1

Description

[0001] The present invention relates to a dispenser device of a jet of water, such as a hand shower, shower head or bulb, in particular of the plate-type, i.e. having a flattened shape, with an extension in the plane perpendicular to the dispensing direction of the jet of water much greater than the thickness or height of the dispenser device.

[0002] In sanitary systems for dispensing or distributing water, once the dispensing is interrupted for example by a user, the water present in the end dispensing device does not flow away immediately and completely. On the contrary, the dispensing device continues to dispense a quantity, even if minimal, of water, for example in the form of drops, for several seconds.

[0003] In some sanitary appliances, for example in the case of shower heads of particularly large dimensions and a flattened shape, this phenomenon is very accentuated and is somewhat unpleasant. In fact, in this type of dispensing device the surface tension of the thin layer of water between opposite walls of greater dimensions than the dispensing device contributes to preventing an immediate and complete emptying of the water.

[0004] Attempts have been made to overcome this drawback by providing the dispensing device for example with an external air intake valve, so that, at the end of dispensing the flow of water from a supply duct to the dispensing device, the aspirated air pushes the residual water out.

[0005] However, this problem has not yet been solved in a satisfactory way, especially in the case of dispensing devices having a flattened shape and large size.

[0006] The need is therefore deeply felt to remedy such a drawback, and thereby provide a dispensing or distribution system of a liquid in which, at the moment of interrupting the supply, all the liquid is immediately emptied without giving rise to dripping phenomena.

[0007] The purpose of the present invention is to propose a dispensing device of a jet of water able to satisfy this need, even in the case of plate-type and large dispensing devices.

[0008] Such purpose is achieved by a dispenser device according to claim 1. The dependent claims describe preferred or advantageous embodiments of the dispenser device according to the invention.

[0009] The characteristics and advantages of the dispenser device according to the invention will, in any case, be evident from the description given below of its preferred embodiments, made by way of a non-limiting example with reference to the appended drawings, wherein:

-figure 1 is a perspective view in axial cross-section of the dispenser device according to the invention;
Figure 2 is an axial cross-section of the dispenser device;

- Figure 2a is an enlarged view of the detail A circled in figure 2;

Figure 3 is an exploded perspective view from above of the dispenser device;

Figure 4 is an exploded perspective view from below of the dispenser device; and

- Figure 5 is a perspective view of the dispenser plate and the inner plate assembled together.

[0010] In said drawings, reference numeral 1 globally denotes a dispenser device of a jet of water according to the invention. The device 1 illustrated in the drawings is in the form of a shower head, in particular of the plate-type, i.e. having an extension in the plane perpendicular to the dispensing direction of the jet of water much greater than the thickness of the shower head. It is clear, however, that the teaching of the present invention could likewise be implemented in a hand-held shower, or even a dispenser head of a tap such as for a bathtub.

[0011] In the following description, for simplicity, a jet of water directed vertically will be considered. The dispenser device, in this case, has a main extension in the horizontal plane.

[0012] The device 1 comprises, in a general embodiment, a device body 10 defining a dispensing chamber 100 of a flat shape, i.e. suitable to receive a layer of water extending horizontally but very thin.

[0013] The device body 1 is provided with a connection element 200 suitable to fluidically connect the dispensing chamber 100 with a water supply pipe - not shown.

[0014] The device body 1 is delimited at the bottom by a dispenser plate 14. In this dispenser plate 14 a plurality of outlet holes 16 of the water are made.

[0015] In a preferred embodiment, the water outlet holes 16 are uniformly distributed in the dispenser plate 14, so as to generate a rain-like jet of water.

[0016] On the inner side of the dispenser plate 14, i.e. on the side facing the dispensing chamber 100, an inner plate 18 is positioned. From this inner plate 18 a plurality of dispensing nozzles 20 extend which are inserted in the respective water outlet holes 16. Each dispensing nozzle 20 is in fluidic communication with the dispensing chamber 100.

[0017] In one embodiment, the dispensing nozzles 20 pass through the entire thickness of the dispenser plate 14 and protrude downwards from it.

[0018] In one embodiment, the inner plate 18 and the dispensing nozzles 20 are made in a single body made of a soft material. The dispensing nozzles 20 of soft material protruding from the dispenser plate can be pressed by the user to remove limescale.

[0019] Therefore, the dispensing chamber 100 is delimited below by the inner plate 18.

[0020] The device body 1 comprises a closure plate 22 which delimits the dispensing chamber 100 above.

[0021] The device body 1 further comprises a side wall 24 which connects the dispenser plate 14 to the closure plate 22.

[0022] According to one aspect of the invention, in the thickness of the inner plate 18 a plurality of concave,

truncated-pyramid portions 26 is made.

[0023] Each of these concave, truncated-pyramid portions 26 has a base 262 open towards the dispensing chamber 100 and the vertex 264 coinciding with a respective dispensing nozzle 20. More precisely, the vertex 264 coincides with the inlet opening of the water of a respective nozzle 20.

[0024] In other words, each concave truncated-pyramid portion 26 and the respective dispensing nozzle 20 form a sort of funnel for the water present in the dispensing chamber 100.

[0025] As illustrated in the drawings, since the inner plate 18 also has an extension in the plane perpendicular to the dispensing direction of the jet of water much greater than its thickness, the base 262 of each concave truncated-pyramid portion 26 is greater than the height. In other words, the side walls 266 of the concave portions 26 have a slightly accentuated slope, but in any case sufficient to overcome the surface tension of the molecules of water so as to cause, by gravity, the exit of the water from the side walls towards the respective dispensing nozzles 20.

[0026] In addition, each concave portion 26 has each side of its base 262 in common with a side or with a portion of the side of an adjacent conical portion, in such a way that the surface of the inner plate 18 facing towards the dispensing chamber is substantially devoid of flat portions.

[0027] In other words, the upper surface of the inner plate is formed exclusively by concave portions 26 adjacent to each other seamlessly.

[0028] In other terms again, the bases 262 of the concave portions form a lattice of edges.

[0029] Preferably, the sides, or edges, which delimit the open bases 262 of the concave portions 26, lie on the same horizontal plane.

[0030] Therefore, when the water supply to the dispensing chamber 100 is interrupted the layer of water present in the dispensing chamber 100, even if devoid of pressure, does not find any flat surface that prevents, due to the surface tension of the molecules of water, the complete emptying towards the dispensing nozzles.

[0031] On the contrary, as mentioned above, the layer of water slides by gravity along the side walls of the concave portions 266 and reaches the dispensing nozzles 20.

[0032] In an embodiment illustrated in the drawings, the device body 10, the dispenser plate 14 and the inner plate 18 have a circular outline. In this case, the concave truncated-pyramid portions 26 may be made along concentric circular crowns.

[0033] As a result, the sides of the base 262 of each concave truncated-pyramid portion 26 form a circular crown sector.

[0034] In an embodiment variant in which the device body, the dispenser plate and the inner plate have a rectangular shape, the concave truncated-pyramid portions have a rectangular base.

[0035] In one embodiment, to further accentuate the sliding of the water along the side walls 266 of the concave portions, said side walls are provided with ribs 268 which extend from the sides of the base 262 towards the respective dispensing nozzle 20. These ribs 268 further prevent the adhesion of the water molecules to the side walls 266.

[0036] In a preferred embodiment, particularly suitable in the case of dispensing devices in which the dispensing chamber is so thin that it also creates a surface tension between the water molecules and the upper wall of the device body, i.e. the wall which delimits the dispensing chamber from the side opposite the dispenser plate, the complete and immediate emptying of the dispensing chamber is further facilitated by providing in the connection element 200 suction means 300 suitable to aspirate air from the outside and to introduce the aspirated air into the dispensing chamber 100.

[0037] An example of such of air suction means is described in DE202010001468 U1, on behalf of the same Applicant.

[0038] The connection element 200 comprises a connection body 202 in which an inlet duct 204 connected to the water supply pipe, an outlet duct 206 in fluidic communication with the dispensing chamber 100, and at least one intermediate passage placing the inlet duct in fluidic communication with the outlet duct, are made. In the connection body 202 an air suction channel 208 communicating with the outside and open towards the outlet duct 206 is also made. An obturator movable between a closed position of the suction channel 208 and an open position of the suction channel 208 for the aspiration of air from the outside toward the outlet duct 206 is associated with this suction channel 208.

[0039] In particular, the obturator device is kept in the closed position of the suction channel 208 by the water pressure flowing through the connection element 200; when the water supply stops, and therefore the pressure on the obturator stops, the latter returns, for example by gravity, to the open position of the suction channel 208, so that an air flow is aspirated from the outside and introduced into the dispensing chamber 100. This air flow helps to overcome the force of cohesion between the water molecules and the walls which delimit the dispensing chamber 100, in particular the wall of the closure plate 22.

[0040] Returning now to the structure of the device body, in one embodiment the dispenser plate 14 has a peripheral edge which forms the side wall 24 of the device body. For example, this side wall 24 extends perpendicular to the plane where the water outlet holes 16 are made.

[0041] In one embodiment, a plurality of fastening pins 142 extend from the dispenser plate 14 into the dispensing chamber, in each of which a threaded hole 144 is made. The closure plate 22 of the device body 10 is connected to the dispenser plate 14 by means of fastening screws 222 screwed into the threaded holes 144.

[0042] In the sectional view of Figure 2 and in the enlarged detail of Figure 2a, one can see how the closure plate 22 is provided, around each fastening pin and along its peripheral edge, with sealing walls 224, 226 which extend towards the inner plate and which are provided with sealing ribs 228 suitable to incise the inner plate 18 so as to completely seal the dispensing chamber 100.

[0043] In one embodiment, the connection element 200 comprises a ball joint 210 which allows the oscillation of the dispensing device relative to the water supply pipe. To such purpose, the closure plate 22 is provided with a threaded collar 230 which forms a joint seat for the ball joint 210. The latter is retained in the joint seat with the possibility of oscillation by means of a threaded sleeve 232 screwed onto the threaded collar.

[0044] In one embodiment, the closure plate 22, fixed by means of screws 222 to the dispenser plate 14, is coated with a cover plate 30, for example bent around or welded to the closure plate 22, so as to conceal from view the heads of the screws 222.

[0045] A person skilled in the art may make modifications and adaptations to the embodiments of the dispenser device according to the invention, replacing elements with others functionally equivalent so as to satisfy contingent requirements while remaining within the sphere of protection of the following claims. Each of the characteristics described as belonging to a possible embodiment may be realised independently of the other embodiments described.

Claims

1. Dispenser device of a jet of water, comprising:

- a device body (10) defining a dispensing chamber (100) of a flattened shape with a main extension in the direction perpendicular to that of the output jet of water, said device body (10) being provided with a connection element (200) suitable to fluidly connect the dispensing chamber (100) to a water supply pipe;
- a dispenser plate (14) which forms a wall of the device body and in which a plurality of outlet holes (16) of the water are made,
- an inner plate (18) which rests on the dispenser plate and from which a plurality of dispensing nozzles (20) extend which are inserted in respective outlet holes (16) of the water, each dispensing nozzle (20) being in fluidic communication with the dispensing chamber (100),

the device being **characterised in that** in the thickness of the inner plate (18) a plurality of concave truncated-pyramid portions (26) are made, each having its base (262) open towards the dispensing chamber and the vertex (264) coinciding with a respective dispensing nozzle (20), each concave por-

tion (26) having each side of its base in common with a side or with a portion of the side of an adjacent concave portion (26), in such a way that the surface of the inner plate (18) facing towards the dispensing chamber (100) is substantially devoid of flat portions.

2. Device according to claim 1, wherein the outlet holes (16) of the water, with their respective dispensing nozzles (20), are uniformly distributed over the entire surface of the dispenser plate (14).
3. Device according to claim 1 or 2, wherein the inner plate (18) and the dispensing nozzles (20) are made in a single body made of a soft material.
4. Device according to any one of the preceding claims, wherein the device body, the dispenser plate and the inner plate have a circular shape, and wherein the concave truncated-pyramidal portions (26) are made along concentric circular crowns.
5. Device according to the preceding claim, in which the sides of the base (262) of each concave truncated pyramid portion (26) form a circular crown sector.
6. Device according to any one of the claims 1-3, wherein the device body, the dispenser plate and the inner plate have a rectangular shape, and wherein the concave truncated-pyramid portions have a rectangular base.
7. Device according to any one of the preceding claims, wherein the side walls (266) of each concave truncated-pyramid portion are provided with ribs (268) which extend from the sides of the base towards the respective dispensing nozzle.
8. Device according to any one of the preceding claims, wherein the connection element (200) is provided with suction means (300) suitable to aspirate air from the outside and to introduce the aspirated air into the dispensing chamber (100).
9. Device according to the preceding claim wherein the connection element (200) comprises a connection body (202) in which an inlet duct (204) connected to the water supply pipe, an outlet duct (206) in fluidic communication with the dispensing chamber, at least one intermediate passage placing the inlet duct in fluidic communication with the outlet duct, are made, wherein in the connection body an air suction channel (208) communicating with the outside and open towards the outlet duct (206), is also made, an obturator movable between a closed position of the suction channel (208) and an open position of the suction channel (208) for the aspiration of air from the outside toward the outlet duct (206) being associated with said suction channel.

10. Device according to the preceding claim, wherein the obturator device is kept in the closed position of the suction channel (208) by the water pressure flowing through the connection element (200) and returns to the open position of said suction channel opening (208) as a result of the interruption of the water supply. 5
11. Device according to any one of the preceding claims, wherein the dispenser plate (14) has a peripheral edge which forms the side wall (24) of the device body, and wherein the device body comprises a closure plate (22) which delimits the dispensing chamber (100) on the opposite side to the dispenser plate. 10 15
12. Device according to the preceding claim, wherein a plurality of fastening pins (142) extend from the dispenser plate (14) into the dispensing chamber, in each of which a threaded hole (144) is made and wherein the closure plate is connected to the dispenser plate by means of fastening screws (222) screwed into said threaded holes. 20
13. Device according to any one of the preceding claims, wherein the closure plate (22) is provided with a threaded collar forming a seat for a ball joint of the connection element, said ball joint being retained in said seat with the possibility of oscillation by means of a threaded sleeve screwed to said threaded collar. 25 30

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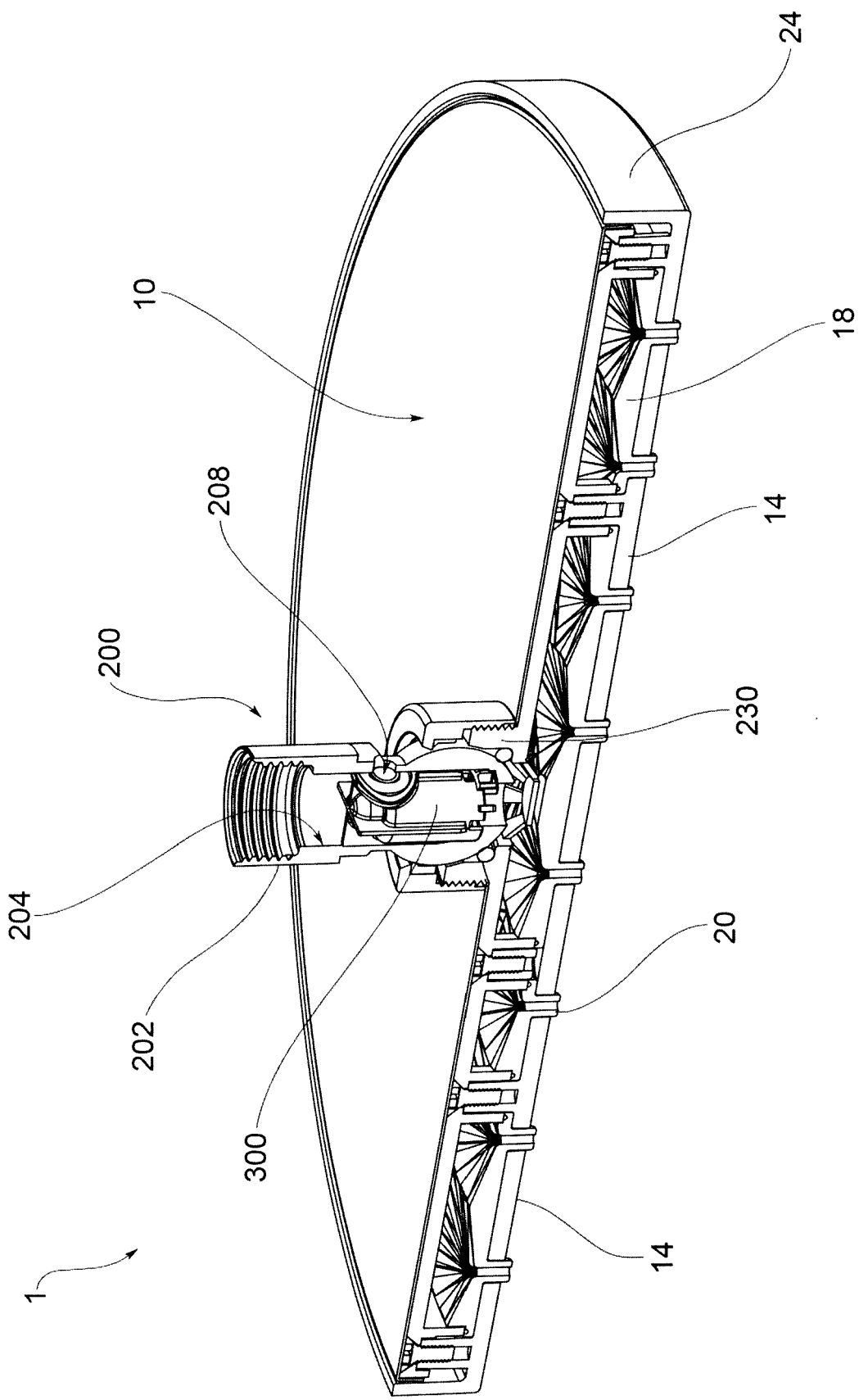


FIG.1

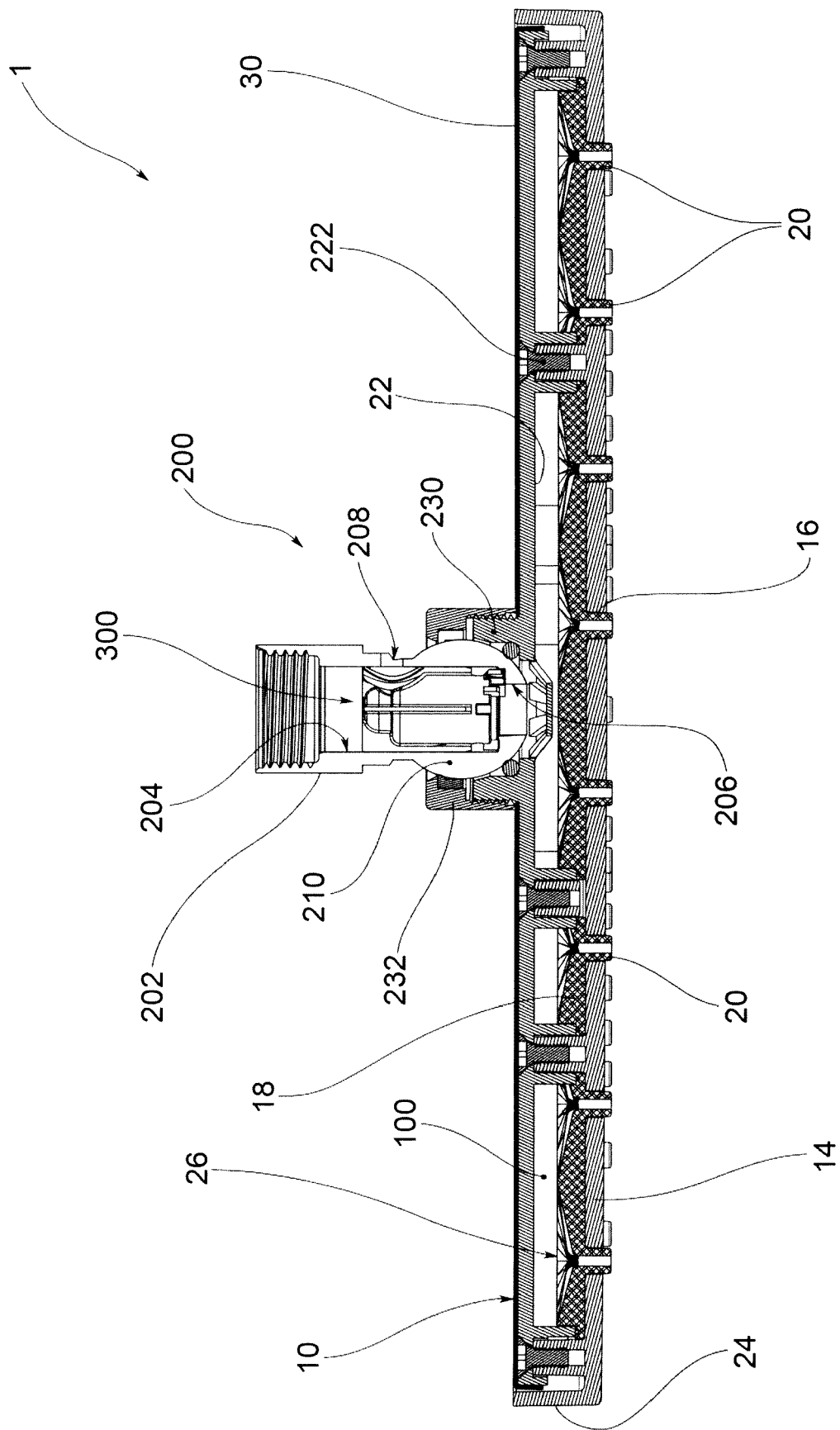
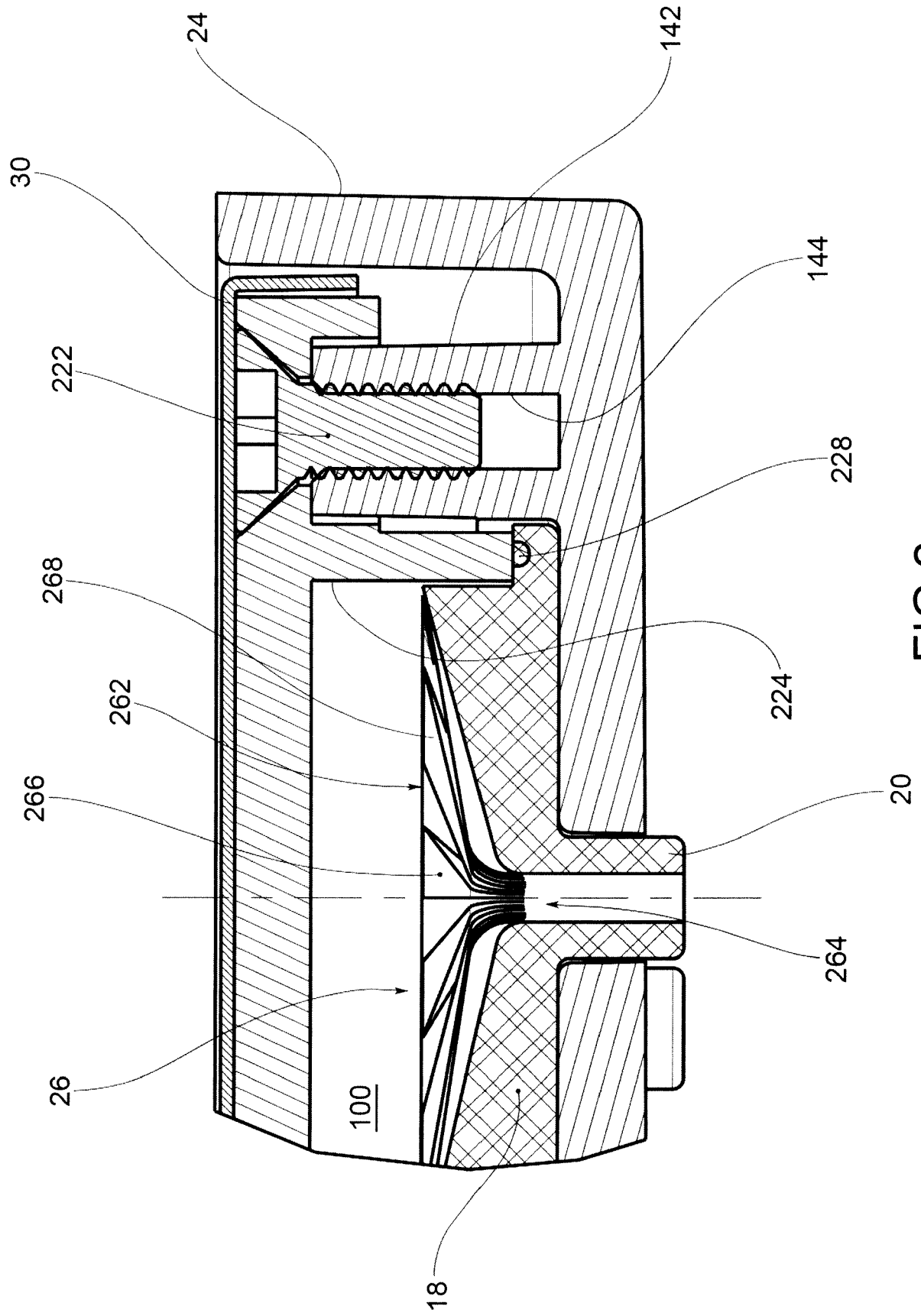


FIG.2



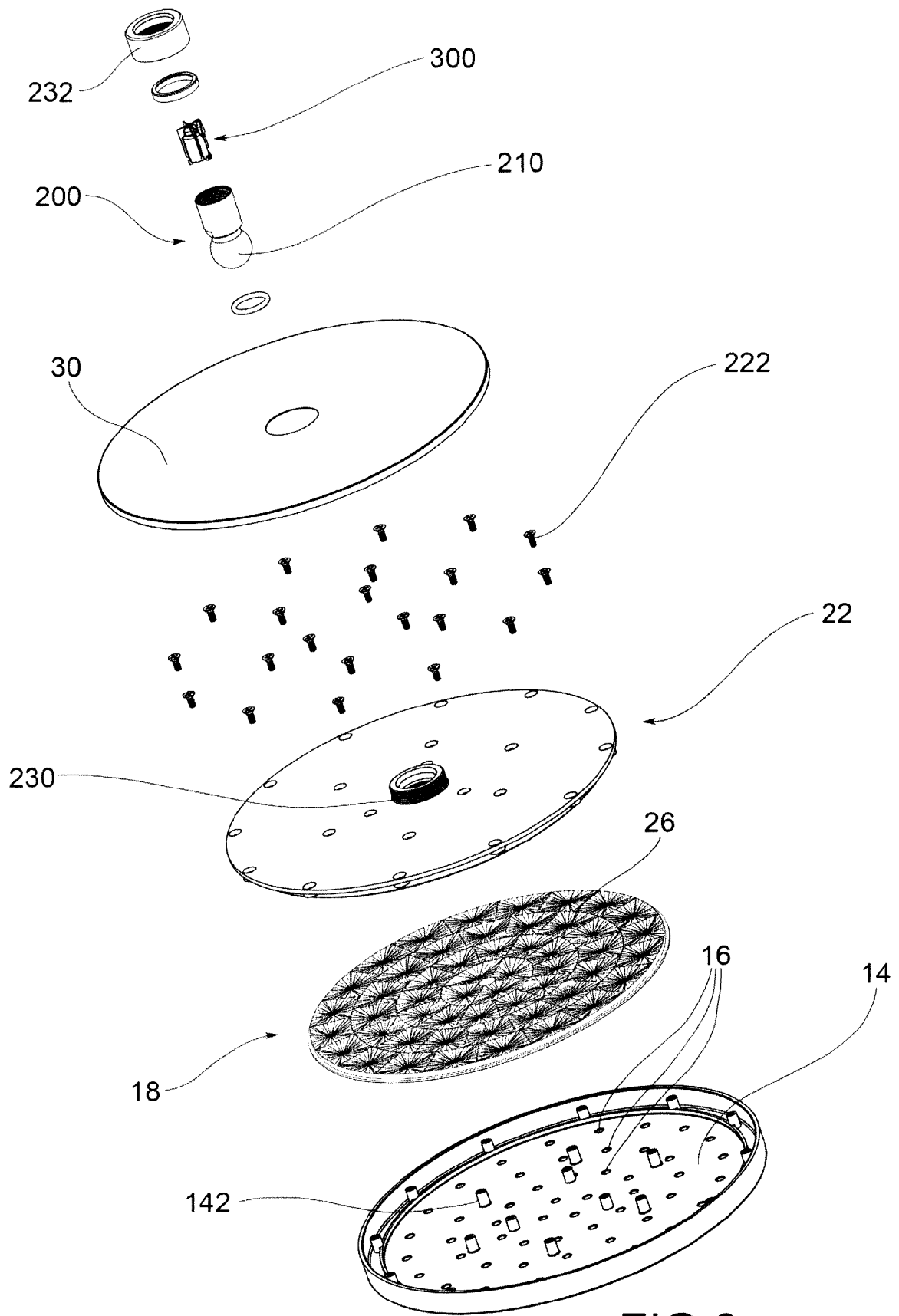


FIG.3

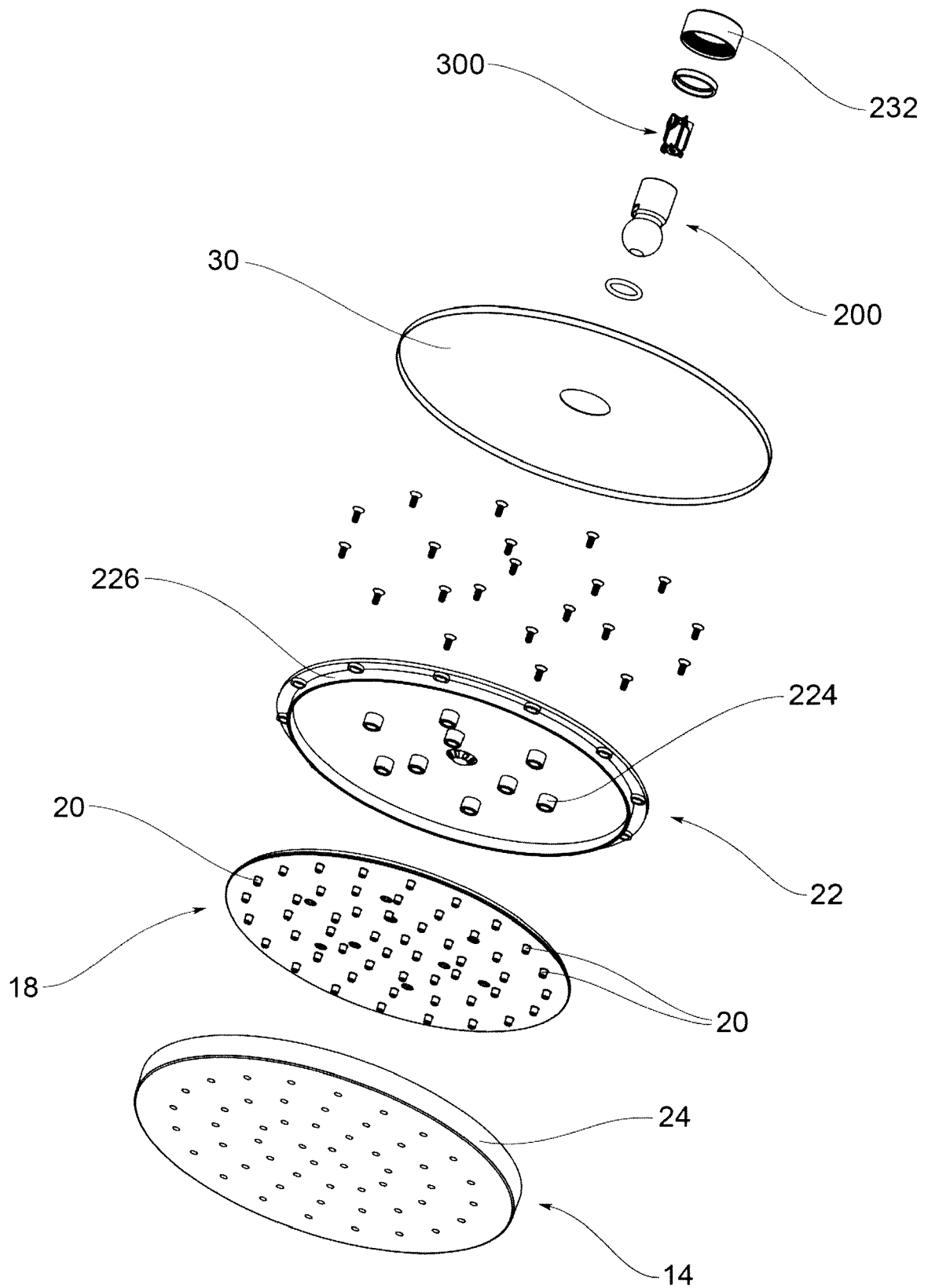


FIG.4

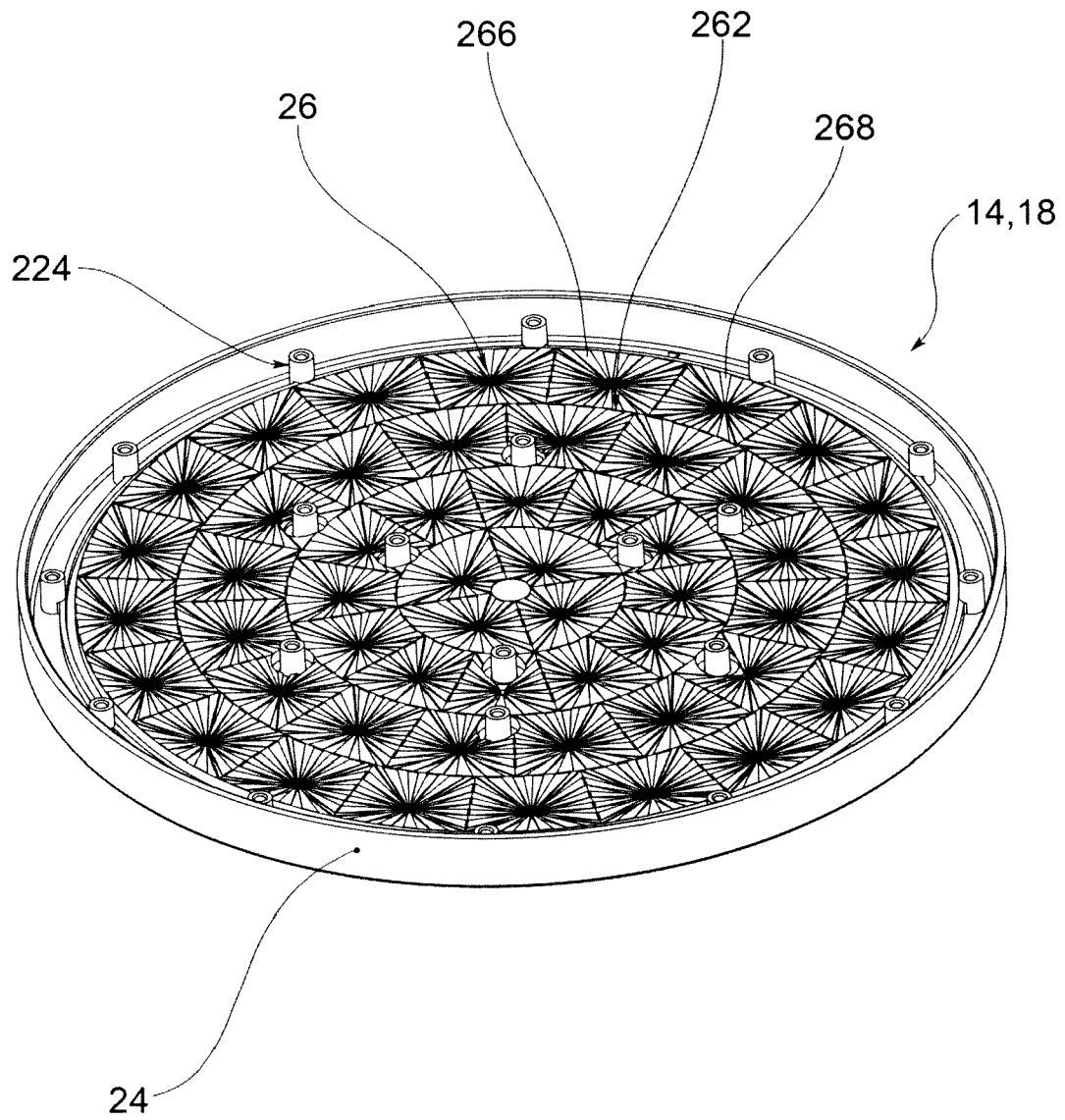


FIG.5



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Application Number
EP 17 42 5028

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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 11 September 2017	Examiner Fregio, Maria Chiara
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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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