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(54) **IMPROVED SHOWER HEAD**

(57) Shower head comprising a lower plate (10, 100) provided with water dispensing holes (12, 120) and an upper plate (14, 140) provided with a water inlet hole (16, 160) and with a water outlet hole (20, 200) in which a

safety device (22, 220) is housed, calibrated to partially uncover said outlet hole (20, 200) while remaining engaged in said upper plate when the pressure inside the shower head exceeds a predetermined maximum level.

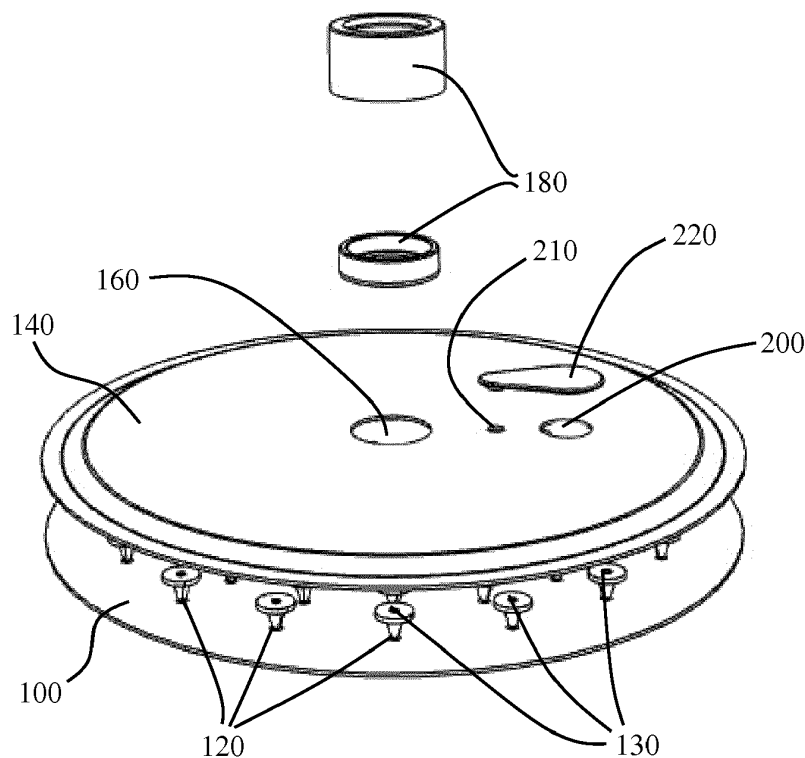


FIG. 8

Description

[0001] The present invention relates to an improved shower head.

[0002] Shower heads of various type, shape and size are known. Generally, they consist of a lower plate, provided with water outlet holes, secured in a watertight manner to an upper plate provided with a water inlet hole, connected with suitable connections and pipes to a water supply faucet. A water collection chamber is defined between the lower plate and the upper plate. Securing of the two plates in a watertight manner can be obtained in various ways, both removably and irremovably. Removable securing of the two plates is typically obtained by means of screws, and with the interposing of appropriate gaskets. Irremovable securing is typically obtained by means of perimeter welding, for example by laser welding. In a possible embodiment, the water collection chamber is formed as a result of the drawn shape of the upper plate.

[0003] A problem of shower heads consists of clogging of the water outlet holes caused by limescale build-up. This problem is particularly common in areas in which the water is hard or very hard, i.e., is rich in calcium and magnesium salts.

[0004] To reduce this problem, nozzles made of silicone rubber or a similar material are normally inserted into the water outlet holes. By squeezing these nozzles after using the shower head, the water retained in the nozzles and in the water collection chamber above can be removed. In this way, it is possible to reduce clogging of the holes with limescale. The rubber nozzles can be formed as part of a mat to be inserted between the lower and upper plate, or can be formed individually, and as such inserted into the holes of the lower plate.

[0005] However, the use of rubber nozzles does not provide a truly effective means to solve the problems generated by limescale build-up. In fact, they are effective as long as the user of the shower carries out the squeezing operation and empties the water collection chamber each time water is dispensed by the shower head. In many cases this operation is not carried out, or is only carried out occasionally. Therefore, limescale build-up can clog the water outlet holes completely. The overpressure that is created in the collection chamber when the shower faucet is turned on can in some cases cause deformation in the shower head, and may even cause it to break.

[0006] Some systems currently present on the market provide for the use of safety caps positioned on the body of the shower head, which following an increase in the pressure above a threshold value are irreversibly deformed or are literally ejected from the body of the shower head freeing a water outlet hole and hence rapidly lowering the pressure. These systems must be replaced each time the predetermined pressure value is exceeded in the case of deformable caps or there is a high risk of losing the cap following its ejection due to the high pres-

sure. Therefore, an object of the present invention is to provide an improved shower head, adapted to prevent the occurrence of deformations or breakages due to clogging of the holes caused by the limescale build-up and which allows easy and rapid reinstatement of the safety systems. The aforesaid and other objects and advantages of the present invention, which will be apparent from the description below, are achieved by means of a shower head comprising a lower plate provided with water dispensing holes and an upper plate provided with a water inlet hole, said upper plate being secured in a watertight manner to said lower plate so as to define a water collection chamber, characterized in that said upper plate is provided with a water outlet hole in which a safety device made of flexible plastics is operatively housed, said safety device being provided with closure means of said water outlet hole, and with at least one retention means designed and calibrated to remain engaged in said upper plate when the pressure exceeds a predetermined maximum level in said water collection chamber, whereby said water outlet hole is partially uncovered and water is discharged while said retention means remains engaged in said upper plate.

[0007] The invention is described below also with reference to the accompanying drawings, wherein:

- Fig. 1 is a perspective view of a shower head according to a first embodiment of the invention;
- Fig. 2 is an exploded perspective view of the shower head of Fig. 1;
- Fig. 3 is an enlarged side view of the safety device of the shower head of Fig. 1;
- Fig. 4 is a bottom view of the safety device of Fig. 3;
- Fig. 5 is a perspective view of the safety device of Fig. 3;
- Fig. 6a is a side view of the safety device of Fig. 3 and of the section of a portion of the shower head of Fig. 1 in a first operative position;
- Fig. 6b is a side view of the safety device of Fig. 3 and of the section of a portion of the shower head of Fig. 1 in a second operative position;
- Fig. 7 is a perspective view of a shower head according to a second embodiment of the invention;
- Fig. 8 is an exploded perspective view of the shower head of Fig. 7;
- Fig. 9 is an enlarged side view of the safety device of the shower head of Fig. 7;
- Fig. 10 is a bottom view of the safety device of Fig. 7;
- Fig. 11 is a perspective view from the bottom of the safety device of Fig. 7;
- Fig. 12 is an exploded perspective view of a third embodiment of the shower head of the invention;
- Fig. 13 is a perspective view from the top of a safety device for a shower head according to the third embodiment of Fig. 12;
- Fig. 14 is a side view of the safety device of Fig. 12;
- Fig. 15 is a perspective view from the bottom of the safety device of Fig. 12;

- Fig. 16 is a view from the bottom of the safety device of Fig. 12;
- Fig. 17 is a side view of the safety device for a shower head according to a fourth embodiment of the invention;
- Fig. 18 is a perspective view from the bottom of the safety device of Fig. 17;
- Fig. 19 is a bottom view of the safety device of Fig. 17;
- Fig. 20 is a side view of the safety device of Fig. 17 and of the section of a portion of a shower head in a first operative position; and
- Fig. 21 is a front view of the safety device of Fig. 17 and of the section of a portion of a shower head in a second operative position.

[0008] With reference to the accompanying figures, the shower head according to the present invention comprises a lower plate 10, 100 provided with a plurality of water dispensing holes 12, 120. In the embodiments illustrated, the plate 10, 100 is round, but in other embodiments the plate could be rectangular, square, oval or have any other geometry.

[0009] The shower head further comprises an upper plate 14, 140, provided with a water inlet hole 16, 160, connected by means of connectors 18, 180 to a water supply faucet, not illustrated, as is known in the art.

[0010] In the embodiments illustrated the upper plate 14, 140 is irremovably secured in a watertight manner to the lower plate 10, 100 by means of welding, preferably laser welding. The upper plate 14, 140 is drawn and has a flat perimeter edge, and is therefore formed with a concave central part, adapted to define a substantially cylindrical water collection chamber when secured to the lower plate 10, 100.

[0011] In other embodiments, not shown, the lower and upper plates are secured by means of screws, with interposing of a perimeter gasket and, if necessary, of spacer rings or frames, adapted to form the water collection chamber.

[0012] Nozzles 13, 130 made of silicone rubber, adapted to allow emptying of the water collection chamber and minimize the formation of limescale deposits, are inserted into the holes 12, 120. The water is fed into the collection chamber by means of the hole 16, 160 and dispensed by means of the holes 12, 120.

[0013] In the embodiments with removable securing of the plates 10, 100, 14, 140 it is possible to disassemble the two plates and access the water collection chamber for cleaning and maintenance purposes.

[0014] In the embodiments with irremovable securing of the plates 10, 100, 14, 140 it is possible to carry out cleaning and maintenance of the shower head by introducing washing liquids capable of dissolving limescale without corroding the metal parts.

[0015] According to the invention, the upper plate 14, 140 is provided with at least one water outlet hole closed by a safety device acting as a safety valve designed and calibrated to open when the pressure in the water collec-

tion chamber exceeds a predetermined design value.

[0016] The safety device is provided with closure means of said water outlet hole and with retention means designed and calibrated to remain engaged in the upper plate 14, 140 when the pressure exceeds a predetermined maximum level in the water collection chamber.

[0017] In a first embodiment illustrated in Figs. 1-7, the upper plate 14 is provided with a hole 20 only, which is a water outlet hole to be opened when the pressure exceeds a predetermined maximum level. A safety device 22 is fitted on the hole 20, as better illustrated in Figs. 3-6. With reference to these figures, the device 22 is provided with closure means comprising a first lower protuberance 24, substantially cylindrical in shape, ending with a first rib 24'. The diameter of the protuberance 24 corresponds to the diameter of the hole 20. The diameter of the rib 24' is slightly larger than the diameter of the hole 20.

[0018] The device 22 is provided with a second lower protuberance 25 substantially cylindrical in shape and coaxial to said first protuberance 24, and extending downwards from it. The second protuberance 25 ends with a second rib 25' provided with at least two lobed portions. In particular, as illustrated in Fig. 4, the protuberance 25 is provided with four lobed portions. The second protuberance 25 ending with the rib 25' are the retention means of the safety device, adapted and calibrated to remain engaged in the upper plate when the pressure exceeds a predetermined maximum level in the water collection chamber. Since this retention means is formed by the second lower protuberance 25 and rib 25' that are coaxial to the closure means comprising the first lower protuberance 24 with rib 24', this retention means is designated as "central retention means".

[0019] The safety device 22 is made of yielding and flexible plastic material, so as to allow insertion of the protuberances 24 and 25 into the hole 20 of the plate 14, exerting a pressure from above, so as to force the ribs 24', 25' to enter this hole. The safety device 22 is therefore a cap forced into the hole 20 of the upper plate 14.

[0020] The safety device 22 is designed to withstand, when inserted into the hole 20, normal operating pressures of the city networks for supplying water to residential buildings, and an adequate overpressure that is generated in the water collection chamber of the shower head when part of the water dispensing holes 12, and related nozzles 13, are clogged by limescale build-up.

[0021] Preferably the safety device remains housed in its seat, i.e., inserted in the hole 20, until a predetermined pressure threshold value is reached, or until roughly half the holes 12 are clogged. When a larger number of holes is clogged, or the pressure threshold value is exceeded, and the pressure in the water collection chamber increases further, the safety device 22 it is risen from its seat, partially uncovering the hole 20 and allowing the outflow of water through it. In this way, an emergency discharge of the water from the hole 20 of the upper plate is produced, preventing the shower head from being stressed

by excessive overpressure, and hence being damaged, or even breaking.

[0022] As illustrated in detail in Figs. 4 and 5, the second rib 25' provided with four lobed portions 28, has a larger diameter than the hole 20. Therefore, the structure of the second rib 25' does not allow total ejection of the safety device 22 from the hole 20 in order to prevent the device from being lost following ejection. This part of the device acts as the central retention means of the safety device, which keeps it fixed to the shower head while water is discharged from hole 20.

[0023] The outflow of water from the hole 20 is ensured by the lobed structure of the rib 25'. In fact, the portions of the second rib 25' between two adjacent lobes define zones from which water can flow through hole 20 of the upper plate 14. This structure makes it possible to guarantee the passage of water around the protuberance 25 of the safety device 22 when it is in the risen position.

[0024] Fig. 6a shows the safety device inserted in the hole 20 of the upper plate 14, in the operative position of hole closed, which is the normal situation of the shower head.

[0025] Fig. 6b shows the safety device inserted in the hole 20 of the upper plate 14, in the operative position of hole opened, which is the emergency situation of the shower head.

[0026] With reference to Fig. 6a, rib 24' of protuberance 24 has been pushed through hole 20 so that it is under plate 14. Hole 20 is thus closed.

[0027] When the pressure in the water collection chamber is higher than the predetermined threshold, the safety device 22 is risen, as shown in Fig. 7b. In this position, the lobed portions 28 of the second rib 25' abut against the upper plate 14, so that the safety device 22 remains engaged inside the hole 20, and is thus retained on the plate 14.

[0028] In different embodiments not illustrated in the accompanying figures, the second rib 25' is provided with two or three lobed portions.

[0029] Due to the lobed portions 28 of the second rib 25', the hole 20 is partially uncovered, reducing the pressure inside the water collection chamber in a gradual and controlled way, thereby preventing the shower head from breaking due to a sudden variation in the pressure.

[0030] The choice of the pressure value at which the safety device 22 is risen from its seat determines dimensioning of the device and the dimension of the hole 20.

[0031] In a second embodiment of the shower head according to the invention, illustrated in Figs. 7-11, the upper plate 140 is provided with a second hole 210 of smaller diameter with respect to the diameter of the hole 200, and positioned in proximity of the hole 200.

[0032] With reference to Figs. 9-11, the safety device 220 is provided with a lateral lower protuberance 260, spaced apart from the first 240 and second 250 protuberances.

[0033] As in the first embodiment, the first 240 and second 250 protuberances are formed with lower ribs 240',

250', of larger size than the respective protuberances. Similarly, the lateral lower protuberance 260 is substantially cylindrical in shape, and ends with a third rib 260'.

[0034] As in the first embodiment, the first 240 protuberance with rib 240' are the closure means of hole 200, and the second protuberance 250 with rib 250' are a central retention means of the safety device. In this second embodiment the lateral lower protuberance 260 with rib 260' forms a lateral retention means of the safety device. The term "lateral" designates a retention means that is not coaxial with the closure means but is located laterally with respect to the closure means and the central retention means.

[0035] The function of the lateral retention means comprising protuberance 260 with rib 260' is of keeping the safety device fixed to the upper plate 140, when the pressure in the water collection chamber exceeds a predetermined value and also the central retention means is forced out of hole 200 by the water pressure.

[0036] Operation of this second embodiment is similar as operation of the first embodiment described above.

[0037] The distance between the lower protuberances 240, 250 from the lateral protuberance 260 corresponds to the distance between the holes 200 and 210 of the plate 140, respectively. Also in this embodiment the safety device 220 is made of yielding and flexible plastic material, so as to allow insertion of the protuberance 260 into the hole 210 of the plate 140, exerting a pressure from above, so as to force the rib 260' to enter these holes.

[0038] The diameter of the lateral protuberance 260 corresponds to the diameter of the hole 210, while the diameter of the rib 260' is slightly larger than that of the hole 210. The thickness of the rib 260' is greater than the thickness of the rib 250' of the second protuberance 240. In this way, when the pressure inside the water collection chamber exceeds the threshold value and the closure means of the safety device 220 it is risen from its seat, thus partially uncovering the hole 200, an emergency discharge of water from the upper plate 140 is allowed. The portion of the device corresponding to the lateral protuberance 260 with rib 260', however, is not risen from the hole 210 due to the greater resistance exerted by the third rib 260', namely, the lateral protuberance 260 with rib 260' remains tightly inserted in hole 210.

[0039] In the case in which the closure means of and the central retention means of the safety device 220 were to be accidentally completely ejected from the hole 200, disengaging also the second rib 250' provided with lobed portions 280, the lateral retention means of the device prevents it from being thrown far from the shower head and being lost or accidentally ending up in the shower drain. In this way, an additional safety measure is provided in case of problems of the second rib 250' due to wear or possible manufacturing defects.

[0040] Fig. 11 shows a variant of the second embodiment of the safety device, in which the only difference is that only two lobes 280' instead of four lobes are present

in the rib 250' of the second protuberance 250.

[0041] Figs. 12-15 show a safety device according to a third embodiment of the shower head according to the invention.

[0042] In this embodiment the upper plate 140 of the shower head is provided with a couple of holes 210, 211, of smaller diameter with respect to the diameter of the hole 200, and positioned diametrically opposed in proximity of the hole 200, more particularly each placed at a distance D from the centre of hole 200.

[0043] The safety device 320 is provided with a central protuberance 324 extending downwards, ending with a rib 324' (Figs. 14-15). This part of the device is the closure means of hole 200. The safety device 320 is provided also with a couple of lateral protuberances 360a, 360b, disposed diametrically opposed to the central protuberance 324. Each lateral protuberance 360a, 360b is substantially cylindrical in shape and ends with a rib 360a', 360b'. Each lateral protuberance 360a, 360b with ribs 360a', 360b' is a retention means of the safety device 320. The distance of the lateral protuberances 360a, 360b from the central protuberance 324 is the same as the distance of the lateral holes 210, 211, from the hole 200 of the upper plate. Therefore, the safety device 320 is mounted on the upper plate by inserting the central protuberance 324 in the hole 200 of the upper plate, and the lateral protuberances 360a, 360b in the holes 210, 211 of smaller diameter positioned diametrically opposed in proximity of the hole 200.

[0044] Concerning the distance of the couple of holes of smaller diameter with respect to the central hole 200, which is the same as the distance of the protuberances 360a and 360b from the central protuberance 324 (Fig. 14), the term "in proximity of the hole 200" has the following meaning.

[0045] With reference to Figs. 14-16, the diameter of protuberance 324 has been designated as "d", while distance between the centre of protuberance 324 from the centre of each of lateral protuberances 360a, 360b has been designated as D. According to an aspect of the present invention, $d \leq D \leq 2d$.

[0046] The function of this couple of lateral protuberances 360a, 360b is of keeping the safety device fixed to the upper plate 140, whichever value of pressure is reached in the water collection chamber. Each lateral protuberance 360a, 360b is thus a lateral retention means of the safety device 320.

[0047] Furthermore, the bottom side of safety device 320 is formed with a plurality of ribs 315 extending along portions of circumferences coaxial with the central protuberance 324. In the embodiment illustrated in Figs. 14-16 four circumferential ribs 315 are present.

[0048] Operation of this third embodiment is therefore similar as operation of the second embodiment described above, but with the retention means of keeping the device fixed to the shower head represented by the two lateral protuberances 360a, 360b, with ribs 360a', 360b'. As in the previous embodiments, also in this embodiment the

safety device 320 is made of yielding and flexible plastic material, so as to allow insertion of the protuberances 324, 360a, 360b into the respective holes of the upper plate, exerting a pressure from above, so as to force the ribs to enter these holes.

[0049] The ribs 315 modify the adhesion of the device to the surface of the upper plate 140, thus allowing an easier removal of the safety device from the upper plate of the shower head, when necessary.

[0050] The diameter of the lateral protuberances corresponds to the diameter of the respective holes, while the diameter of the ribs 360a', 360b' is slightly larger than that of the holes. The thickness of the ribs 360a', 360b' is greater than the thickness of the rib 324' of the central protuberance 324. In this way, when the pressure inside the water collection chamber exceeds the threshold value and the safety device 320 it is risen from its seat partially uncovering the hole 200, as illustrated above for the second embodiment, the portions of the device corresponding to the lateral protuberances 360a, 360b are not risen from their respective holes due to the greater resistance exerted by the ribs 360a', 360b'.

[0051] This construction provides an additional safety measure to avoid total ejection of the safety device from the shower head. The risen position of the closure while the safety device is retained to the shower head is the same as that shown in Fig. 21, that is described below for the fourth embodiment of the invention.

[0052] Figs. 17-21 show a safety device according to a fourth embodiment of the shower head according to the invention.

[0053] This fourth embodiment is the same as the third embodiment with the difference that the device 320 is provided with a second lower protuberance 325, substantially cylindrical in shape and coaxial to the first protuberance 324, and extending downwards from it. The second protuberance 325 ends with a second rib 325' of oval shape, having a size larger than the diameter of the first protuberance 324. In particular, the oval shape of rib 325' forms two lobed portions that extend in the longitudinal direction of the safety device 320.

[0054] The lateral protuberances 360a, 360b and the ribs 315 on the bottom side of the safety device are the same as those of the third embodiment.

[0055] With reference to Fig. 19, the distance of the lateral protuberances 360a, 360b from the central protuberance 324 is the same as defined for the third embodiment, namely $d \leq D \leq 2d$. The same relation applies also to the distance from the central hole 200 and the couple of lateral holes in the upper plate of the shower head.

[0056] The device is provided also with a central retention means, as described for the second embodiment, variant with the rib 250' of oval shape, thus defining only two lobes. This embodiment thus comprises three retention means, one central and two lateral means.

[0057] The functioning of the safety device of the fourth embodiment is essentially the same as that of the third embodiment, and is shown in Figs. 20 and 21.

[0058] Fig. 20 shows the position of the device inserted in the holes of the upper plate 140 of the shower head. In this position the lower protuberance 324, which has the same size as the central hole 200 of the upper plate 14, closes this hole. The first rib 324' abuts against the lower side of plate 140, ensuring a watertight closure.

[0059] The lateral protuberances 360a, 360b are inserted into the lateral holes of plate 140, as described for the third embodiment.

[0060] Fig. 21 shows the functioning of the safety device when the pressure inside the water collection chamber exceeds the threshold value.

[0061] In this case the safety device 320 it is risen from its seat partially, thus uncovering the hole 200. The second rib 325', having an oval shape with two lobed portions 28, in the longitudinal direction has a larger diameter than the diameter of the hole 200 (feature not shown in Fig. 21). Therefore, the structure of the second rib 325' does not allow total ejection of the safety device 320 from the hole 200, but it allows passage of water thanks to the flanks narrower than the diameter of the central hole, as shown in Fig. 21. This structure defines zones from which water can flow through hole 200 of the upper plate 14. This structure makes it possible the passage of water around the protuberance 325 when the safety device 320 when is in the risen position.

[0062] When the pressure inside the water collection chamber exceeds the threshold value, however, the portions of the device corresponding to the lateral protuberances 360a, 360b do not rise from the lateral holes in which they are inserted, due to the greater resistance exerted by the ribs 360a', 360b'. In the case in which the central protuberances of the device 320 were to be accidentally completely ejected from the hole 200, disengaging also the second rib 325', this structure of the device prevents it from being thrown from the shower head and being lost or accidentally ending up in the shower drain.

[0063] In this fourth embodiment there are three retention means of the safety device, one being located centrally and two being located laterally.

[0064] The central retention means consists of the protuberance 325 with rib 325' of oval shape: it retains the device fixed to the plate 140 by the abutment of the lobes of the rib 325' against the bottom surface of the plate 140 (a disposition not shown in the figures).

[0065] The lateral retention means consists of the protuberance 360a with rib 360a', and protuberance 360b with rib 360b', respectively.

[0066] In this way, an additional safety measure is provided.

[0067] The improved shower head with the safety device according to the invention eliminates the problems caused by internal overpressure caused by clogging of the outlet holes as ejection of the valve clearly warns the user that numerous holes are clogged and that the shower head therefore requires cleaning and maintenance. This prevents a further increase of pressure from causing

irreversible damage to the shower head. When the user has performed cleaning and maintenance of the shower head the safety valve can be reinserted into its seat, or can be replaced with a new valve, available as spare part at an affordable price.

[0068] Moreover, the improved shower head with the safety device according to the invention allows a gradual decrease in the pressure in case of its activation, preventing damage caused by sudden changes in pressure inside the water collection chamber.

[0069] Finally, the improved shower head with the safety device according to the invention prevents this device from being lost or damaged due to its total ejection from the shower head.

Claims

1. Shower head comprising a lower plate (10, 100) provided with water dispensing holes (12, 220, 320) and an upper plate (14, 140) provided with a water inlet hole (16, 160), said upper plate (14, 140) being secured in a watertight manner to said lower plate (10, 100) so as to define a water collection chamber, **characterized in that** said upper plate (14, 140) is provided with at least one water outlet hole (20, 200) in which a safety device (22, 220, 320) made of flexible plastics is operatively housed, said safety device (22, 220) being provided with closure means (24, 24'; 240, 240'; 324, 324') of said water outlet hole (20, 200) and with at least one retention means (25, 25'; 250, 250'; 260, 260'; 325, 325'; 360a, 360a'; 360b, 360b') designed and calibrated to remain engaged in said upper plate (14, 140) when the pressure exceeds a predetermined maximum level in said water collection chamber, whereby said water outlet hole (20, 200) is partially uncovered and water is discharged while said retention means (25, 25'; 250, 250'; 260, 260'; 325, 325'; 360a, 360a'; 360b, 360b') remains engaged in said upper plate (14, 140).
2. Shower head according to claim 1, **characterized in that** said closure means of said safety device (22, 220) comprises a first lower protuberance (24, 240), substantially cylindrical in shape, terminating with a first rib (24', 240') operatively forced into said hole (20, 200), said first rib (24', 240') having a larger dimension than the dimension of said hole (20, 200) of said upper plate (14, 140), and said retention means being a central retention means and comprising a second protuberance (25, 250) substantially cylindrical in shape and coaxial to said first protuberance (24, 240), terminating with a second rib (25', 250') provided with at least two lobed portions (28, 280), said second rib (25', 250') having a larger dimension than the dimension of said hole (20, 200) of said upper plate (14, 140) and a larger dimension

than the dimension of said first rib (24', 240').

3. Shower head according to claims 1 or 2, **characterized in that** said upper plate (140) comprises a further hole (210) spaced apart from said water outlet hole (200), and **in that** said retention means comprises lateral retention means comprising a lower protuberance (260), substantially cylindrical in shape, terminating with a rib (260') operatively forced into said further hole (210), said rib (260') having a larger dimension than the dimension of said further hole (210) of said upper plate (140). 5
4. Shower head according to claim 3, **characterized in that** said holes (200, 210) are positioned in proximity to each other. 10
5. Shower head according to claim 3, **characterized in that** said water outlet hole (200) has a larger dimension than said further hole (210). 15
6. Shower head according to any claim 2-5, **characterized in that** said second rib (25', 250') of said second lower protuberance (25, 250) is provided with four lobed portions (28, 280). 20
7. Shower head according to one or more of the preceding claims, **characterized in that** said upper plate (140) of the shower head is provided with a couple of holes (210, 211) of smaller diameter with respect to the diameter of said water outlet hole (200), and positioned diametrically opposed in proximity of said water outlet hole (200), and **in that** said safety device (320) is provided with a central closure means (324, 324') and with a couple of lateral retention means comprising lateral protuberances (360a, 360b), disposed diametrically opposed to said central closure means (324, 324'), each lateral protuberance (360a, 360b) being substantially cylindrical in shape and ending with a rib (360a', 360b'). 25
8. Shower head according to claim 7, **characterized in that** said safety device (320) comprises a central retention means comprising a second protuberance (325) substantially cylindrical in shape and coaxial to said first protuberance (324), terminating with a second rib (325') provided with at least two lobed portions, said second rib (325') having a larger dimension than the dimension of said water outlet hole (200) of said upper plate (140). 30
9. Shower head according to one or more of claims 7 or 8, **characterized in that** said couple of holes (210, 211) of said upper plate (140) and said couple of lateral retention means (360a, 360a'; 360b, 360b') are spaced apart from a distance (D) which is defined as $d \leq D \leq 2d$, wherein d is the diameter of said first protuberance (324) of said central closure means. 35

10. Shower head according to one or more of the preceding claims, **characterized in that** said upper plate (14, 140) and said lower plate (12, 120) are irremovably secured to each other, said upper plate (14, 140) being drawn and formed with a concavity defining a water collection chamber. 40

11. Shower head according to claim 10, **characterized in that** said upper plate (14, 140) and said lower plate (12, 120) are irremovably secured by means of laser welding laser. 45

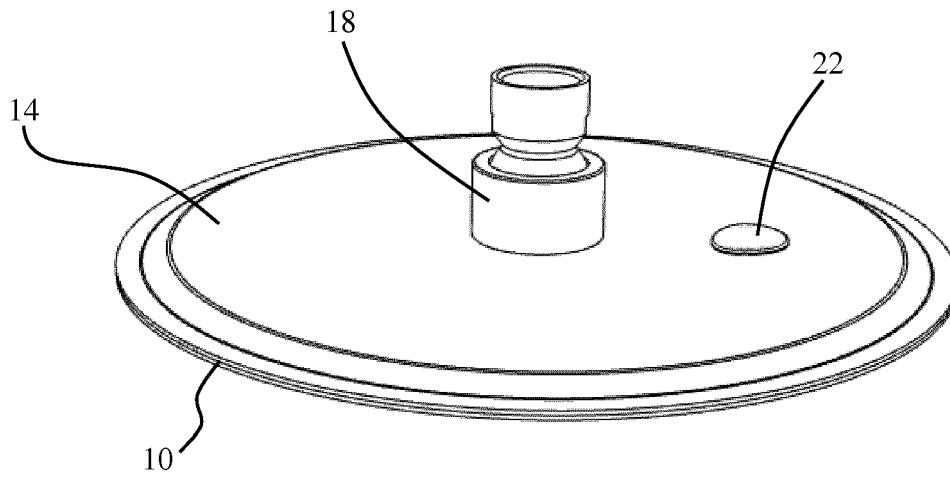


FIG. 1

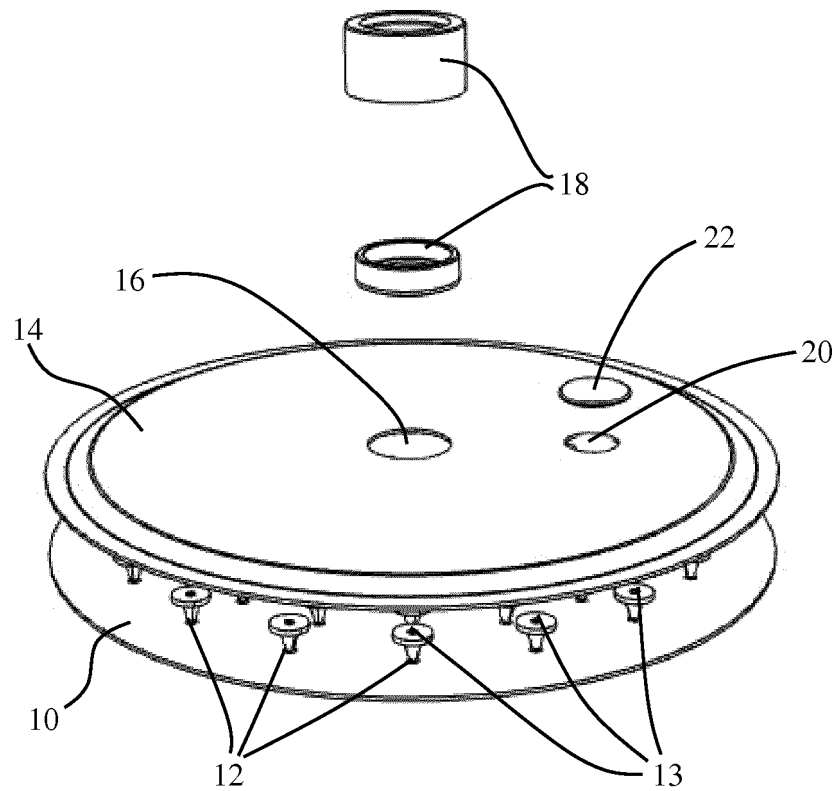


FIG. 2

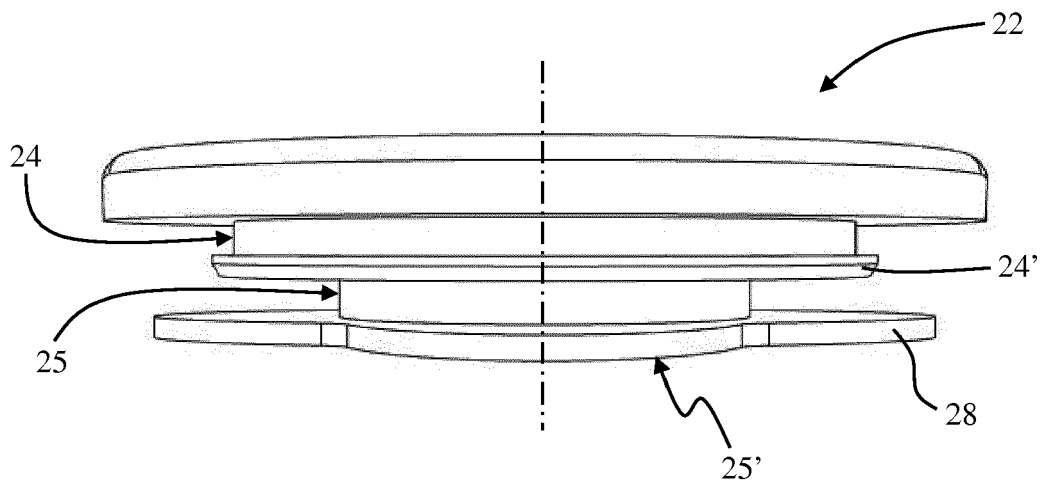


FIG. 3

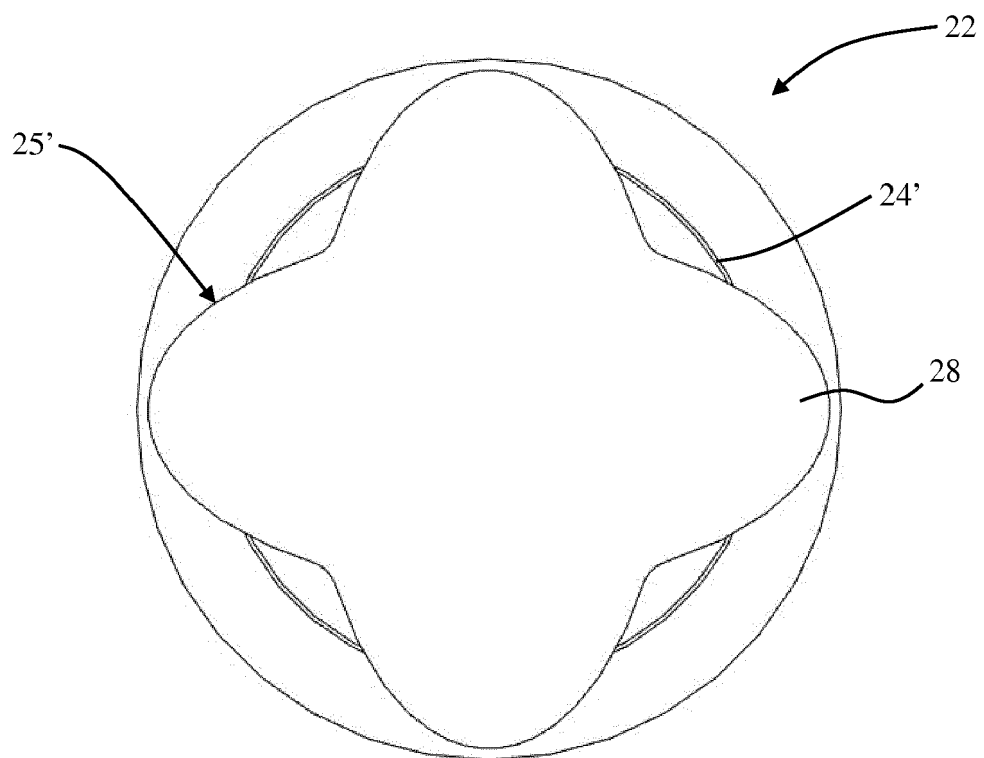


FIG. 4

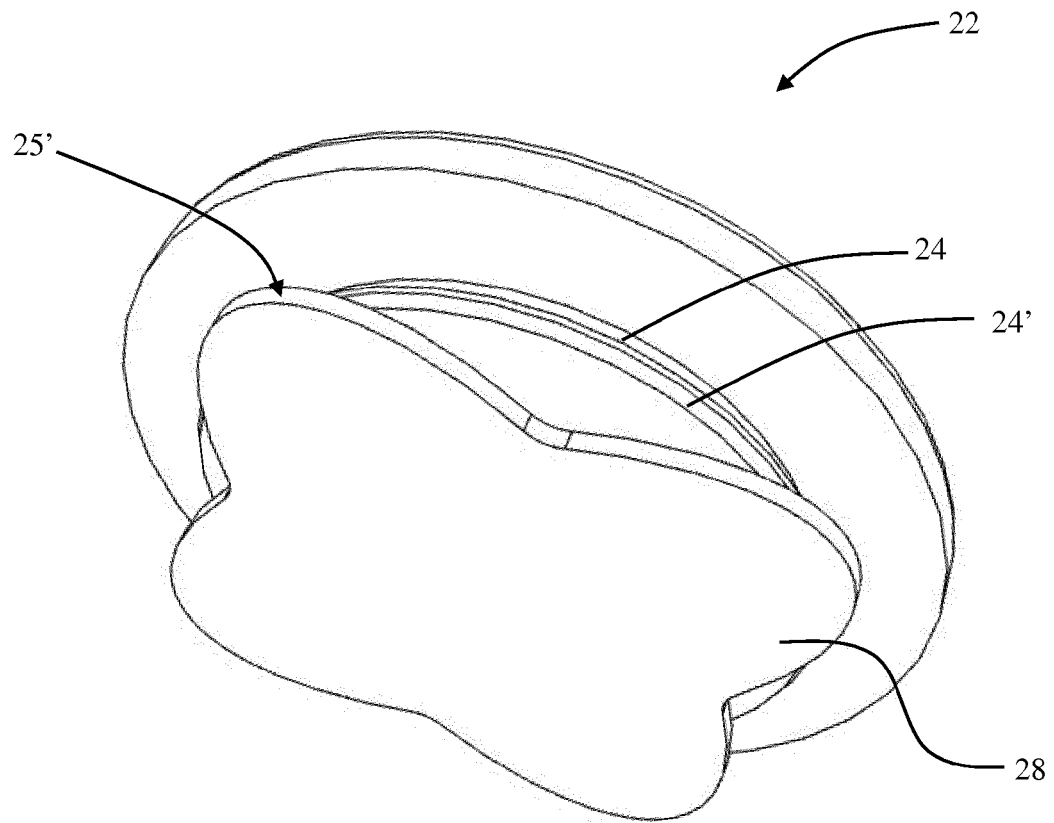


FIG. 5

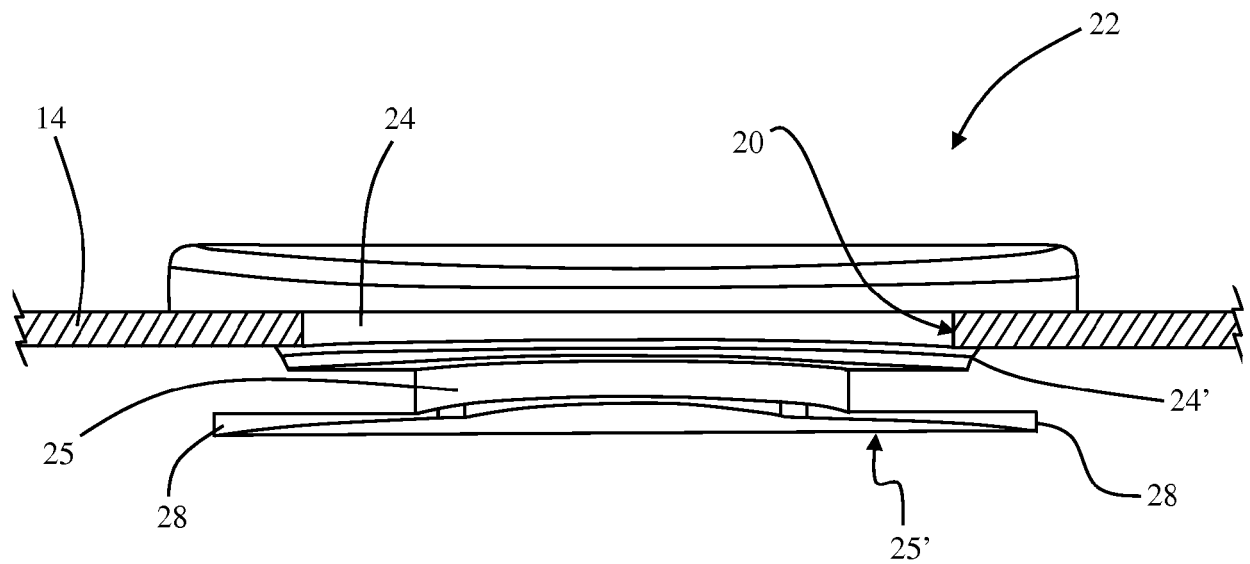


FIG. 6a

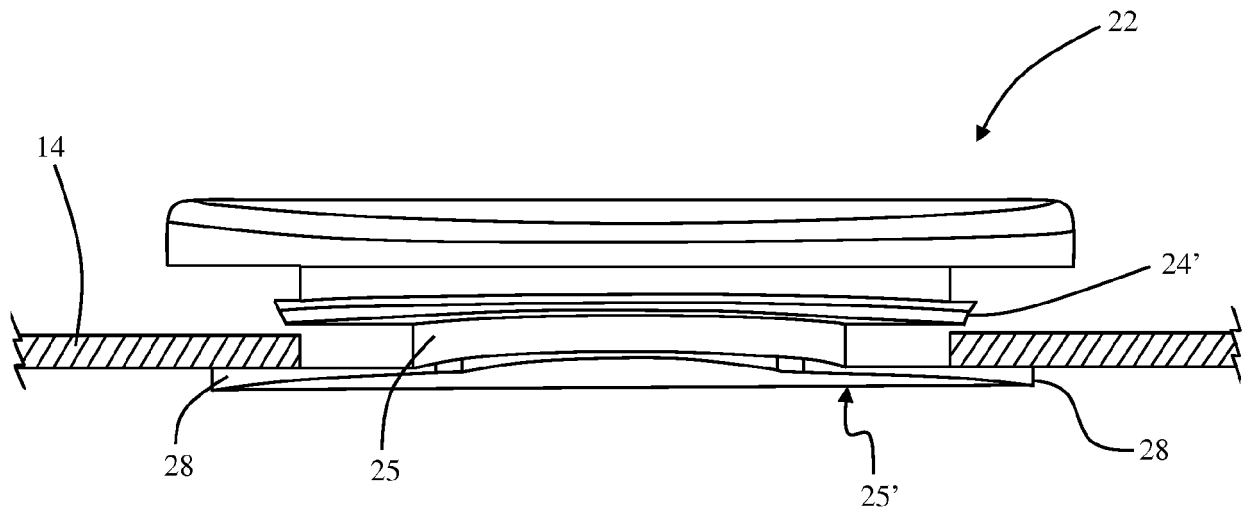


FIG. 6b

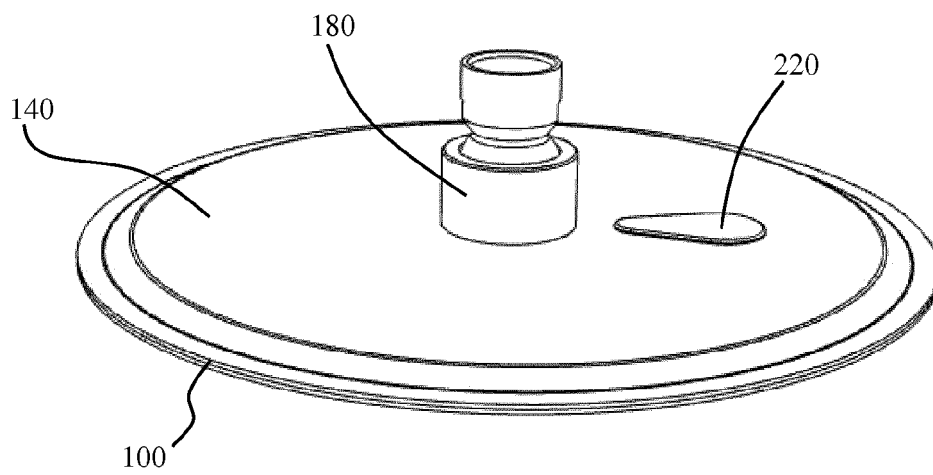


FIG. 7

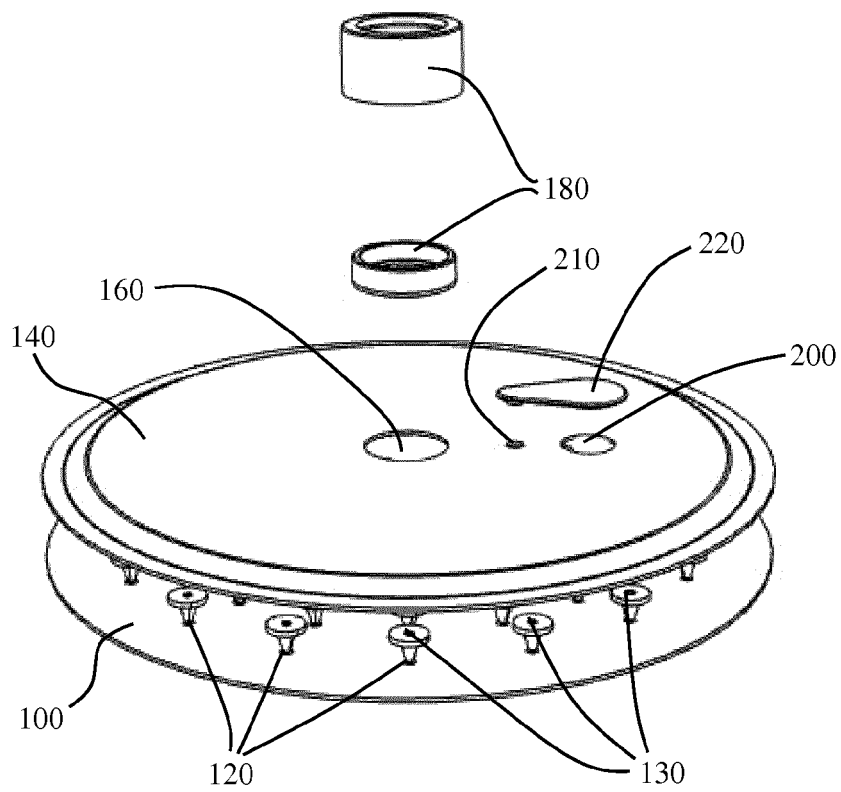


FIG. 8

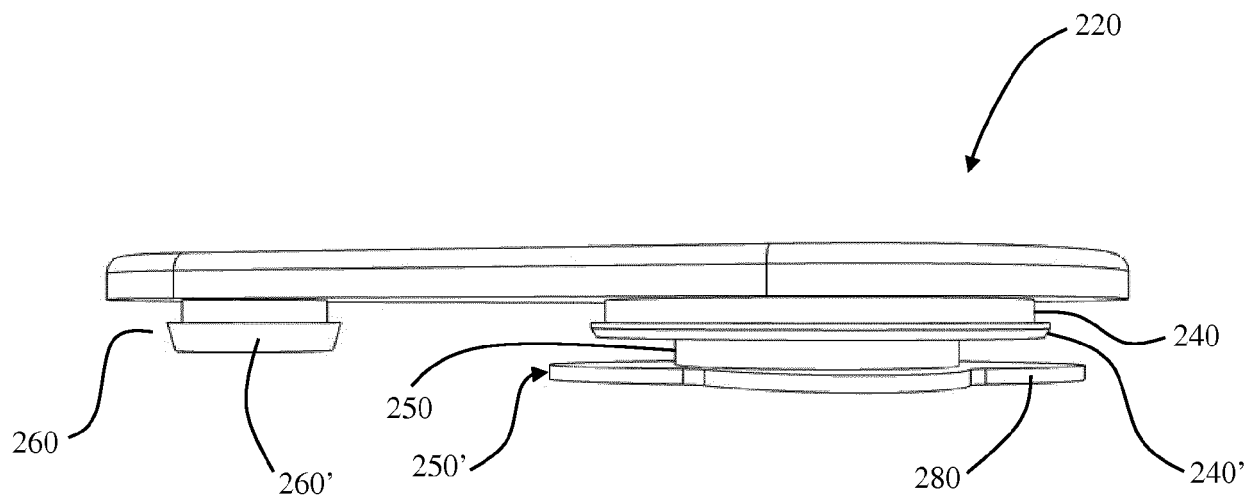


FIG. 9

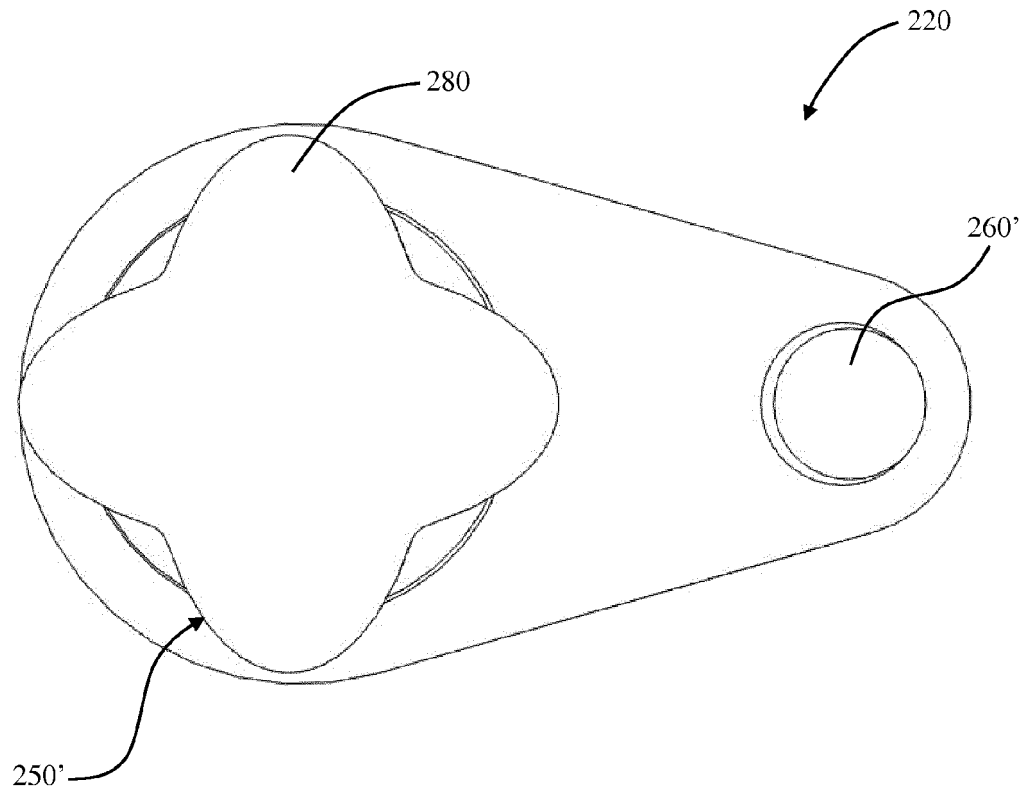


FIG. 10

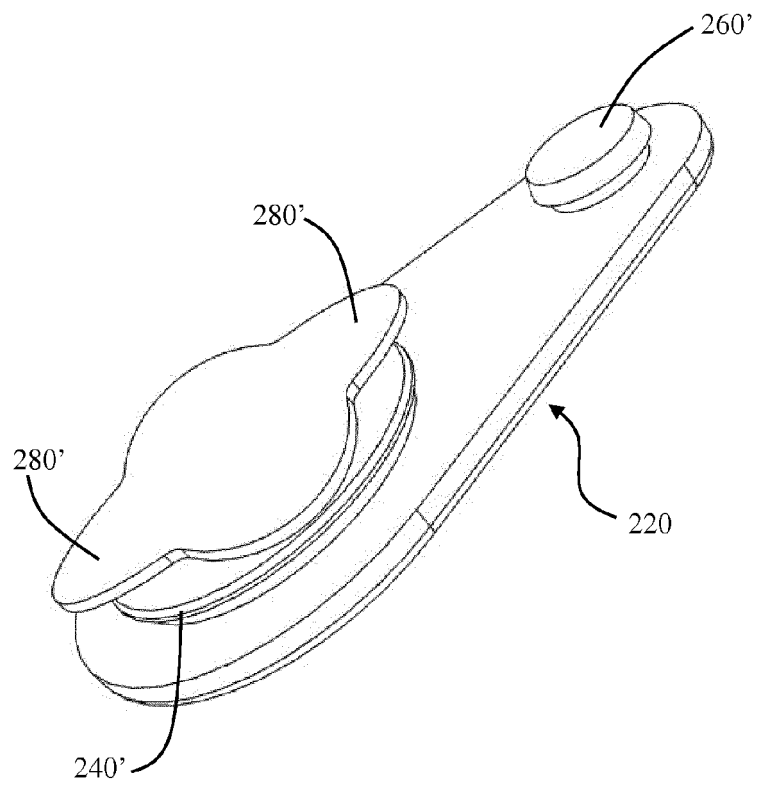


FIG. 11

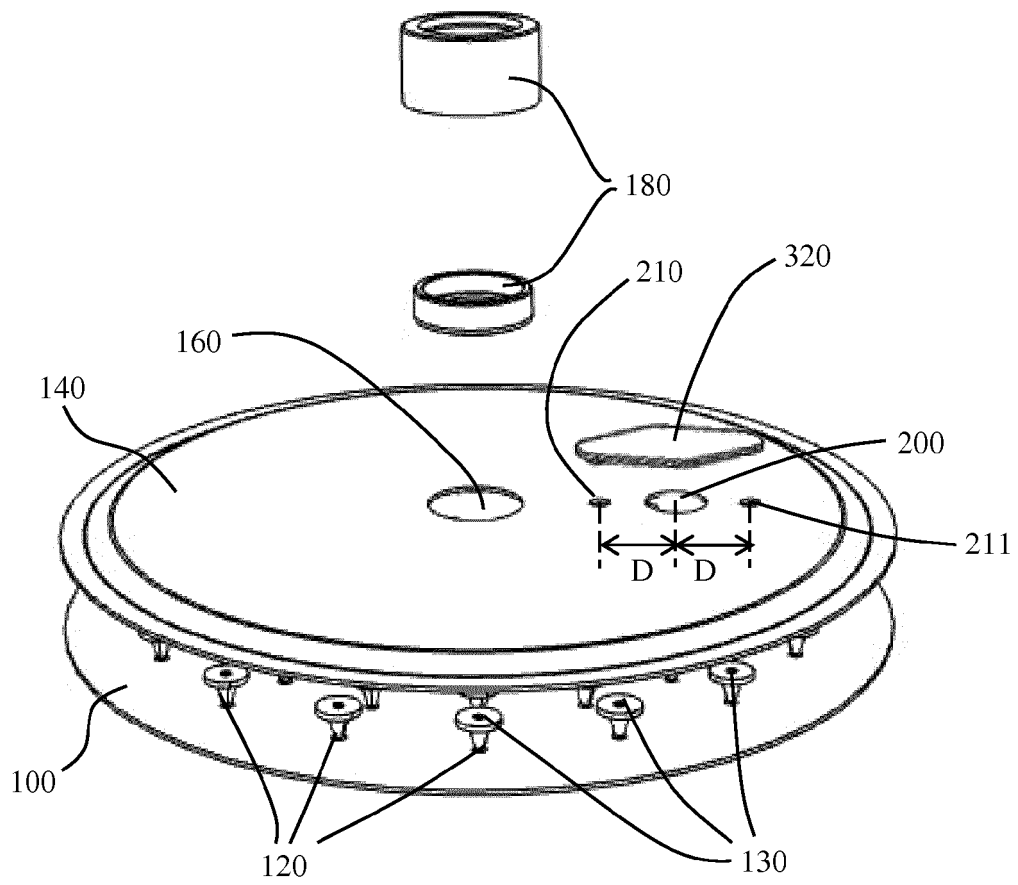


FIG. 12

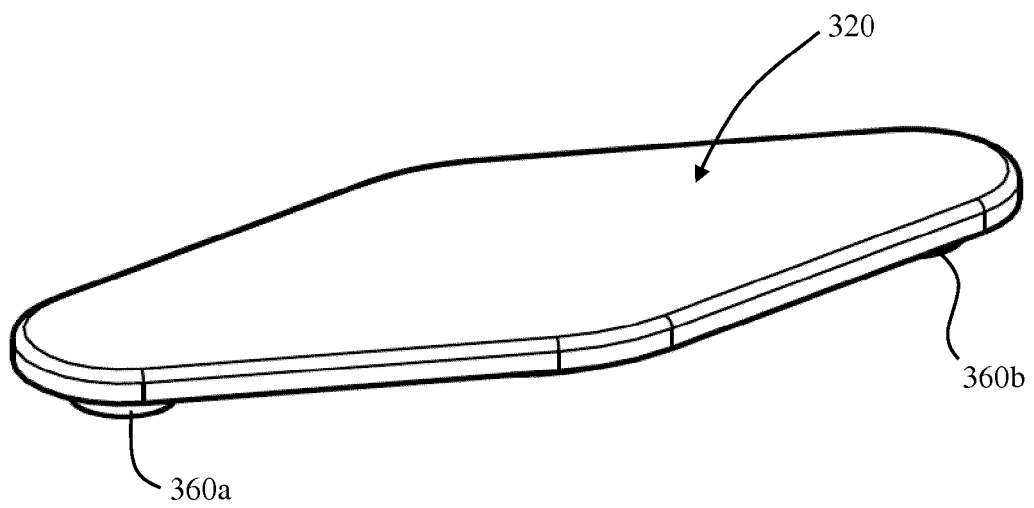


FIG. 13

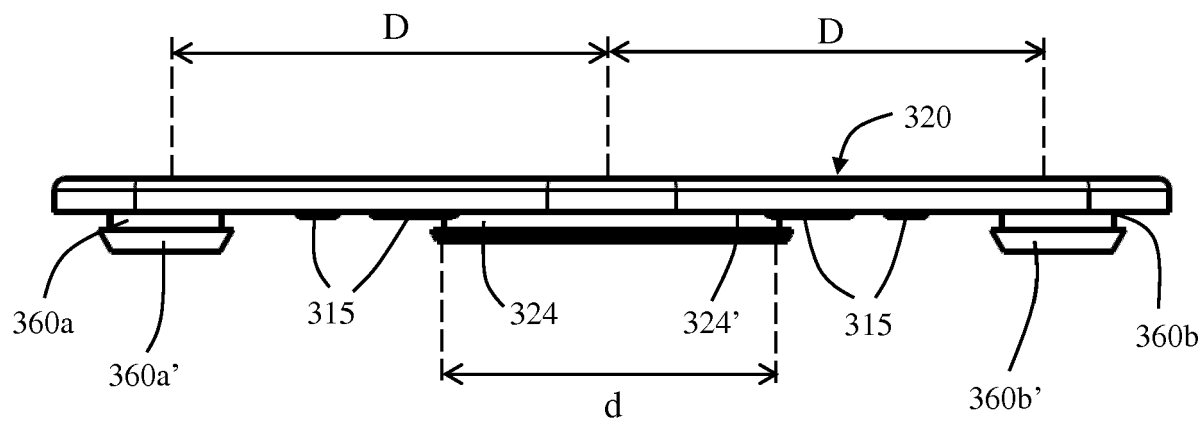


FIG. 14

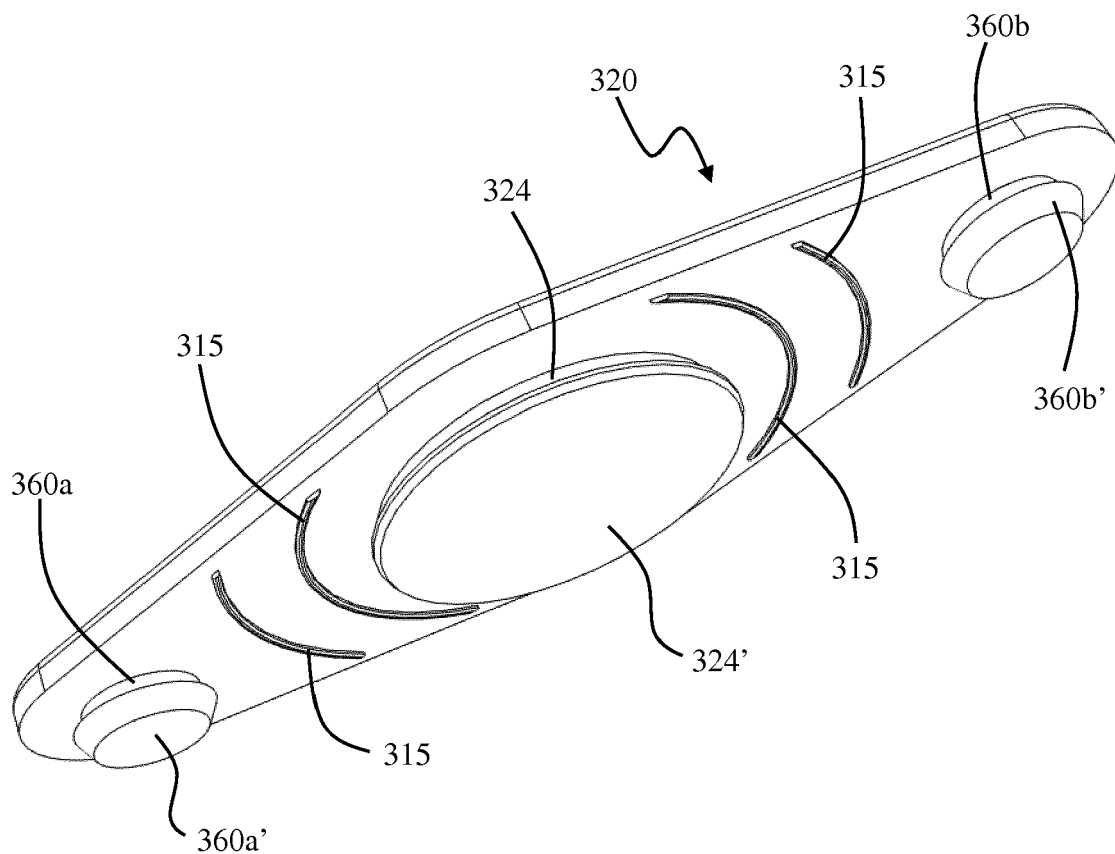


FIG. 15

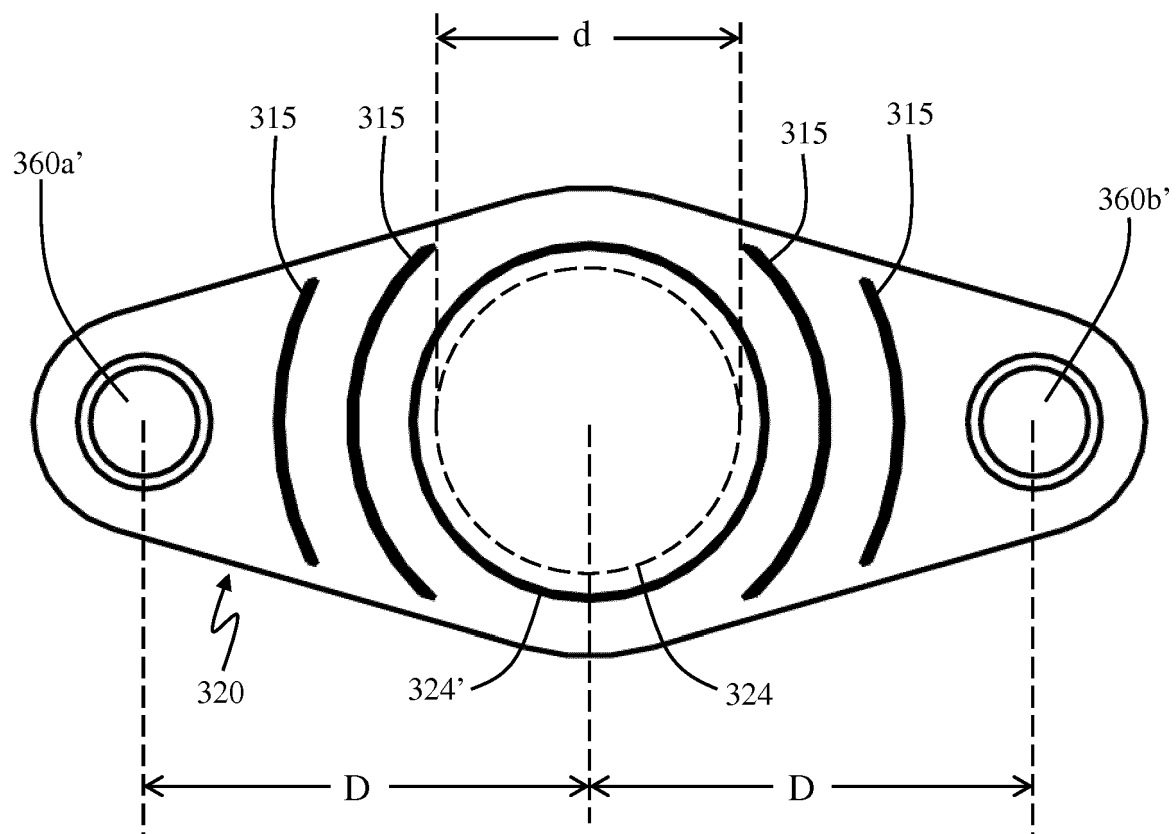


FIG. 16

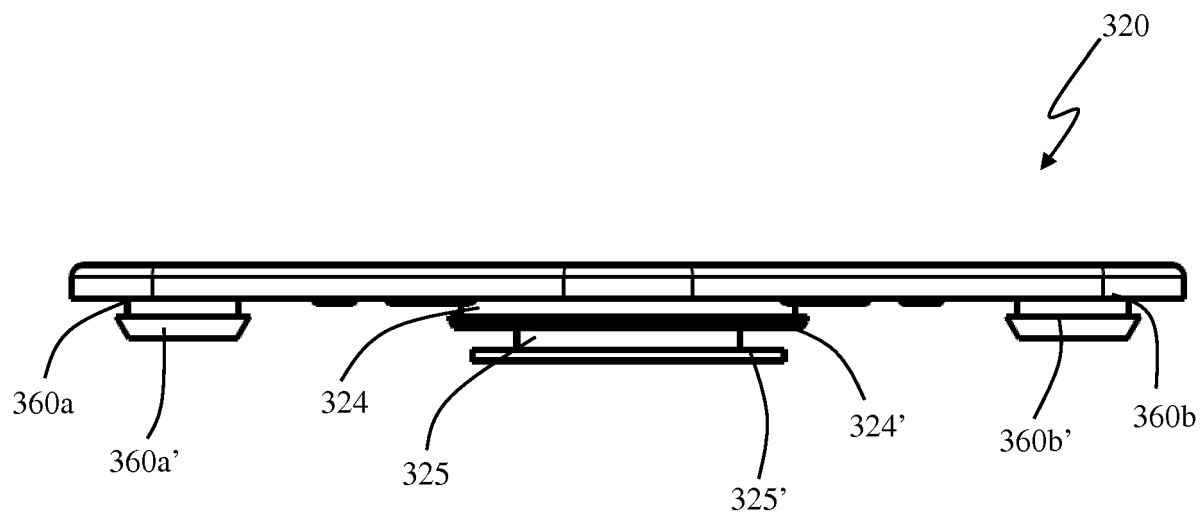


FIG. 17

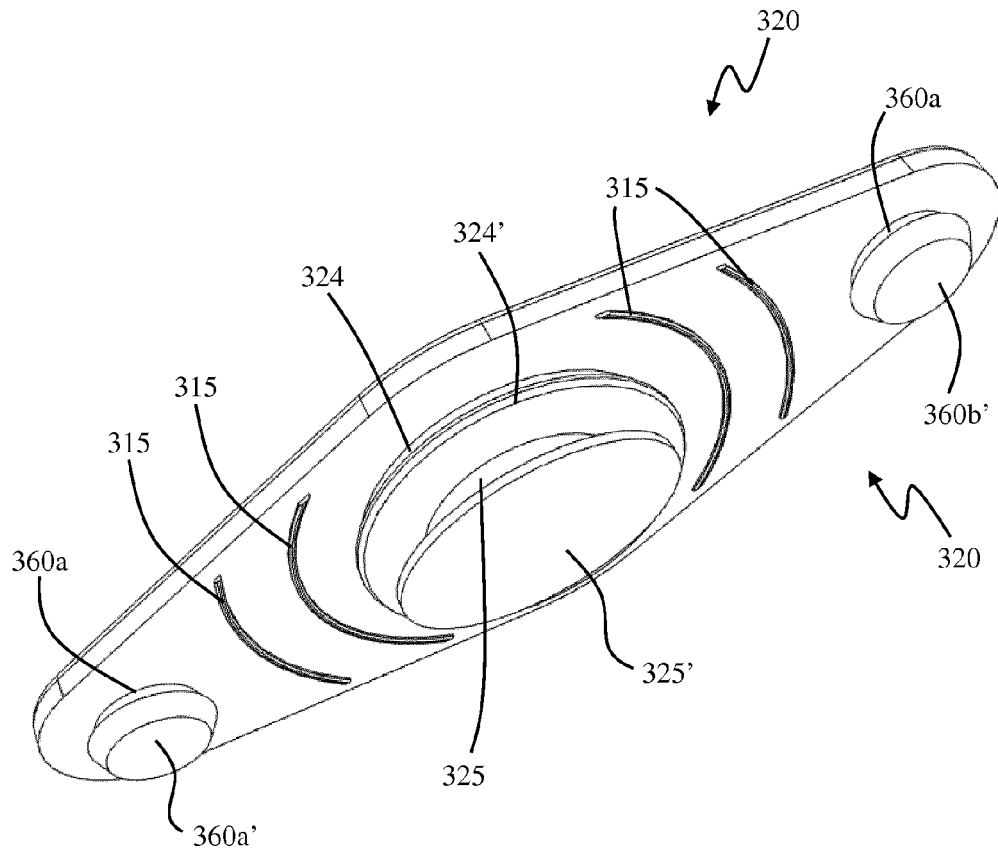


FIG. 18

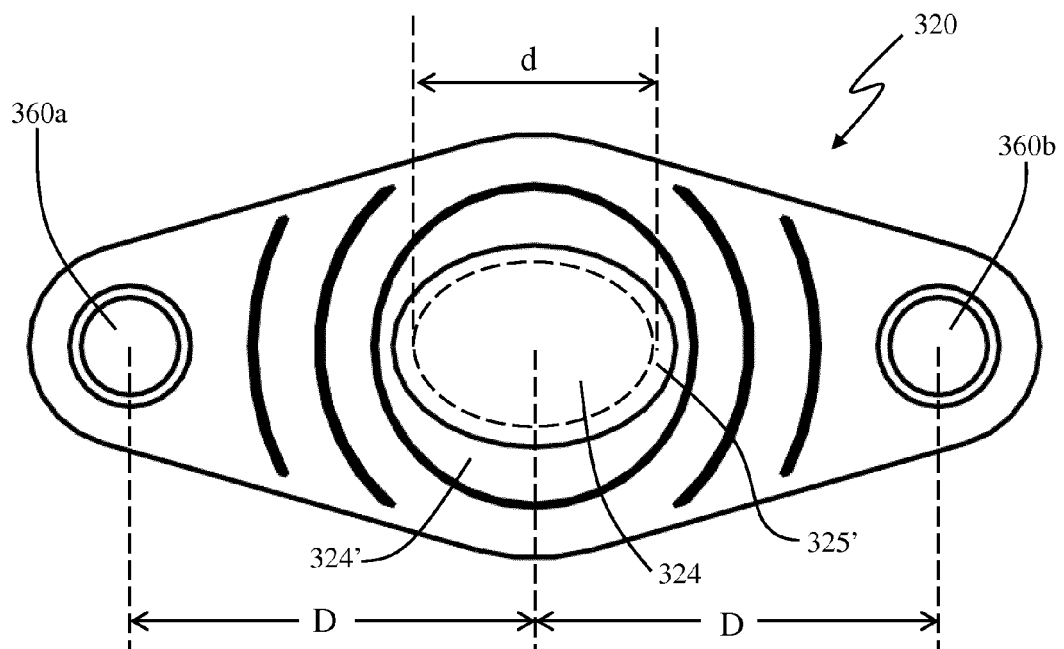


FIG. 19

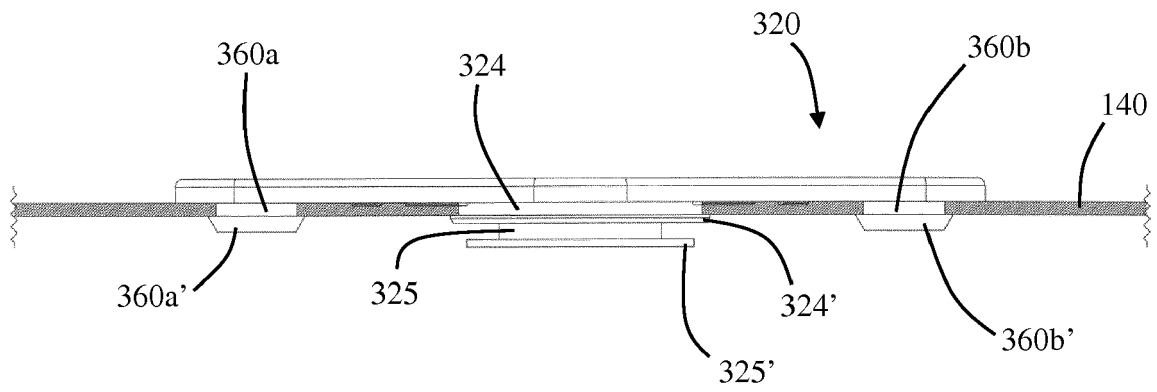


FIG. 20

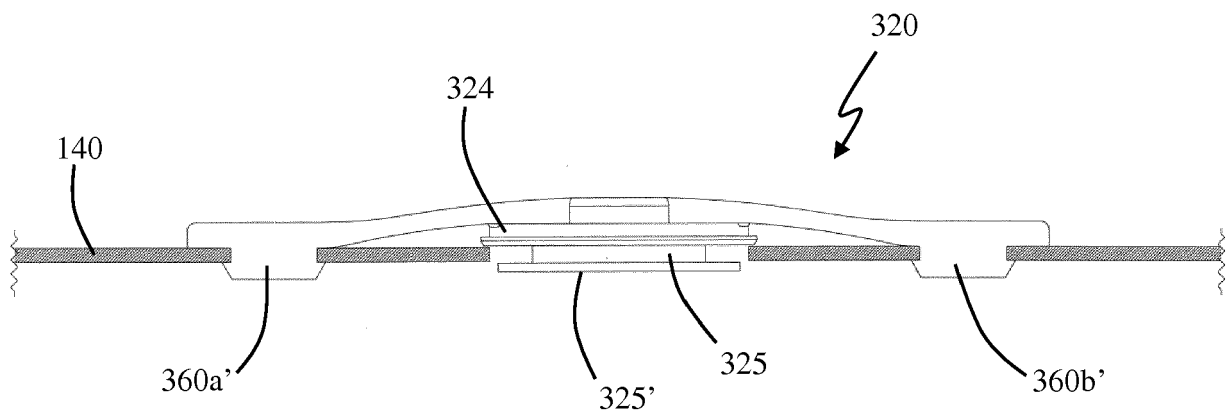


FIG. 21



EUROPEAN SEARCH REPORT

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