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(54) **SAFETY DEVICE AGAINST OVERFLOW**

SICHERHEITSVORRICHTUNG GEGEN ÜBERSCHWEMMUNG

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(56) References cited:
EP-A- 0 951 860 **DE-C- 19 841 372**

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Description

[0001] The present invention is related to a device that prevents the overflow of water out of the machine to be used in the washing machines wherein water is used as the fluid.

[0002] Overflow of water in washing machines may be caused by such factors as locating the machine in a position inclined to any direction with respect to the ground plane or the excessive amount of water taken in. In order to avoid such overflows, certain methods, such as the use of pneumatic safety fitting and floats, as well as measuring the flow-rate of the excessive take-in water have been developed. These methods are discussed below.

[0003] In the state of art, in EP 0580563 a safety device comprising a tube that is in interaction with the chassis (frame) used in the dish washers, is disclosed. Said tube is provided with an inlet at the point corresponding to the safety level of water collected in said chassis; and the pneumatic safety system is activated when water enters an air-proof chamber through said inlet, and it stops the machine. This safety device determines the water level before water rises up to the safety level and activates the light-and sound-signals. In such devices, a float which is present in the tube is activated during the interaction and one or more switches are used to determine the location of the float.

[0004] In another prior art document, EP 0951860, a device used to prevent water overflow in washing machines or dish washers, is mentioned. This device consists of a chassis at the bottom of the machine wherein water coming from the hydraulic connections are collected in order to avoid its spilling out of any component of the machine, and a float disposed in said chassis, which actuates a micro switch when it rises due to the rising water level. Said micro switch closes the inflow valve and actuates the evacuation pump, thus avoids overflow. In the claims of the referred application, the float, and a hole provided on the float are mentioned, said hole being closed by a diaphragm-shaped piece to make it water proof and the diaphragm-shaped piece activating the float by pushing it upwards. The pushing force exerted by the diaphragm-shaped piece on the float is transferred from the diaphragm-shaped piece to the float by means of a relay.

[0005] Another state of art is explained in US Patent No. 5309939 wherein a safety device for water-conducting household appliances is disclosed. Said safety device consists of a float disposed in a chamber at a distance from the liquid container and a safety level switch which operates interactively with said float. There the float acts upon the switch which in turn, turns on the evacuation pump, and when the liquid level reaches a certain level above the expected level, the inflow valve is subsequently kept closed and when the amount of liquid attains the expected level, the float turns off the evacuation pump by means of the switch.

[0006] In another prior art document, EP No. 0958777, a water level regulator used to regulate the water level in washing machines or dish washers, is disclosed. Said device consists of a float guided in the floatation chamber, connected to the auxiliary chamber of the tub of the machine. A rod provided in said auxiliary chamber, moves on the vertical axis between the two water levels of the float and actuates the lever and thus acts on the micro switch. In this case, the inflow valve is closed to avoid water inflow. The lever is driven by an independent mechanism and operates on two main points, in connection with the micro switch.

[0007] In EP 0947156, a water supply and dosing device for the washing machines or dish washers, is disclosed. Dosing is realized by measuring the level of the liquid in the water tank provided in the chassis. Said device determines the level by determining the level of the liquid in the water tank, which is characterized in that the first float prevents the liquid from being filled in the tank by means of the first contact. Said first float is disposed in a chamber inside the device, within a body with defined borders; which is in turn placed outside the tank to which it is hydraulically connected. In this way, a rise in the water level in the tank causes the rising of the first float placed in the first chamber which leads to the actuation of the switch in order to lower the water level to a predetermined level. At least a second chamber is provided in the body of said device, wherein a second float is placed to provide the activation of the micro switch by a second electrical contact. The second chamber is also connected to the water tank, hydraulically. The second float in the second chamber also rises, depending on the rising of the liquid level in the tank and consequently, when said liquid attains the predetermined second level, the second contact occurs. The second float is spherical and the second chamber, second contact and second float are used for safety purposes in case the first contact is not switched on. The threshold value required for the switching on of the second contact is at a higher level than that of the first contact.

[0008] The object of the present invention is to realize a device that avoids water from flowing over the machine, to be used in the water-conducting washing machines.

[0009] The safety device against overflow, realized in order to attain above mentioned objects of the invention has been illustrated in the attached drawings, wherein:

Figure 1, is the perspective view showing the overflow float.

Figure 2, is the perspective view from the top showing the outer float.

Figure 3, is the perspective view from below showing the outer float.

Figure 4, is the view of the outer float from below.

Figure 5, is the lateral, cross-section view of the outer float.

Figure 6, is the perspective view from the top showing the inner float.

Figure 7, is the perspective view from below showing the inner float.

Figure 8, is the view of the inner float from below.

Figure 9, is the lateral, cross-section view of the inner float.

Figure 10, is the overall view of the safety device against overflow.

Figure 11, is the cross section view of the safety device against overflow.

[0010] The components shown on the drawings have been enumerated as follows :

1. Overflow float
2. Outer float
3. Inner float
4. Float (seat) chamber
5. Outer float chamber
6. Outer float upper surface
7. Drainage outlet
8. Channel
9. Boss
10. Switch
11. Hub
12. Discharge
13. Chute
14. Overflow safety device
15. Outer float boss

[0011] With this invention, by using two or more floats nested, into one another the switch can be triggered at different times and the time required for the machine to detect the undesired amount of water is shortened by obtaining the water column in a much shorter time. Moreover, frequent calls for service are avoided by preventing the machine warnings due to momentary irregularities.

[0012] The overflow float (1) comprises an outer float (2) and an inner float (3) placed inside the outer float chamber (5).

[0013] The safety device against overflow (14) is formed by disposing the over flow float (1) into the float chamber (4) wherein one or more than one chutes (13) that ensure the transfer of the undesired water which may cause an overflow due to an excessive amount of intake water or due to the mounting of the machine in an inclined manner with respect to the ground plane, are provided on its upper section, and a triggering switch (10) is provided in said float chamber (4).

[0014] The float chamber (4) is so formed that the outer float (2) can move freely in it and it is fixed to any point in the machine in such a manner that it can rest on the bottom of the machine/chassis.

[0015] The switch (10) located in the float chamber (4) at a certain height from the bottom of said chamber (4) is actuated by the rising of the outer and inner floats (2,3) which are telescopically nested in one another or by the rising of only the inner float (3). The chutes (13) providing the transfer of the unwanted water that may lead to over-

flow, into the outer float chamber (5) are located at any point in the machine, above the float chamber said unwanted water is transferred to the outer float chamber (5) by means of the chutes (13) connected to hoses.

[0016] The inner float (3) is provided with discharges (12) and bosses (9). As the difference of the diameter is minimum between the inner (3) and outer (2) floats, they adhere to each other due to the surface tension occurring as the result of unwanted water coming from the chutes (13). The purpose of the bosses (9) and discharges (12) is to provide a space at the bottom of the inner float (3) for the passage of the unwanted water. By virtue of these spaces (gaps), unwanted water easily enters below the inner float (3) and causes it to float. In case the difference between the diameters is too much, centering of the inner float (3) will be difficult, which in turn makes the actuation of the switch (10) more difficult. Numerous discharges (12) of various shapes are provided at the regions in proximity to the side of the inner float (3) in order that unwanted water coming over the inner float (3) can easily be transferred inside the outer float chamber (5). For the same purpose, the top surface (6) of the inner float (3) is made inclined from the peak point towards the edge.

[0017] Water can easily enter the gap created by the bosses (9) between the inner float (3) and the outer float chamber (5) by means of the bosses (8) provided on the bottom of the inner float (3). In this manner, the inner float (3) can freely float inside the outer float chamber (5) without adhering to its base. A hub (11) is provided on the upper surface (6) of the inner float (3), which provides the triggering of the switch (10) by conveying the buoyancy force of the water to the switch (10).

[0018] A drainage outlet (7) is provided at the center of the outer float chamber (5) located inside the outer float (2). In case the overflow float (1) is disposed on an inclined place, the bottom surface of the outer float chamber (5) is made with a gradient at a determined angle, by the manufacturer, towards the center of the outer float chamber (5) in order to avoid the unwanted water from collecting at one side and to facilitate the drainage of the unwanted water through the drainage hole (7). Said drainage outlet (7) may also be formed by the holes arranged at certain angles on the side of the outer float chamber (5). However, the preferred embodiment is to place it in the middle of the outer float chamber (5). When the drainage outlet (7) is located at the side of the outer float chamber (5), the bottom surface of the outer float (2) can be inclined from the center towards the sides and the inner float (1) can be made in conformity with said form. The bottom of the outer float (2) is provided with channels (8) and bosses (15). Said channels (8) at the bottom of the outer float (2) are connected to the drainage hole (7) and facilitate the evacuation of water; whereas the bosses (15) prevent the adhesion of the outer float (2) to the bottom of the machine, and are used to enable the outer float (2) to rise on the vertical plane in the float chamber (4) easily. In this way, leakage, escaped water (due to system connections and potential holes) can eas-

ily enter below the overflow float (1) and contributes it buoyancy.

[0019] The inner float (3) is located in the outer float chamber (5). The chamber at the bottom of the machine serves as a pool for the outer float (2) and the outer float chamber (5) similarly serves as a pool for the inner float (3). By placing the inner float (3) inside the outer float (2), the amount of the unwanted water coming from the chutes (13) of the float chamber (4) is evaluated. The switch (10) can communicate by the rising of the inner float (3) as well as of the inner and outer floats (2,3). In cases requiring the detection of the momentary overflow in a minimum time, the switch (10) is triggered by the inner float (3). When the switch (10) is triggered, the machine may stop or transmit a fault message. One of such situations is causing water to collect, when the machine is located in an inclined manner, towards any direction, i.e. to the left, to the right, to and fro; and the other is excessive water intake.

[0020] The lateral movement of the inner float (3) located in the outer float chamber (5) is prevented by bringing the difference between the inner diameter of the outer float chamber (5) and the outer diameter of the inner float (3) to a minimum, and only the vertical, i.e. up-and down-movement of the inner float (3) within the outer float chamber (5) is allowed. Although the outer (2) and inner (3) floats can be made in various shapes, a circular shape is preferred.

[0021] The overflow float (1) operates in two ways. First, upon the collecting of leakage, escaped water (due to system connections and potential holes) in the bottom/chassis of the machine, the overflow float (1) floats and triggers the switch (10) located in the float chamber (4). As the result of this operation, a service should be called for. The second way of operation is related to the collecting of the unwanted water that may lead to an overflow, within the outer float chamber (5) which has a much smaller volume, causing the floating of only the inner float (3) to trigger the switch (10). If this happens due to momentary irregularities, service should not be called and the machine should be allowed to handle the irregularity by itself. As the floating of the inner float (3) during momentary irregularities is performed in a much shorter time, and consuming less water in comparison with the first operational mode, water collected in the bottom/chassis of the machine evaporates and is eliminated by the time.

[0022] Unwanted water, occurred due to a leakage, an escapement or as the result of a leakage and tearing on the hoses, are transferred to the overflow float (1) by means of the chutes (13) provided on the float chamber (4). By the slopes and discharges (12) formed on the top surface (6) of the inner float, unwanted water is passed to the outer float chamber (5) and by virtue of the inclined bottom surface of the latter, it is directed towards the water drainage outlet (7), to flow into the bottom of the machine.

[0023] In case the flow rate of the unwanted water

passed to the overflow float (1) by means of the chutes (13) is very little, and if it cannot be collected in the outer float chamber (5), it should be evacuated through the drainage hole (7) at the bottom, to the bottom/chassis of the machine. As the unwanted water is not collected in the outer float chamber (5), the inner float (3) does not move and consequently the switch (10) is not triggered. In this case, the amount of the water discharged to the machine chassis gains importance. Until the amount of the water discharged attains a height sufficient to activate the outer float (2), no triggering occurs. When a sufficient amount of water is collected in the chassis of the machine, the outer float (2) moves on a vertical plane inside the float chamber (4) and the triggering of a switch (10) by the hub (11) located at the top of the inner float (3) is provided.

[0024] In case the amount of water transferred to the overflow float (1) by means of the chutes (13) is more than that evacuated through the drainage hole (7) at the bottom of the outer float chamber (5), the unwanted water is collected in the outer float chamber (5), and this in turns causes the inner float (3) located in outer float chamber (5) and having a specific density smaller than that of water, to rise by moving upwards on a vertical plane and to trigger a switch (10). When water in the outer float chamber (5) is drained together with the evacuated water, this time the inner float (3) starts to move downward on the vertical plane and the triggered switch (10) is closed. These subsequent movements of the inner float on the vertical plane continue until the amount of water evacuated into the bottom, increases and activates the outer float.

[0025] The overflow float (1) may comprise an inner float (3) nested within more than one outer floats (2) of different diameters.

Claims

1. A safety device against overflow (14), having an overflow float (1) said overflow float (1), comprising an outer float (2) disposed in a float chamber (4) and a triggering switch (10) at a certain height from the bottom of the float chamber (4), **characterized in that** an inner float (3) is placed in an outer float chamber (5) of the outer float (2) and **in that** the float chamber (4) includes one or more chutes (13) on its upper section, said chutes (13) providing transfer of the unwanted water that has excessively been taken in or that has been collected as the result of leakage and which may lead to an overflow due to the inclined installation of the machine.
2. A safety device against overflow (14) according to Claim 1, **characterized** with the inner float (3) comprising a hub (11) on its upper surface, which provides the connection between the overflow float (1) and the switch (10), numerous discharges (12) of

various shapes provided at the regions in proximity to the side of the inner float (3) in order that unwanted water coming over the inner float (3) can easily be transferred to the outer float chamber (5), bosses (9) of various shapes and number, provided on the bottom of the inner float (3) by means of which water can easily enter the gap created by the bosses between the inner float (3) and the outer float chamber (5) so that the inner float (3) can freely float inside the outer float chamber (5) without adhering to its base, and a top surface (6) inclined from the peak point towards the edge.

3. A safety device against overflow (14) according to Claim 1 or 2, **characterized** with the outer float (2) comprising at the bottom, bosses (15) that prevent the adhesion of the outer float (2) to the bottom of the machine, and are used to enable the outer float (2) to rise on the vertical plane in the float chamber (4) easily, channels (8) that facilitate the evacuation of water and a drainage hole (7) at the center, for the drainage of unwanted water.
4. A safety device against overflow (14) according to Claim 1 to 3, **characterized** with the outer float chamber (5), the bottom surface of which is inclined with an angle, from the sides towards the drainage hole (7), at the center.
5. A safety device against overflow (14) according to Claim 1 to 3, **characterized** with the outer float chamber (5), the bottom surface of which is inclined with an angle, from the center towards the edges.
6. A safety device against overflow (14) according to Claim 5, **characterized** with the outer float chamber (5) with holes arranged at certain angles at the regions close to the edges.
7. A safety device against overflow (14) according to Claims 1-6, **characterized** with the overflow float (1) having an inner float (3) nested within more than one outer floats (2) of different diameters.

Patentansprüche

1. Sicherungseinrichtung gegen Überlauf (14) mit einem Überlaufschwimmer (1), wobei der Überlaufschwimmer (1) einen äußeren Schwimmer (2), der in einer Schwimmkammer (4) angeordnet ist, und einen Auslöseschalter (10) in einer bestimmten Höhe über dem Boden der Schwimmkammer (4) umfasst, **dadurch gekennzeichnet, dass** ein innerer Schwimmer (3) in einer äußeren Schwimmkammer (5) des äußeren Schwimmers (2) angeordnet ist, und dass die Schwimmkammer (4) in ihrem oberen Bereich eine oder mehrere Rinnen (13) aufweist,

wobei die Rinnen (13) eine Übertragung des unerwünschten Wassers vorsehen, das in zu großer Menge aufgenommen wurde, oder das sich aufgrund eines Lecks gesammelt hat, und das aufgrund der geneigten Installation der Maschine zu einem Überlaufen führen kann.

2. Sicherungseinrichtung gegen Überlauf (14) nach Anspruch 1, **dadurch gekennzeichnet, dass** der innere Schwimmer (3) an seiner Oberfläche eine Nabe (11) umfasst, die die Verbindung zwischen dem Überlaufschwimmer (1) und dem Schalter (10) bereitstellt, sowie eine Vielzahl von Auslässen (12) unterschiedlicher Form, die in den Regionen in der Nähe der Seite des inneren Schwimmers (3) vorgesehen sind, damit unerwünschtes Wasser, das über den inneren Schwimmer (3) gelangt, leicht in die äußere Schwimmkammer (5) übertragen werden kann, Nocken (9) unterschiedlicher Form und Anzahl, die am Boden des inneren Schwimmers (3) vorgesehen sind, und durch die Wasser leicht in den Spalt gelangen kann, der durch die Nocken zwischen dem inneren Schwimmer (3) und der äußeren Schwimmkammer (5) erzeugt werden, so dass der innere Schwimmer (3) frei in der äußeren Schwimmkammer (5) schwimmen kann, ohne an ihrem Boden anzuhängen, sowie eine Oberfläche (6), die von der Spitze zur Kante hin geneigt ist.

3. Sicherungseinrichtung gegen Überlauf (14) nach Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** der äußere Schwimmer (2) einen Boden umfasst, sowie Nocken (15), die das Anhaften des äußeren Schwimmers (2) am Boden der Maschine verhindern, und dazu dienen, es dem äußeren Schwimmer (2) zu ermöglichen, leicht in vertikaler Ebene in der Schwimmkammer (4) anzusteigen, Kanäle (8), die das Ablassen des Wassers unterstützen, und eine Dränöffnung (7) in der Mitte zum Ablassen unerwünschten Wassers.

4. Sicherungseinrichtung gegen Überlauf (14) nach Anspruch 1 bis 3, **dadurch gekennzeichnet, dass** die Bodenfläche der äußeren Schwimmkammer (5) mit einem Winkel von den Seiten zu der Dränöffnung (7) in der Mitte hin geneigt ist.

5. Sicherungseinrichtung gegen Überlauf (14) nach Anspruch 1 bis 3, dass die Bodenfläche der äußeren Schwimmkammer (5) mit einem Winkel von der Mitte zu den Kanten hin geneigt ist.

6. Sicherungseinrichtung gegen Überlauf (14) nach Anspruch 5, **dadurch gekennzeichnet, dass** die äußere Schwimmkammer (5) in den Regionen in der Nähe der Kanten Öffnungen aufweist, die in bestimmten Winkeln angeordnet sind.

7. Sicherungseinrichtung gegen Überlauf (14) nach Anspruch 1 bis 6, **dadurch gekennzeichnet, dass** der Überlaufschwimmer (1) einen inneren Schwimmer (3) aufweist, der verschachtelt in mehreren äußeren Schwimmern (2) unterschiedlichen Durchmessers angeordnet ist.

Revendications

1. Système de sécurité contre le débordement (14) ayant un flotteur de débordement (1), ledit flotteur de débordement (1) comprenant un flotteur extérieur (2) disposé dans une chambre de flotteur (4) et un interrupteur déclenchant (10) à une certaine hauteur à partir du bas de la chambre de flotteur (4), **caractérisé en ce qu'un** flotteur intérieur (3) soit placé dans une chambre extérieure de flotteur (5) du flotteur extérieur (2) et **en ce que** la chambre de flotteur (4) contienne un ou plusieurs toboggans (13) sur sa partie supérieure, lesdits toboggans (13) assurant la transmission de l'eau non désirée qui y aurait été prise excessivement ou qui y aurait été collectée en conséquence d'une fuite et qui pourrait donc conduire à un débordement à cause de l'installation inclinée de la machine.
2. Système de sécurité contre le débordement (14) selon la Revendication 1, **caractérisé par** un flotteur intérieur (3) comprenant un moyeu (11) sur sa surface supérieure, qui assure la connexion entre le flotteur de débordement (1) et l'interrupteur (10), de nombreuses décharges (12) de diverses formes produites dans les régions à proximité du bord du flotteur intérieur (3) de façon à ce que l'eau non désirée débordant le flotteur intérieur (3) puisse facilement être transmise à la chambre extérieure de flotteur (5), des bosses (9) de diverses formes et de divers nombres produites au-dessus du flotteur intérieur (3), à l'aide desquelles l'eau peut facilement entrer dans le trou créé par les bosses entre le flotteur intérieur (3) et la chambre extérieure de flotteur (5), et par conséquent, le flotteur intérieur (3) peut librement flotter dans la chambre extérieure de flotteur (5) sans coller à sa base, et une surface supérieure (6) inclinée au point culminant vers le bord.
3. Système de sécurité contre le débordement (14) selon la Revendication 1 ou 2, **caractérisé par** le flotteur extérieur (2) comprenant en dessus des bosses (15) qui empêchent l'adhésion du flotteur extérieur (2) au bas de la machine et qui sont utilisées pour activer le flotteur extérieur (2) à monter facilement au plan vertical dans la chambre de flotteur (4), des canaux (8) qui facilitent l'évacuation de l'eau et un trou de drainage (7) au centre pour le drainage de l'eau non désirée.

4. Système de sécurité contre le débordement (14) selon les Revendications de 1 à 3, **caractérisé par** la chambre extérieure de flotteur (5), la surface supérieure de laquelle étant inclinée sur ses côtés avec un angle vers le trou de drainage (7) au centre.
5. Système de sécurité contre le débordement (14) selon les Revendications de 1 à 3, **caractérisé par** la chambre extérieure de flotteur (5), la surface supérieure de laquelle étant inclinée avec un angle sur le centre vers les bords.
6. Système de sécurité contre le débordement (14) selon la Revendication 5, **caractérisé par** la chambre extérieure de flotteur (5) avec des trous arrangés à certains trous aux régions proches des bords.
7. Système de sécurité contre le débordement (14) selon les Revendications de 1 à 6, **caractérisé par** le flotteur de débordement (1) ayant un flotteur intérieur (3) niché dedans avec plusieurs flotteurs extérieurs (2) de différents diamètres.

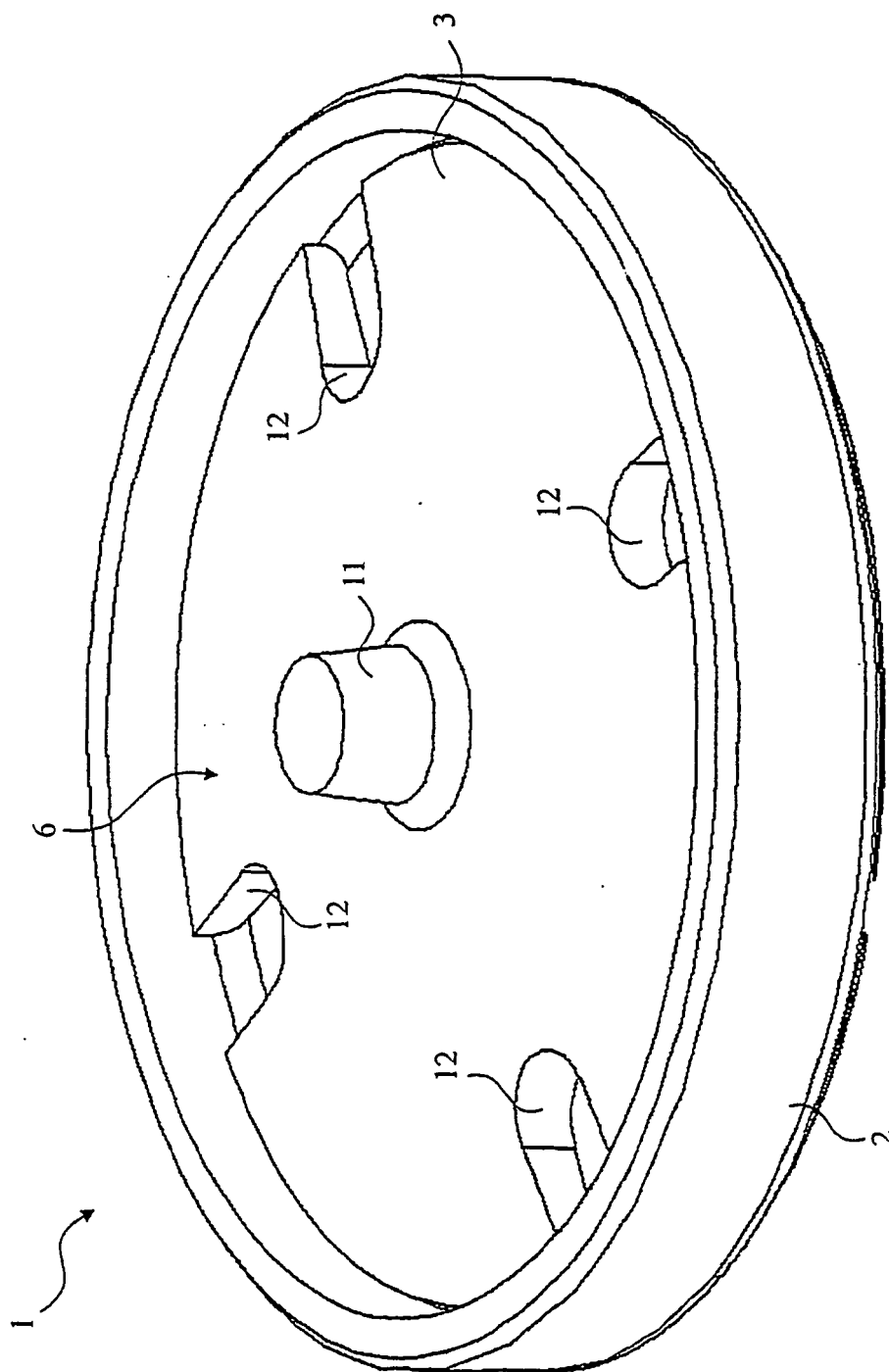


Figure 1

Figure 2

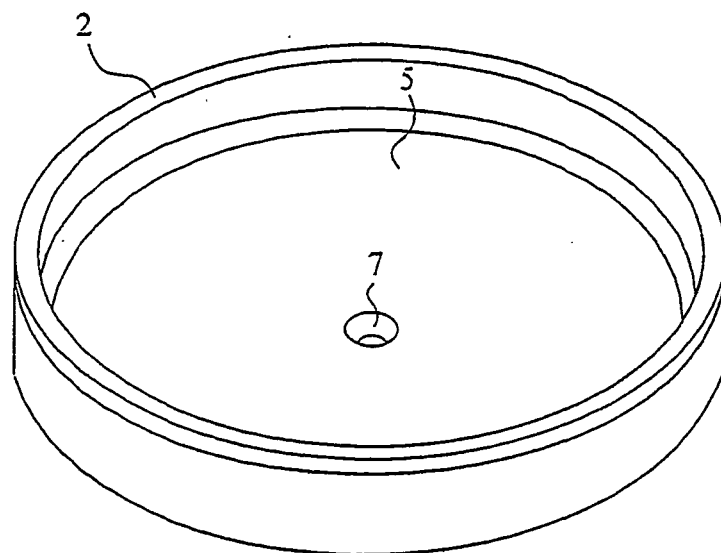


Figure 3

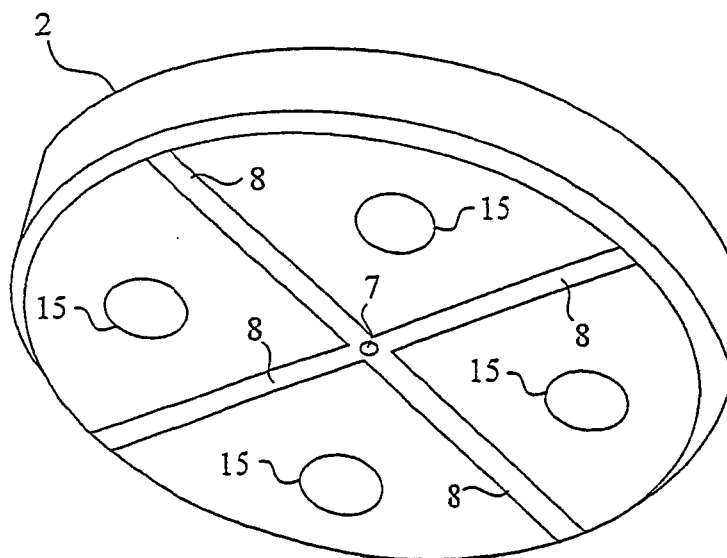


Figure 4

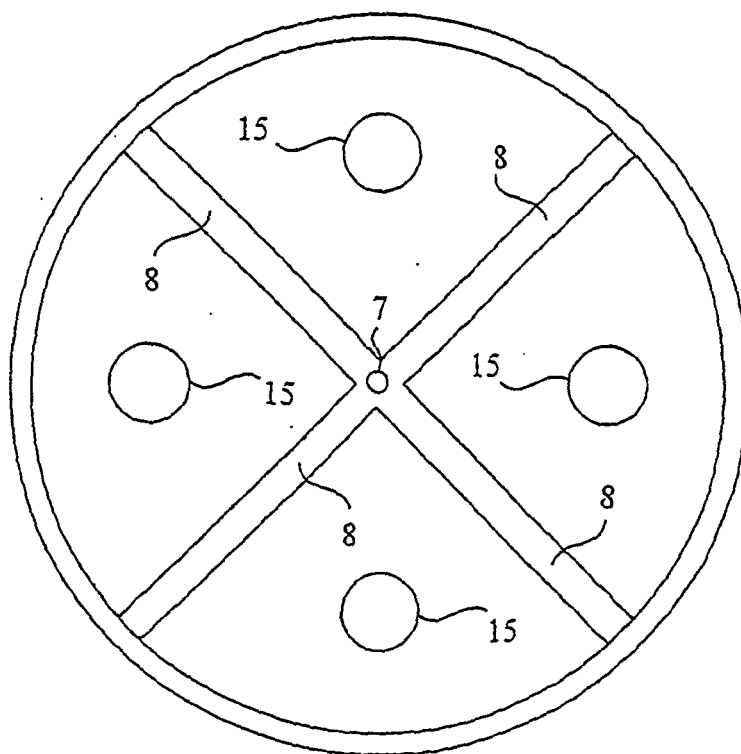


Figure 5

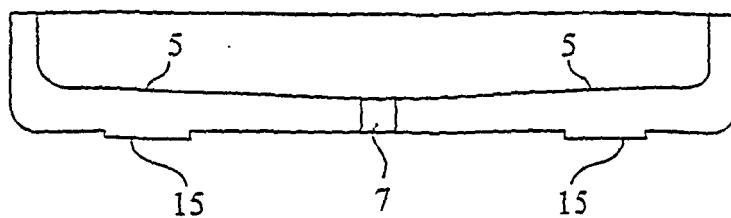


Figure 6

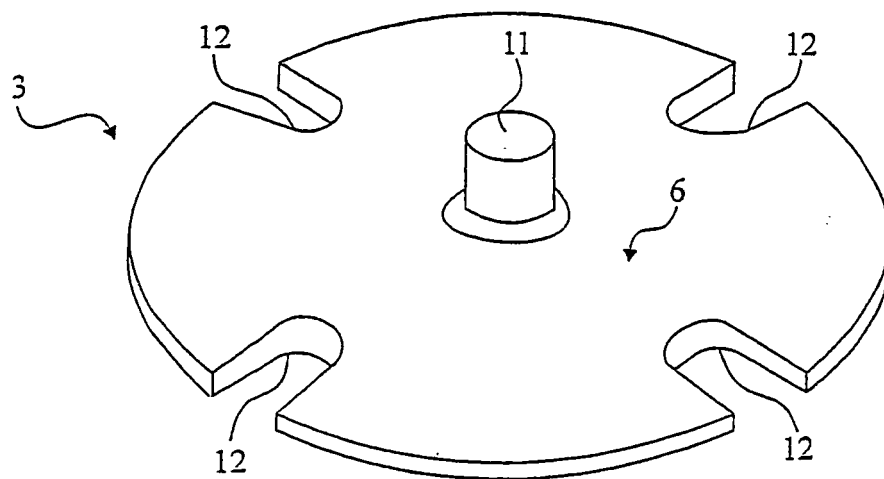


Figure 7

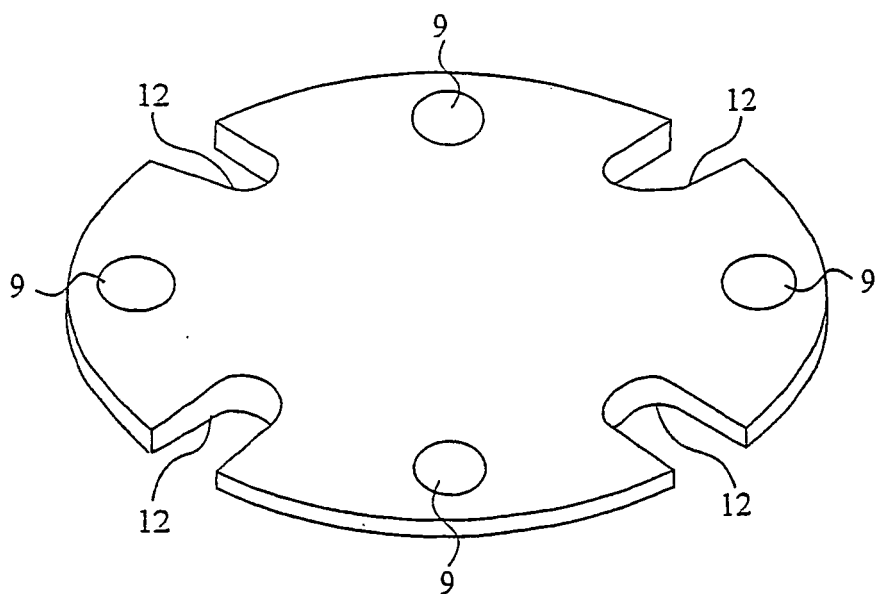


Figure 8

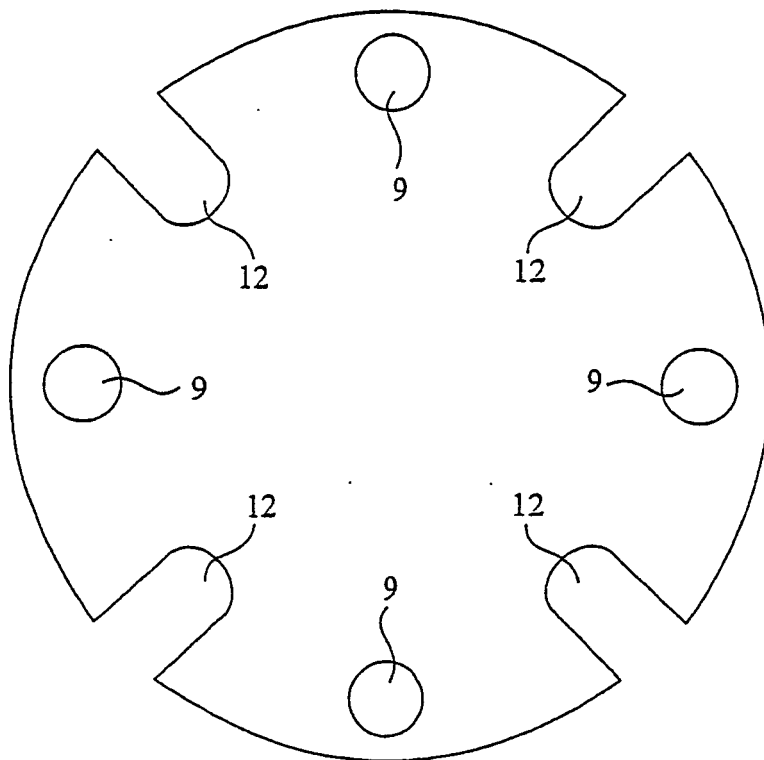
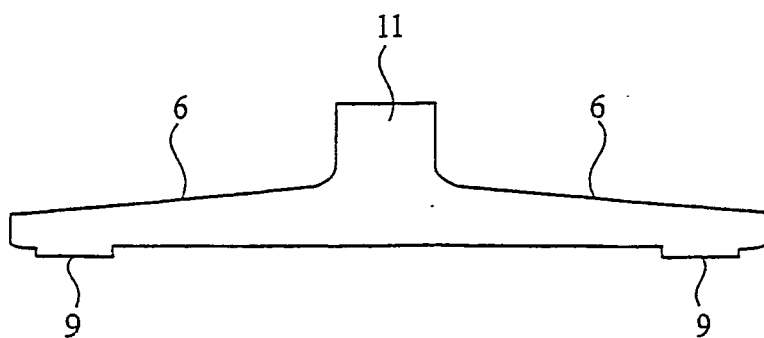


Figure 9



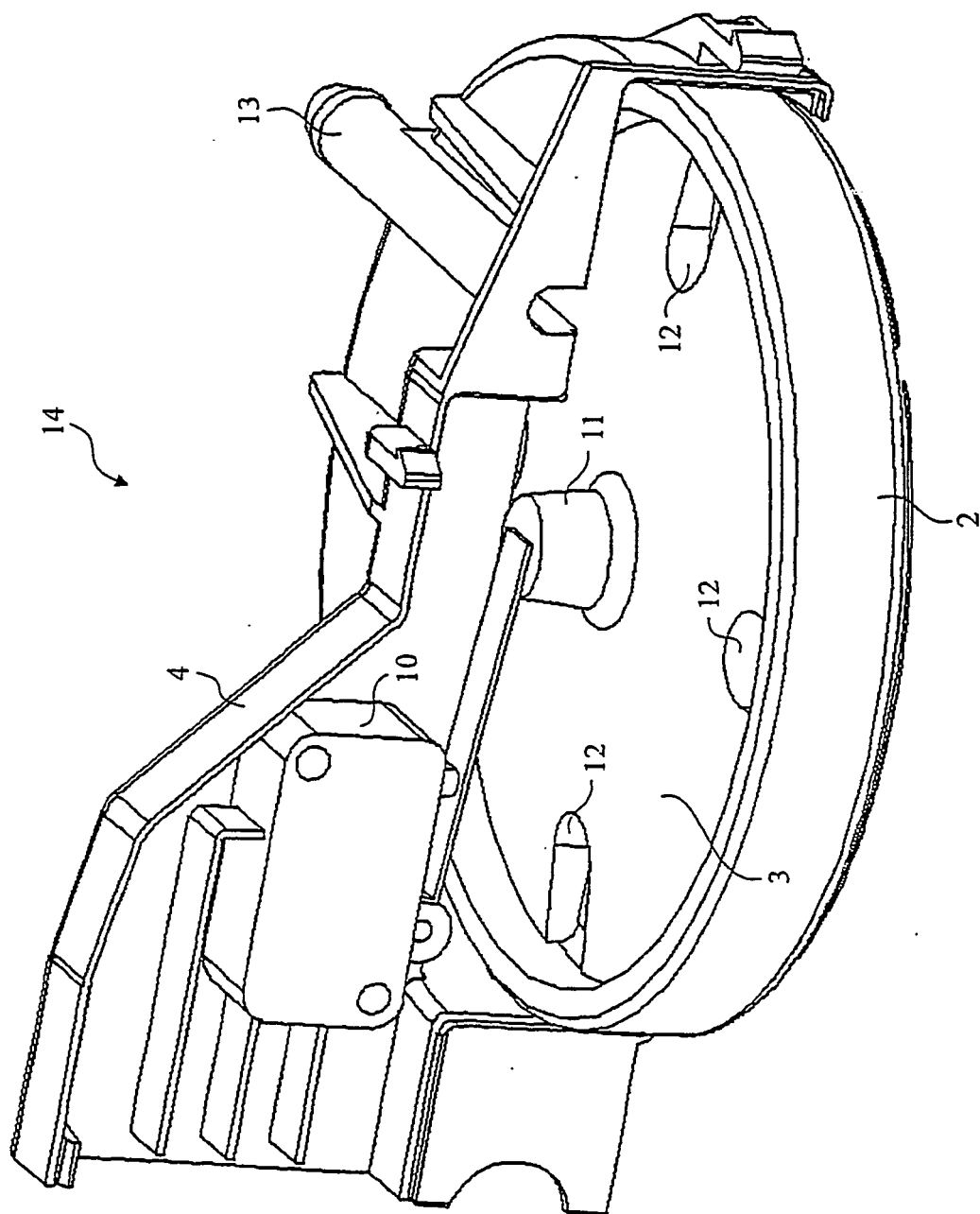


Figure 10

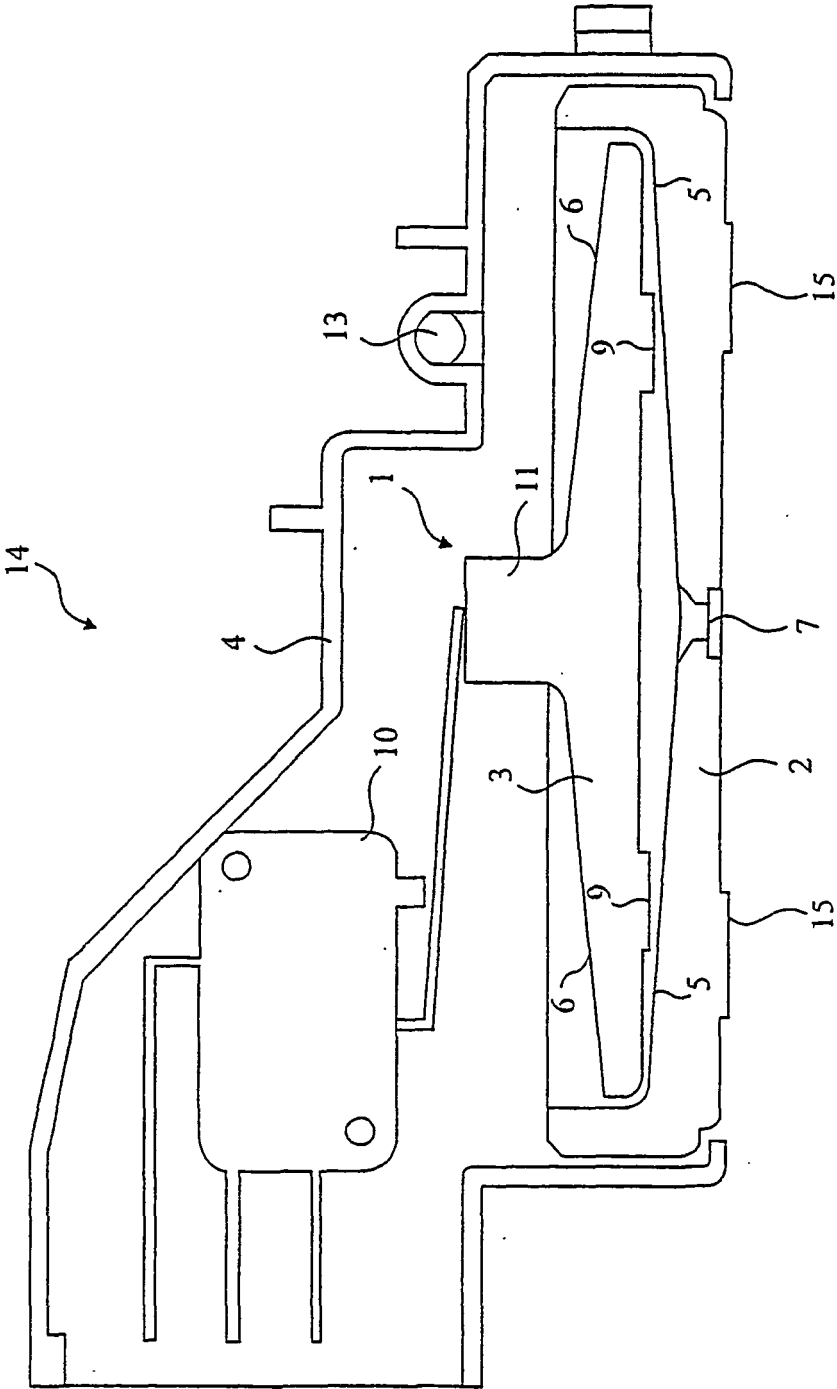


Figure 11

REFERENCES CITED IN THE DESCRIPTION

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