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(54) **A COOLING DEVICE COMPRISING AN EVAPORATION TRAY**

EINE VERDUNSTUNGSSCHALE UMFASSENDE KÜHLVORRICHTUNG

DISPOSITIF DE REFROIDISSEMENT COMPRENANT UN PLATEAU D'ÉVAPORATION

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Description

[0001] The present invention relates to a cooling device comprising an evaporation tray that enables evaporation of the defrost water. In cooling devices, for example refrigerators or freezers, the defrost process is performed in order to defrost the frost formed on the refrigeration system. In the defrost process, a container named as the evaporation tray is used wherein the melted water is collected and evaporated. In state of the art embodiments, the evaporation tray is placed on the compressor to provide energy saving and the water inside the evaporation tray is enabled to be evaporated by using the heat generated by the compressor while operating. In this embodiment, the evaporation tray is seated on the compressor so that the evaporation efficiency is high and the evaporation tray is agitated by being affected by the vibrations generated during the operation of the compressor. The evaporation tray that is agitated non-resonantly with respect to the compressor causes unwanted rattling by contacting the compressor. The total noise level of the cooling device increases when the oscillations of the compressor and the vibrations of the evaporation tray are in resonance. At the same time, compressors in different sizes are used in cooling devices in different sizes and the same evaporation tray cannot be used for compressor casings in different sizes since the evaporation tray is seated on the surface of the compressor. This situation necessitates the production of evaporation trays suitable for compressors in different sizes and causes increase in production costs.

[0002] In the Patent Application No. WO2010055076, a cooling device having an evaporation tray is disclosed, which is suitable to be mounted to different types of compressors.

[0003] In the Patent Application No. EP2159520, a cooling device is disclosed comprising an evaporation tray having a flexible base.

[0004] German Utility Model DE 84 37 286 U1 discloses a compressor on top of which an evaporator tray is mounted. A shaft extends vertically upwards from the casing of the compressor with its end projecting through an opening in the tray, wherein a leaf spring is arranged between the end of the shaft and the upper side of the tray and presses the tray down towards the compressor.

[0005] British Patent GB 1 376 953 discloses a similar arrangement in which an evaporator tray is pressed towards a compressor by a nut, a protective washer, and a sealing washer that are arranged at the end of a stud which extends from the compressor through the bottom of the tray.

[0006] The aim of the present invention is the realization of a cooling device that comprises a single type of evaporation tray that is suitable to be utilized with different types of compressors and wherein the total noise level is decreased.

[0007] The cooling device realized in order to attain the aim of the present invention is disclosed in the inde-

pendent claim 1.

[0008] In the cooling device of the present invention, the noise level is prevented from increasing by transferring the oscillations generated while the compressor operates to the evaporation tray. Furthermore, the distance of the evaporation tray to the casing can be adjusted as desired by means of the nut and the evaporation tray is enabled to be used on compressors in different sizes.

[0009] In an embodiment of the present invention, the shaft is mounted to the casing by screws without requiring changes in the production molds. By means of the shaft screwed to the screw hole bored on the casing, connection is provided for compressors in any size.

[0010] In an embodiment of the present invention, the connection is maintained by adhering the shaft on the casing. In this embodiment, the shaft is mounted without making alterations in the available products and thus the noise level is decreased.

[0011] In an embodiment of the present invention, the shaft is produced with the casing as a single piece. By means of this embodiment, the number of parts used is decreased and the noise generated at joints of the parts is prevented.

[0012] In an embodiment of the present invention, a sealing member is used in order to prevent water from leaking between the shaft and the opening. Thus, the compressor is prevented from malfunctioning due to the water leaking through the opening - shaft cavity when the amount of condensed water increases.

[0013] In an embodiment of the present invention, a second spring is used, that is fitted over the shaft, situated between the opening and the nut, in order to prevent the vibrations transmitted by the shaft to the evaporation tray by means of the nut. By means of this embodiment, the vibrations generated by the compressor while operating are dampened by the first spring and the second spring, and the noise level is decreased.

[0014] By means of the present invention, the casing is joined with the evaporation tray by a suspension-like method and the compressor vibrations are prevented from being transferred to the evaporation tray. Furthermore, by adjusting the compression rate of the first spring by the nut, the evaporation tray is mounted to compressors in different sizes.

[0015] The cooling device realized in order to attain the aim of the present invention is illustrated in the attached figures, where:

Figure 1 - is the sideways schematic view of a cooling device.

Figure 2 - is the exploded view of the casing and the evaporation tray related to an embodiment.

Figure 3 - is the exploded view of the casing and the evaporation tray related to another embodiment.

Figure 4 - is the exploded view of the casing and the evaporation tray related to an embodiment of the present invention.

Figure 5 - is the perspective view of the casing and

the evaporation tray related to an embodiment of the present invention.

Figure 6 - is the perspective view of the casing and the evaporation tray related to another embodiment of the present invention.

[0016] The elements illustrated in the figures are numbered as follows:

1. Cooling device
2. Body
3. Compressor
4. Casing
5. Evaporation tray
6. Shaft
7. First spring
8. Opening
9. Nut
10. Sealing member
11. Second spring

[0017] The cooling device (1) comprises a body (2), a compressor (3) that is situated inside the body (2), that performs the refrigeration cycle and that has a casing (4) covering the compressor (3), and an evaporation tray (5) that is disposed on the casing (4) and where to the water condensed on the evaporator (not shown in the figures) is transferred.

[0018] In the cooling device (1), the water condensed on the evaporator after the defrost process is collected in the evaporation tray (5) that is disposed on the casing (4). The heat generated while the compressor (3) operates is transferred to the evaporation tray (5), enabling the water therein to be evaporated.

[0019] The cooling device (1) of the present invention comprises a shaft (6) in form of an upright member that extends upwards vertically from the upper surface of the casing (4), a first spring (7) that is mounted by fitting around the shaft (6), an evaporation tray (5) that has an opening (8) through which the shaft (6) passes, and a nut (9) that is screwed to the end portion of the shaft (6) and that enables the first spring (7) to be compressed by applying pressure on the opening (8). In the cooling device (1) of the present invention, the first spring (7) is mounted over the shaft (6) and the evaporation tray (5) is seated on the casing (4) by passing the shaft (6) through the opening (8). The first spring (7) is compressed by the nut (9) that is screwed to the screw threads formed on the upper end of the shaft (6) and the evaporation tray (5) is fixed to the casing (4). The vibrations generated while the compressor (3) operates are enabled to be dampened by the first spring (7). Furthermore, the evaporation tray (5) is enabled to be used with compressors (3) in different sizes by adjusting the compression rate of the first spring (7) by means of the nut (9).

[0020] In an embodiment of the present invention, the shaft (6) is fixed on the casing (4) by means of screws. In this embodiment, screw threads are formed on the

lower end of the shaft (6) and the shaft (6) is screwed into the screw hole bored on the casing (4).

[0021] In an embodiment of the present invention, the shaft (6) is fixed on the casing (4) by means of adhesion. By means of this embodiment, it is not required to make alterations on the casing (4) and the shaft (6) is enabled to be used with compressors (3) in any size.

[0022] In an embodiment of the present invention, the shaft (6) is produced as a single piece with the casing (4). In this embodiment, the noise originating from joining the casing (4) with the shaft (6) is prevented and furthermore strength is increased.

[0023] In an embodiment of the present invention, the cooling device (1) comprises a sealing member (10) that provides leak-proofing between the shaft (6) and the opening (8). In this embodiment, water is prevented from leaking from the cavity between the shaft (6) and the opening (8) and from damaging the compressor (3) when a large amount of water is collected in the evaporation tray (5).

[0024] In an embodiment of the present invention, the cooling device (1) comprises a second spring (11) that is situated between the nut (9) and the opening (8) and that applies pressure on the evaporation tray (5) from above by being fitted over the shaft (6). The vibrations generated while the compressor (3) operates which are transmitted to the evaporation tray (5) by the casing (4) are dampened by the first spring (7), the vibrations transmitted through the shaft (6) when the nut (9) contacts the opening (8) are dampened by the second spring (11).

[0025] In an embodiment of the present invention, the nut (9) can be a flange nut or a cap nut/a flat cap nut.

[0026] In the cooling device (1) of the present invention, the compressor (3) vibrations are dampened by the first spring (7) before being transmitted to the evaporation tray (5) and the total noise level is decreased by preventing the evaporation tray (5) from vibrating/shaking. A uniform evaporation tray (5) that can be used in compressors (3) in different sizes is realized by means of the shaft (6) and the opening (8).

Claims

1. A cooling device (1) comprising

- a body (2),
- a compressor (3) that is situated inside the body (2), that performs the refrigeration cycle and that has a casing (4) covering the compressor (3),
- an evaporation tray (5) that is disposed on the casing (4) and where to the water condensed on the evaporator is transferred,
- a shaft (6) in form of an upright member that extends upwards vertically from the upper surface of the casing (4),
- a first spring (7) that is mounted by fitting around the shaft (6),

- an evaporation tray (5) that has an opening (8) through which the shaft (6) passes,

characterized in that

- the first spring (7) is arranged between the casing (4) and the evaporation tray (5)
 - a nut (9) is screwed to the end portion of the shaft (6) and enables the first spring (7) to be compressed by applying pressure on the opening (8).
2. A cooling device (1) as in Claim 1, **characterized in that** the shaft (6) is fixed on the casing (4) by means of screws.
 3. A cooling device (1) as in Claim 1, **characterized in that** the shaft (6) is adhered on the casing (4).
 4. A cooling device (1) as in Claim 1, **characterized in that** the shaft (6) is produced as a single piece with the casing (4).
 5. A cooling device (1) as in any one of the above claims, **characterized by** a sealing member (10) that provides leak-proofing between the shaft (6) and the opening (8).
 6. A cooling device (1) as in any one of the above claims, **characterized by** a second spring (11) that is situated between the nut (9) and the opening (8) and that applies pressure on the evaporation tray (5) from above by being fitted over the shaft (6).

Patentansprüche

1. Kühlvorrichtung (1) umfassend

- einen Körper (2),
- einen Kompressor (3), der sich innerhalb des Körpers (2), der den Kältekreislauf ausführt und ein Gehäuse (4) aufweist, das den Kompressor (3) abdeckt,
- eine Verdunstungsschale (5), die an dem Gehäuse (4) angeordnet ist und zu der das an dem Verdampfer kondensierte Wasser übertragen wird,
- eine Welle (6) in Form eines aufrechten Elementes, das sich vertikal von der oberen Fläche des Gehäuses (4) nach oben erstreckt,
- eine erste Feder (7), die durch Einpassen um die Welle (6) montiert wird,
- eine Verdunstungsschale (5), die eine Öffnung (8) aufweist, durch die die Welle (6) einpasst,

dadurch gekennzeichnet, dass

- eine erste Feder (7) zwischen dem Gehäuse (4) und der Verdunstungsschale (5) angeordnet ist,
- eine Mutter (9) mit dem Endabschnitt der Welle (6) verschraubt ist und das Zusammendrücken der ersten Feder (7) durch Druck auf die Öffnung (8) ermöglicht.

2. Eine Kühlvorrichtung (1) nach Anspruch 1, **dadurch gekennzeichnet, dass** die Welle (6) an dem Gehäuse (4) mittels Schrauben befestigt ist.
3. Eine Kühlvorrichtung (1) nach Anspruch 1, **dadurch gekennzeichnet, dass** die Welle (6) an dem Gehäuse (4) angeklebt ist.
4. Eine Kühlvorrichtung (1) nach Anspruch 1, **dadurch gekennzeichnet, dass** die Welle (6) zusammen mit dem Gehäuse (4) einstückig hergestellt ist.
5. Eine Kühlvorrichtung (1) nach einem der vorangehenden Ansprüche, **gekennzeichnet durch** ein Dichtungselement (10), das eine Dichtigkeit zwischen der Welle (6) und der Öffnung (8) bereitstellt.
6. Eine Kühlvorrichtung (1) nach einem der vorangehenden Ansprüche, **gekennzeichnet durch** eine zweite Feder (11), die sich zwischen der Mutter (9) und der Öffnung (8) befindet und die durch Einpassen über die Welle (6) von oben auf die Verdunstungsschale (5) Druck ausübt.

Revendications

1. Dispositif de refroidissement (1) comprenant:

- un corps (2),
- un compresseur (3) situé à l'intérieur du corps (2), qui effectue le cycle de réfrigération et qui comporte un boîtier (4) recouvrant le compresseur (3),
- un plateau d'évaporation (5) qui est disposé sur le boîtier (4) et auquel l'eau condensée sur l'évaporateur est transférée,
- un arbre (6) en forme d'un élément vertical qui s'étend verticalement vers le haut à partir de la surface supérieure du boîtier (4),
- un premier ressort (7) qui est monté par ajustement autour de l'arbre (6),
- un plateau d'évaporation (5) qui présente une ouverture (8) à travers laquelle passe l'arbre (6),

caractérisé en ce que

- le premier ressort (7) est disposé entre le boîtier (4) et le plateau d'évaporation (5)
- un écrou (9) est vissé sur la partie d'extrémité

de l'arbre (6) et permet de comprimer le premier ressort (7) en appliquant une pression sur l'ouverture (8).

2. Dispositif de refroidissement (1) selon la revendication 1, **caractérisé en ce que** l'arbre (6) est fixé sur le boîtier (4) au moyen de vis. 5
3. Dispositif de refroidissement (1) selon la revendication 1, **caractérisé en ce que** l'arbre (6) est collé sur le boîtier (4). 10
4. Dispositif de refroidissement (1) selon la revendication 1, **caractérisé en ce que** l'arbre (6) est réalisé d'une seule pièce avec le boîtier (4). 15
5. Dispositif de refroidissement (1) selon l'une quelconque des revendications précédentes, **caractérisé par** un élément d'étanchéité (10) qui assure l'étanchéité entre l'arbre (6) et l'ouverture (8). 20
6. Dispositif de refroidissement (1) selon l'une quelconque des revendications précédentes, **caractérisé par** un second ressort (11) qui est situé entre l'écrou (9) et l'ouverture (8) et qui exerce une pression sur le plateau d'évaporation (5) ci-dessus en étant monté sur l'arbre (6). 25

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Figure 1

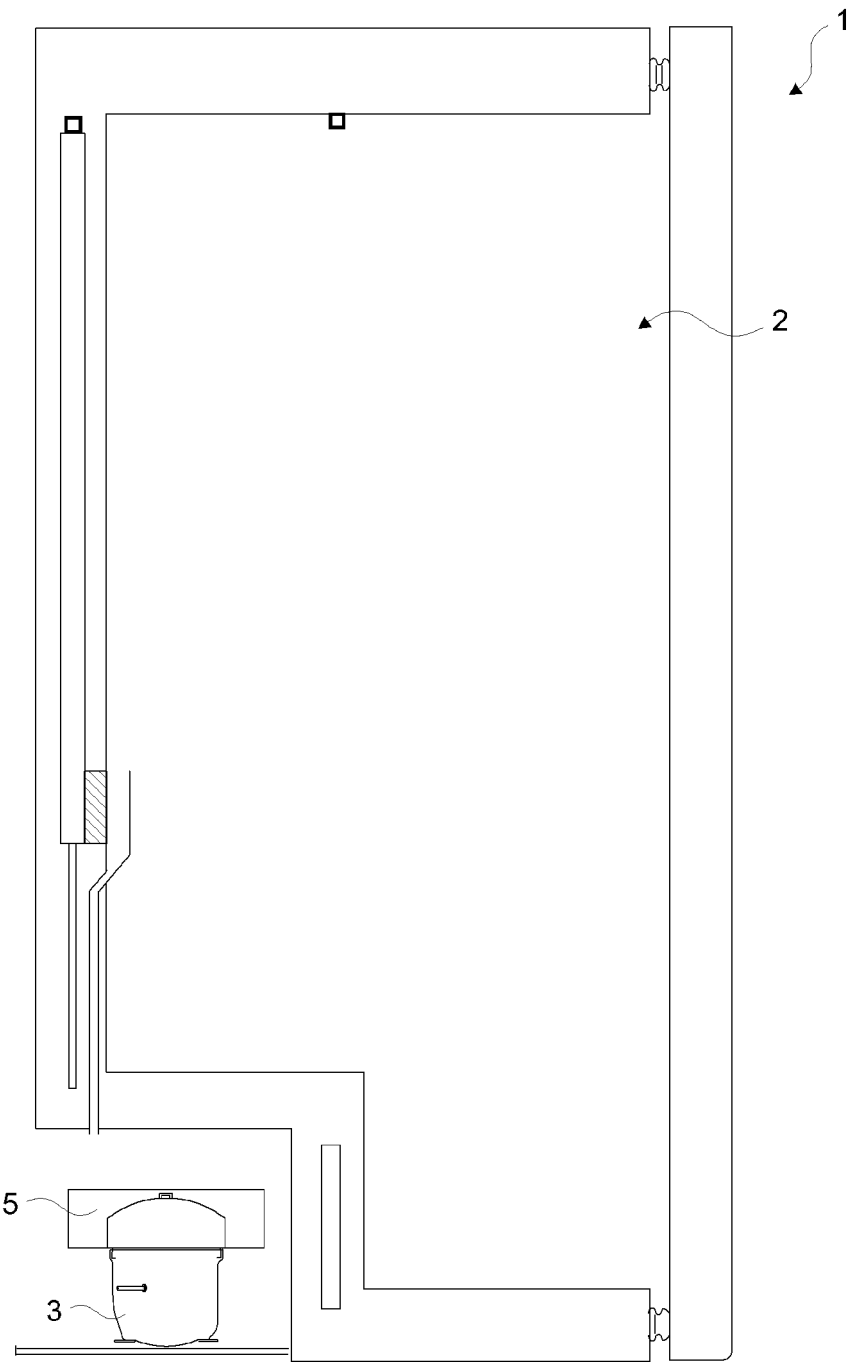


Figure 2

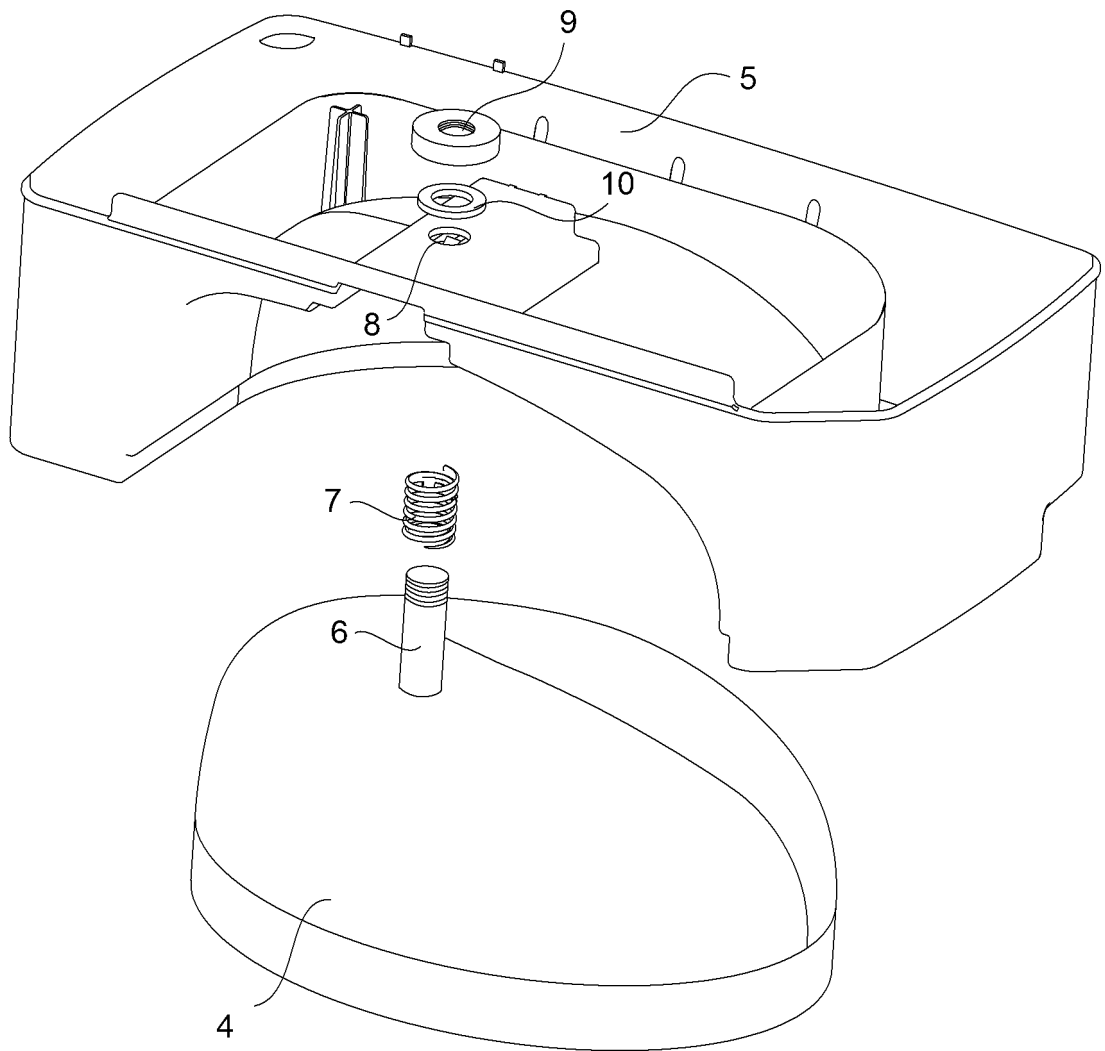


Figure 3

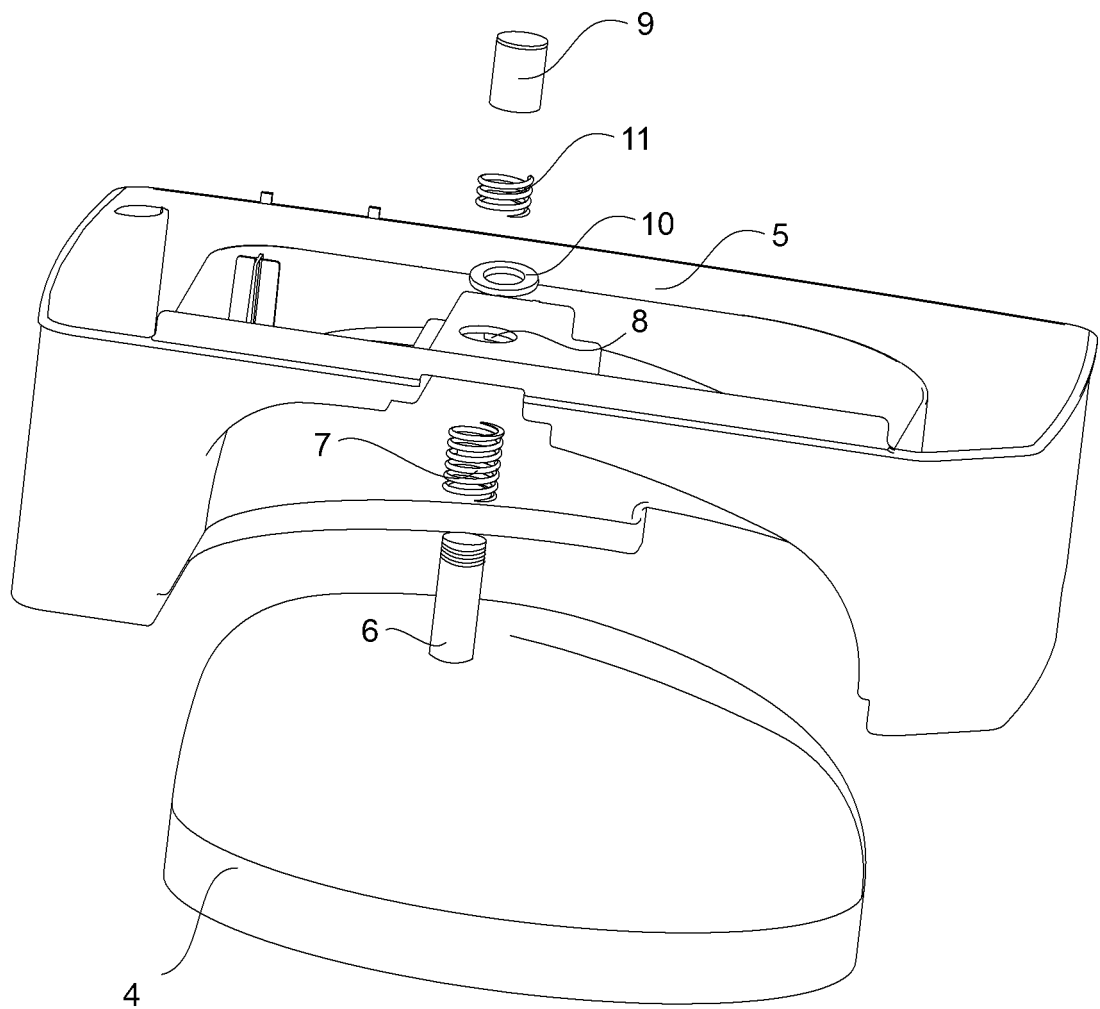


Figure 4

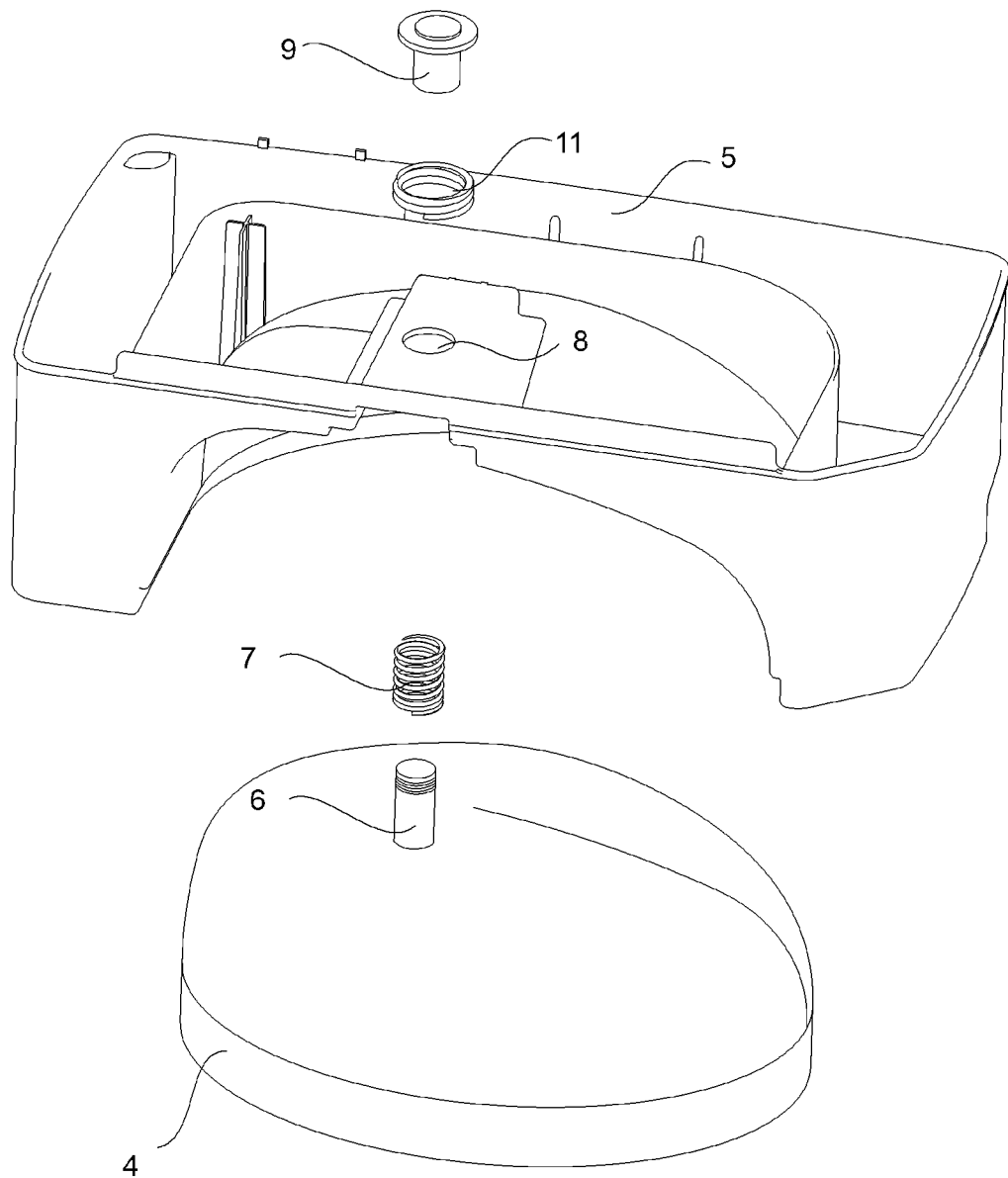


Figure 5

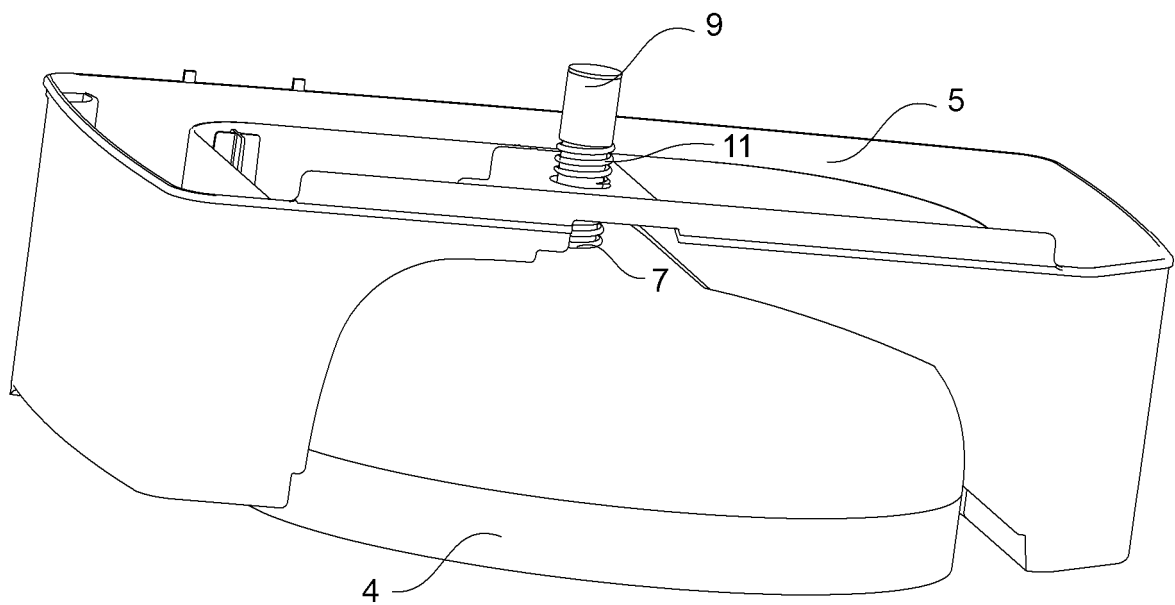
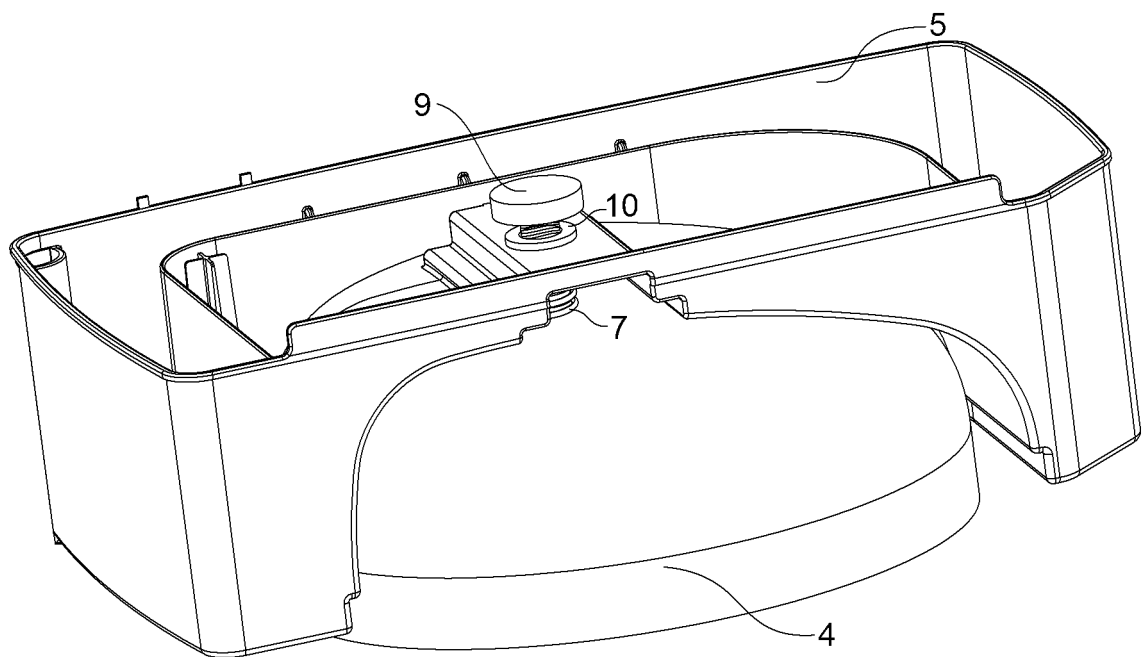


Figure 6



REFERENCES CITED IN THE DESCRIPTION

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