

(19)



(11)

EP 2 405 217 A2

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
11.01.2012 Bulletin 2012/02

(51) Int Cl.:
F25D 23/04^(2006.01) F25D 25/04^(2006.01)

(21) Application number: **11170129.8**

(22) Date of filing: **16.06.2011**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME

(72) Inventor: **Erdem, Fatih Sultan**
35540 Izmir (TR)

(74) Representative: **Cayli, Hülya**
Paragon Consultancy Inc.
Koza Sokak No: 63/2
GOP
06540 Ankara (TR)

(30) Priority: **09.07.2010 TR 201005608**

(71) Applicant: **Vestel Beyaz Esgya Sanayi Ve Ticaret A.S.**
45030 Manisa (TR)

(54) **Level Adjustable Shelf Mechanism**

(57) The shelf mechanism (A) of this invention comprises at least one level-adjustable shelf (1); at least one fixed element (3) fixed to the vertical wall on at least one side of the shelf (1); at least one rotary element (2) rotating around an axis and located on each fixed element

(3). With the rotation of the rotary element (2) and at least one pin (5) on the rotary element (2), at least one channel (6) is located on the fixed element (3) within which the pin (5) is movable. Moreover, on rotary element (2) is a pin (9) mounted on the shelf (1) by means of a swivel joint.

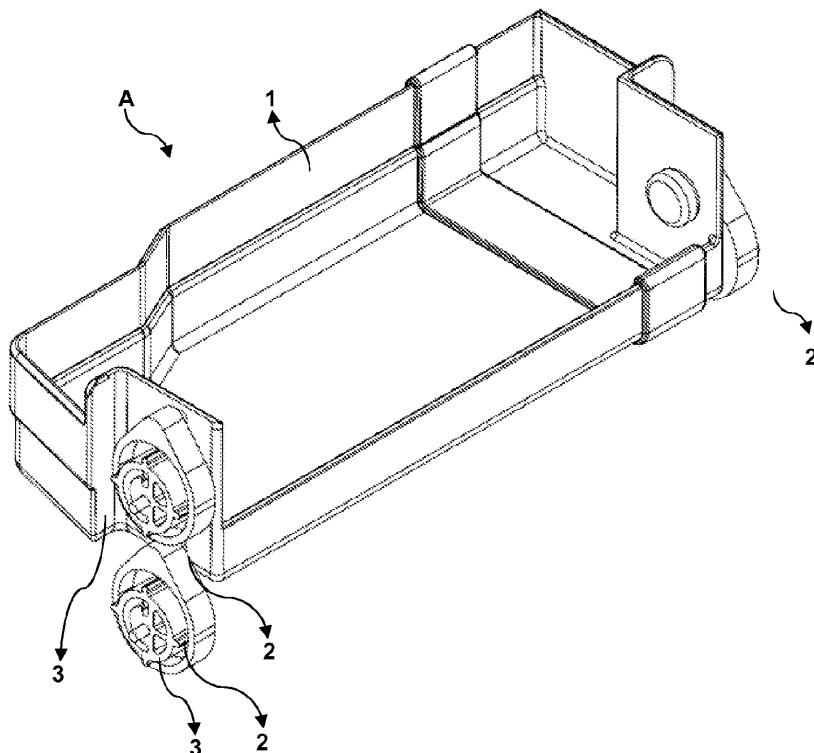


Figure - 2

EP 2 405 217 A2

Description**Technical Field**

[0001] This invention relates to level adjustable shelf mechanisms used generally in cooling devices.

Prior Art

[0002] It is important to benefit optimally from the inner volume of cooling devices which are used to store food products; for this reason, cooling devices are provided with shelves and chambers with various functions. Height adjustable shelves are preferred embodiments by the users. In this respect, various studies, the published patent applications CN2919145 and KR20080079101 of which can set examples, are conducted in this field. In the patent application CN2919145, a shelf placeable into and removable from the slots at different heights on the inner wall of a refrigerator is described. In the patent application KR20080079101, a shelf, mountable and demountable at different heights on the inner wall of the refrigerator and also height adjustable in the place it is mounted by means of a gear mechanism located thereon, is disclosed. In another published patent application KR20020012443 in the state-of-the-art, vertical channels provided inside a refrigerator and shelves which can be located at different heights by moving in these channels are described. In this structure, slots are provided at different heights in the channels, and the height of the shelves can be adjusted by inserting the shelf into these slots. The re-location of shelves is done by rotating the shelves in said slots to free the shelf from the slot and moving it within the channel upwards or downwards to the desired level and reinserting the shelf into the preferred slot.

Brief Disclosure of Invention

[0003] In this invention, a shelf mechanism different from the embodiments in the state of the art is disclosed. In accordance with this, the shelf mechanism of this invention comprises at least one level adjustable shelf, at least one fixed element fixed onto the vertical wall on at least one side of the shelf, at least one rotary element rotating around an axis and located on each fixed element. At least one channel is located on the fixed element within which the pin is movable with the rotation of the rotary element and at least one pin on the rotary element. Moreover, on rotary element is another pin mounted on the shelf by means of a swivel joint.

Objective of the Invention

[0004] The aim of this invention is to provide a level-adjustable shelf mechanism which will preferably be used in cooling devices.

[0005] Another aim of this invention is to provide for

the adjustment of the shelf without any need for mounting and demounting of the shelf.

[0006] A further aim of this invention is to provide a shelf mechanism which is easy and cheap to produce, safe and level adjustable.

Description of Figures

[0007] An exemplary shelf mechanism of this invention is illustrated in the annexed figures, of which

Figure 1 is perspective view of the exemplary shelf mechanism on a refrigerator door.

Figure 2 is perspective view of the shelf mechanism of this invention.

Figures 3 - 6 are front views of the parts, which adjust the level of the shelf, in different positions.

Figure 7 is side view of the parts which adjust the level of the shelf.

Figure 8 is front view of the alternative parts which adjust the shelf level.

[0008] All the parts illustrated in figures are individually assigned a reference number and the corresponding terms of these numbers are listed as below.

Shelf mechanism (A)

Refrigerator door (T)

Shelf (1)

Rotary element (2)

Fixed element (3)

Junction element (4)

Pin (5)

Channel (6)

Lower slot (7)

Upper slot (8)

Pin (9)

Space (10)

Spring (11)

Tab (12)

Inclined surface (13)

Flat surface (14)

Space (15)

Description of the Invention

[0009] The shelf mechanism (A) of this invention, which is illustrated in Figure 1, comprises at least one shelf (1) whose height is adjustable at two levels, namely lower and upper levels, and which can accommodate various materials (for instance food products). In Figure 1, shelf mechanism (A) is shown on a refrigerator door (T) as an example. In Figure 2, another perspective view of the said mechanism (A) is shown, at least one of the rotary and fixed elements (2, 3) which are used for the level adjustment of shelf (1), located on at least one side of the shelf (1) (In figure 2, as an example, they are shown as pairs on one side and single on the other) are illustrated.

[0010] In Figures 3-6, the position of the said rotary and fixed elements (2, 3) with respect to each other is shown. Fixed element (3) is an immobile part in the shelf mechanism (A) and it is used for the mounting of the mechanism (A) onto a vertical wall (for example onto a refrigerator door as in the Figure 1). For this, fixed element (3) can be mounted onto the preferred wall with a junction element (4). In the exemplary embodiment of the invention shown in the Figures, the junction element (4) is located in the geometrical center of the fixed element (3), and it is illustrated in a cylindrical shape (for instance as a screw).

[0011] Rotary element (2) is located on the fixed element (3) or as an example as shown in figures, the fixed element (3) is located within the space (10) in the rotary element (2). Rotary element (2) is rotatable around an axis (or around a junction element (4)), and performs this rotation on the fixed element (3). At least one pin (5) is provided on the rotary element (2) and as the rotary element (2) rotates, this pin (5) moves within a channel (6) provided on the fixed element (3) in a way to make a curve in the shape of a part of a circle, and reaches the desired level. Therefore, by placing the pin (5) in the lowest or in the highest levels, the shelf (1), to which the rotary element (2) is connected, is positioned in the lowest or highest levels.

[0012] The different positions of the pin (5) in the channel (6) are illustrated in Figures 3 - 6. In this respect, in the position in Figure 3, pin (5) is located in a slot (7) which is in the lowest part of the channel (6). For the pin (5) to be released from the lower slot (7), rotary element (2) needs to be raised a little. After that, due to the rotation of rotary element (2), pin (5) rises within the channel (6) and reaches to the position in Figure 4. As the rotary element (2) continues to rotate, the pin (5) rises in the channel (6) and comes to the upper position illustrated in Figure 5. When rotary element (2) is released at this position, pin (5) is seated in a slot (8) in the upper part of the channel (6) as shown in Figure 6.

[0013] When pin (5) is inserted in the lower slot (7) or in the upper slot (8), rotary element (2) (or shelf (1)) needs to be pulled upwards a little for removal from these slots (7, 8). In cases other than this one, as pin (5) will stay in the slot (7, 8), shelf (1) is ensured to be in balance at these two positions.

[0014] In Figure 7, a side view of the rotary element (2) and fixed element (4) together is provided. The pin (5) on the rotary element (2) illustrated here is a part mounted to the shelf (1) with a swivel joint. As the pin (9) is rotatable in the slot (not shown in figures) it is seated on the shelf (1), when the rotary element (2) is rotated, shelf (1) can be moved to an upper position without its parallel position to the floor being lost. The positions of the pin (5) in the lower slot (7) and the upper slot (8), determines the position of the shelf (1) at the same time.

[0015] In the alternative one illustrated in Figure 8, since the balance problem is not as much in the lower position as in the upper position, no slot is provided in

the lower part of the channel (6). In the upper part, there is a spring (11) and a tab (12) held by the spring (11) to extend into the channel (6). Tab (12) is in the upper part of the channel (6), in a location to create an upper slot (8) between itself and the end of the channel (6). As pin (5) moves upwards in the channel (6), firstly it contacts with the tab (12) and pushes the tab (12) (due to its inclined surface (13)) out of the channel (6). When pin (5) reaches the upper slot (8), tab (12) is pushed back into the channel (6) by the spring (11). In the downwards movement of the pin (5) as it is impossible to push the tab (12) out of the channel (6) (because of its flat surface (14)), it is pulled from the space (15) over the tab (12) (by raising the rotary element (2) a little) and it is moved within the channel (6) downwards.

Claims

1. A shelf mechanism (A) comprising at least one shelf (1) whose level is adjustable, **characterized in that** it comprises at least one fixed element (3) fixed onto the vertical wall on at least one side of the shelf (1); at least one rotary element (2) rotating around an axis and located on each fixed element (3); at least one pin (5) on the rotary element (2); at least one channel (6) on the fixed element (3) within which the pin (5) can move with the rotation of the rotary element (2); a pin (9) on the rotary element (2) mounted to the shelf (1) with a swivel joint.
2. A shelf mechanism (A) according to Claim 1, **characterized in that** it comprises a lower slot (7) into which the pin (5) is inserted and which is in the lower part of the channel (6).
3. A shelf mechanism (A) according to Claim 1, **characterized in that** it comprises an upper slot (7) into which the pin (5) is inserted and which is in the upper part of the channel (6).
4. A shelf mechanism (A) according to Claim 1, **characterized in that** the fixed element (3) is located in a space (10) in the rotary element (2).
5. A shelf mechanism (A) according to Claim 4, **characterized in that** rotary element (2) is rotatable around the fixed element (3).
6. A shelf mechanism (A) according to Claim 3, **characterized in that** it comprises a tab (12) located in the upper part of the channel (6), in a way to create an upper slot (8) between itself and the upper part and a spring (11) pushing the tab (12) into the channel (6).

7. A shelf mechanism (A) according to Claim 6, **characterized in that** it comprises an inclined surface (13) which provides for the pushing of tab (12) out of the channel (6) upon the contact of the pin (5) while the pin (5) is moving upwards inside the channel (6). 5
8. A shelf mechanism (A) according to Claim 6, **characterized in that** it comprises, in the downwards movement of the pin (5), a space (15) above the tab (12) which allows for the passage of the pin (5). 10

15

20

25

30

35

40

45

50

55

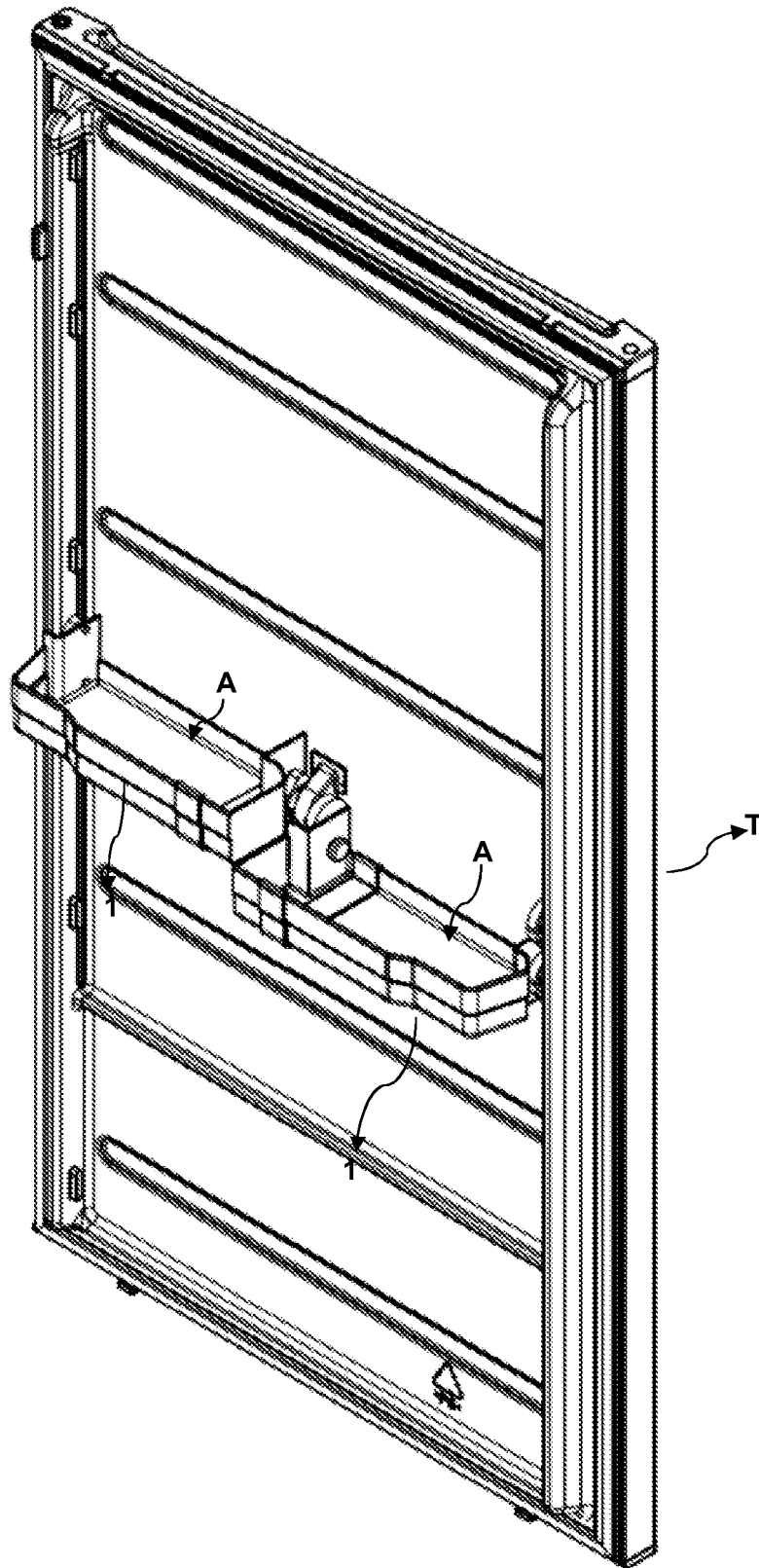


Figure - 1

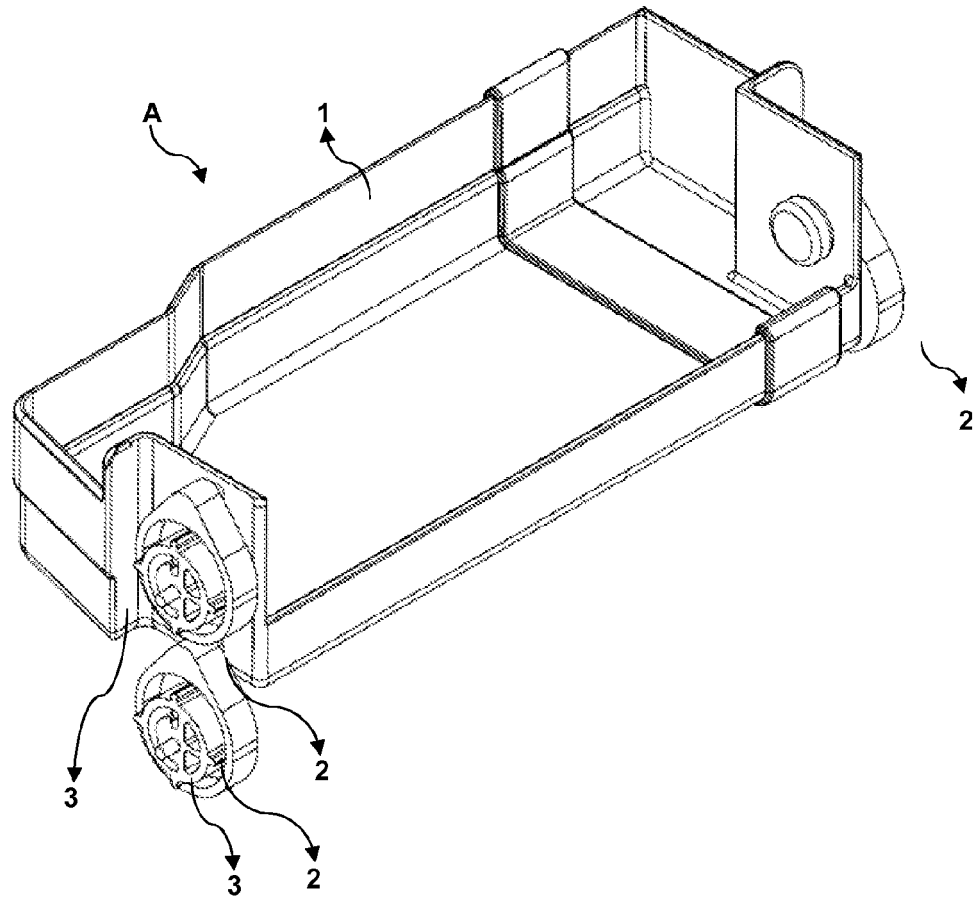


Figure - 2

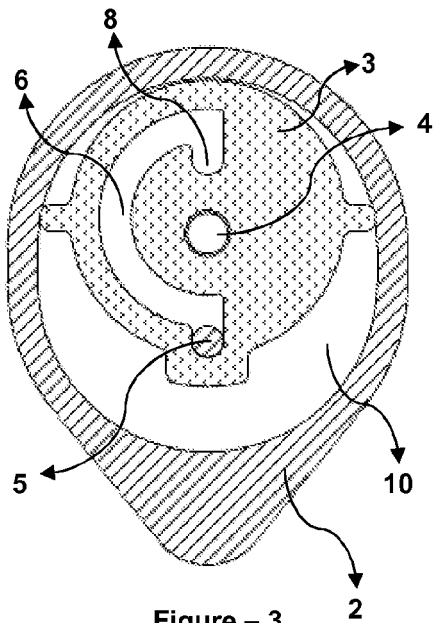


Figure - 3

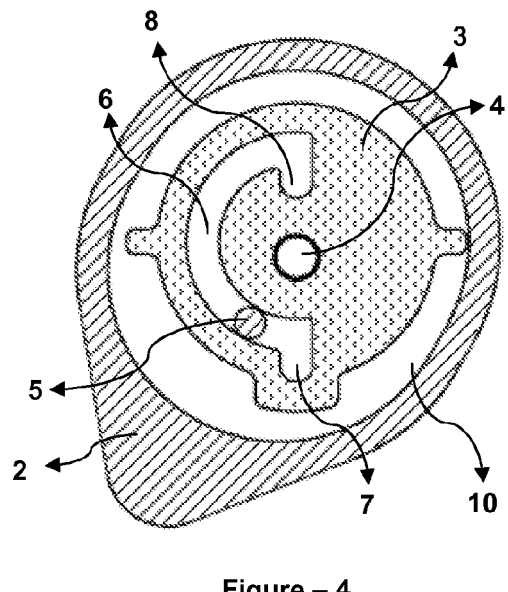


Figure - 4

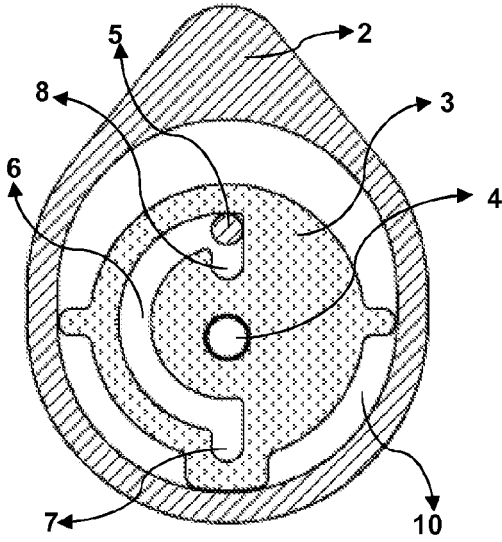


Figure - 5

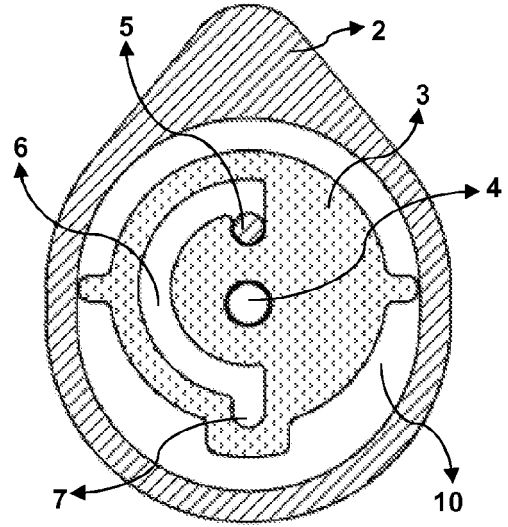


Figure - 6

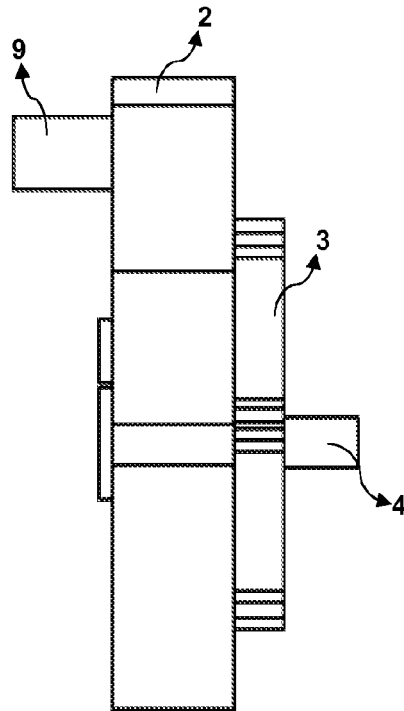


Figure - 7

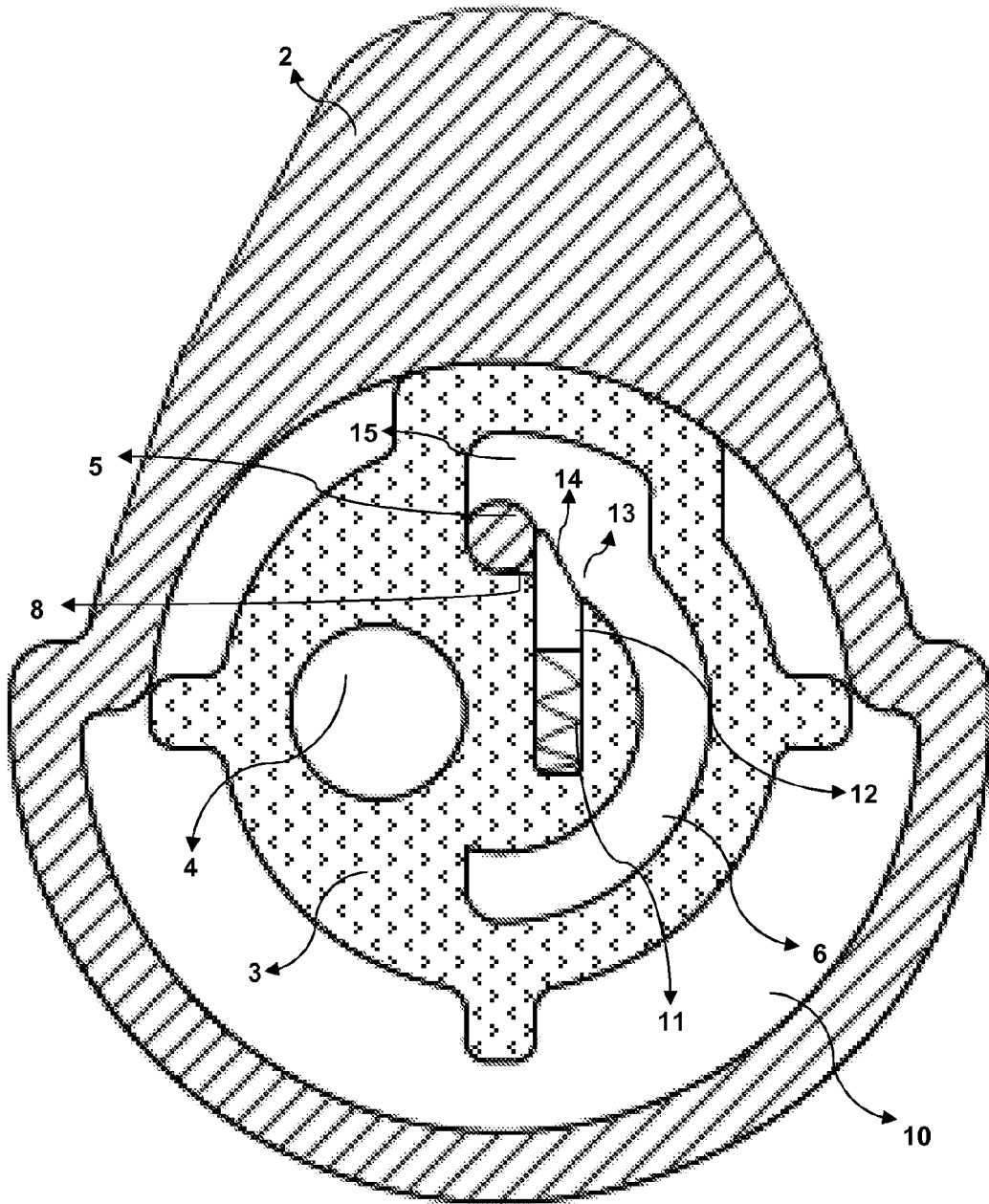


Figure - 8

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- CN 2919145 [0002]
- KR 20080079101 [0002]
- KR 20020012443 [0002]