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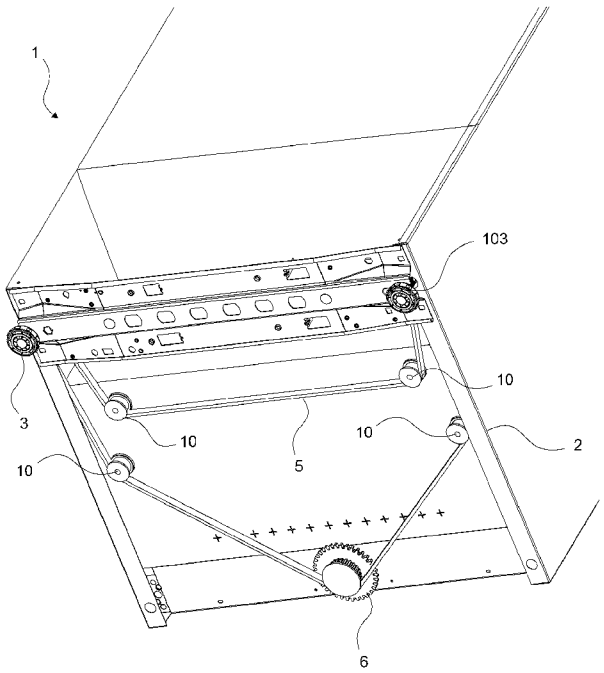
(54) Title: HOUSEHOLD APPLIANCE WITH ADJUSTABLE HEIGHT CONTROLLED FROM THE FRONT

Figure 1



(57) Abstract: The preset invention relates to a household appliance (1) comprising a body (2); two front feet (not shown in the figures) that are disposed on the base of the body (2) and that enable the body (2) to stand on the floor whereon the same is placed; a first rear foot (3) and a second rear foot (103); a first shaft (4) that is attached to the first rear foot (3) and a second shaft (104) that is attached to the second rear foot (103), with their outer surfaces having the helical gear structure, the first shaft (4) and the second shaft (104) passing through the first rear foot (3) and the second rear foot (103) respectively to form the axis of rotation and whereon the rear feet (3, 103) move, and a driving means (6) that is disposed on the bottom front section of the body (2) and that is controlled by the user from the front of the body (2).

Description

HOUSEHOLD APPLIANCE WITH ADJUSTABLE HEIGHT CONTROLLED FROM THE FRONT

[0001] The present invention relates to a household appliance of which the height can be adjusted according to the floor the household appliance is placed on.

[0002] Household appliances usually have four feet mounted on their base that enable the household appliances to sit on the floor. Any irregularities on the floor where household appliances such as refrigerator, washing machine, dryer, dishwasher, oven, etc. are placed cause loss of balance of the household appliance, leading to various adverse effects. Therefore, it is important that household appliances must maintain their balance, especially during the operation thereof. Height of the feet is adjusted so that all feet of the household appliance are balanced so as to press on the floor. Thus, impairment of the balance of a household appliance by any irregularity on the floor is prevented.

[0003] In the state of the art, rear feet seated on the floor are used to provide this effect. The said feet are height adjustable, but since there is no access from the front of the household appliance to the rear feet, the user must go to the rear side of the household appliance and adjust the height of the feet individually. Furthermore, if the household appliance is desired to be used within a cabin, the household appliance should be entirely taken out of the cabin and the height of the feet should be adjusted before replacing the same within the cabin.

[0004] In the state of the art, various mechanisms have been developed to adjust the feet of the household appliances.

[0005] In the state of the art European Patent No. EP1960217, a household appliance is disclosed, wherein the rear feet can be checked and their height can be adjusted by the user from the front.

[0006] In the state of the art British Patent Application No. GB2323276, a household appliance, in particular an oven is disclosed, which comprises a height adjustment mechanism by which the height of a wheel in the rear can be checked and adjusted by the user from the front.

[0007] In the state of the art German Patent Application No. DE4028599, a household appliance, in particular a dishwasher, is disclosed, of which the level can be adjusted by rotating a wheel in the shape of a spiral.

[0008] The aim of the present invention is the realization of a household appliance of which height and/or leveling adjustment can be performed in order to enable the same to stand in balance on the floor whereon the same is placed.

[0009] In the household appliance realized in order to attain the aim of the present invention, explicated in the first claim and the respective claims thereof, the height of the two rear feet are simultaneously adjusted by means of a motion transmitter actuated by the user through a single driving means located on the bottom front section of the body and two adjustment pulleys connected to the rear feet.

[0010] By means of the present invention, by means of a single driving means and a toothed belt, the adjustment pulleys attached to both of the rear feet can be rotated simultaneously whereby one of the rear feet and/or the right or left side of the body is moved downward while the other side of the body is moved upward, thus leveling the household appliance on the surface whereon the same is placed.

[0011] The household appliance realized in order to attain the aim of the present invention is illustrated in the attached figures, where:

[0012] Figure 1 - is the general view of a household appliance.

[0013] Figure 2 - is the detailed view of the motion transmitter and the internal surface thereof.

[0014] Figure 3 - is the exploded view of the driving means.

[0015] Figure 4 - is the exploded view of the driving means from another angle.

[0016] Figure 5 - is the exploded view of the first adjustment pulley.

[0017] Figure 6 - is the exploded view of the second adjustment pulley.

[0018] Figure 7 - is the exploded view of the tensioning pulley.

[0019] Figure 8 - is the exploded view of the tensioning pulley from another angle.

[0020] Figure 9 - is the perspective view of the first rear foot and the first shaft with right-hand helical gear.

[0021] Figure 10 - is the perspective view of the second rear foot and the second

shaft with left-hand helical gear.

[0022] Figure 11 - is the detailed view of the driving means, the motion transmitter and the rear feet.

[0023] Figure 12 - is the detailed view of the driving means, the motion transmitter, the tensioning pulleys, the first adjustment pulley and the rear feet.

[0024] Figure 13 - is the detailed view of the motion transmitter, the adjustment pulleys and the rear feet.

[0025] The elements illustrated in the figures are numbered as follows:

1. Household appliance
2. Body
3. First rear foot

[0026] 103. Second read foot

4. First shaft

[0027] 104. Second shaft

5. Motion transmitter

[0028] 6. Driving means

[0029] 7. Gear

[0030] 8. Gear wheel

[0031] 9. First adjustment pulley

[0032] 109. Second adjustment pulley

[0033] 10. Tensioning pulley

[0034] 11. First channel

[0035] 110. Second channel

[0036] 12. Bearing

[0037] 13. Flange

[0038] 14. Pin

[0039] The household appliance (1) comprises a body (2); two front feet (not shown) that are disposed on the base of the body (2) and that enable the body (2) to stand on the floor whereon the same is placed; a first rear foot (3) and a second rear foot (103) that are disposed on the rear bottom of the body (2) on the right and left sides respectively; and a first shaft (4) that is attached to the first rear foot (3) and a second shaft (104) that is

attached to the second rear foot (103), with their outer surfaces having the helical gear structure, and that enable the first and second feet (3, 103) to be mounted to the body (2) by being rotated.

[0040] The household appliance (1) of the present invention comprises

[0041] - the first shaft (4) with right-hand helical gear that enables the first rear foot (3) to be mounted to the body (2) by being rotated right per the known right hand rule,

[0042] - the second shaft (104) with left-hand helical gear, that enables the second rear foot (103) to be mounted to the body (2) by being rotated left per the known right hand rule,

[0043] - a driving means (6) that is disposed on the bottom front section of the body (2), that is controlled by the user from the front of the body (2) and that provides the adjustment of the height and leveling of the body (2),

[0044] - a motion transmitter (5) that provides the mechanical connection between the driving means (6) and the first and second rear feet (3, 103), and

[0045] - a first adjustment pulley (9) that is mounted to the first shaft (4) and a second adjustment pulley (109) that is mounted to the second shaft (104), that are rotated in the same direction by the driving means (6) and the motion transmitter (5), that are pivotally fastened to the body (2), each providing the movement of the right or left side of the body (2) whereto the pulleys (9, 109) are attached in opposite directions, one in the upward direction and the other in the downward direction.

[0046] The first adjustment pulley (9) has a hub with right-hand helical groove so as to be rotatably mounted to the first shaft (4) and when the first adjustment pulley (9) is rotated right on the first shaft (4) attached to the first foot (3) pressing on the floor, the first adjustment pulley (9) moves (pulls) the side (right or left) of the body (2) whereto the same is attached downward and when rotated left, the first adjustment pulley (9) moves (pushes) the side of the body (2) whereto the same is attached upward.

[0047] The second adjustment pulley (109) has a hub with left-hand helical groove so as to be rotatably mounted to the second shaft (104) and when the second adjustment pulley (109) is rotated right on the second shaft

(104) attached to the second foot (103) pressing on the floor, in contrary to the first adjustment pulley (9), the second adjustment pulley (109) moves (pushes) the side (right or left) of the body (2) whereto the same is attached upward and when rotated left, the second adjustment pulley (109) moves (pulls) the side of the body (2) whereto the same is attached downward.

[0048] By means of the rotational movement in the same direction transmitted by the motion transmitter (5) actuated by the driving means (6) disposed on the bottom front section of the household appliance (1) to the first and second adjustment pulleys (9, 109), one of the first and second rear feet (3, 103) moves toward the floor whereon the household appliance (1) is placed and the other moves in the opposite direction, that is, upward (Figure 9 and Figure 10). For example, in the case wherein the first rear foot (3) touches the floor and the second rear foot (103) does not touch the floor, the first and second adjustment pulleys (9, 109) are rotated left by the driving means (6). The first rear foot (3) touching the floor stays stationary and does not rotate due to the effect of the friction force, but the first adjustment pulley (9) which continues the rotational movement moves the side of the body (2) whereto the same is attached upward. Meanwhile, the second rear foot (103) not touching the floor moves downward with the side of the body (2) whereto the same is attached and touches the floor and stays stationary and does not rotate with the effect of the friction force. The second adjustment pulley (109) which continues to rotate left continues its movement and forces the side of the body (2) whereto the same is attached to move downward. The body (2) inclined to right or left is moved in opposite directions on the first and second rear feet (3, 103) so as to be leveled. The household appliance (1) is positioned parallel to the floor if the floor is level and is brought to vertical position and leveled easily by being given a counter slope if the floor is inclined.

[0049] In an embodiment of the present invention, the motion transmitter (5) is a toothed, preferably trapezoidal toothed belt, which transmits the rotational movement of the driving means (6) to the first and second adjustment pulleys (9, 109) (Figure 2).

[0050] In another embodiment of the present invention, the motion transmitter (5) is a mechanism with worm gear or cog wheel positioned between the motion transmitter (5), the driving means (6) and the first and second adjustment pulleys (9, 109).

[0051] The driving means (6) comprises a circular gear (7) moving by rotating around its center fastened to the body (2) when a force is applied by the user and a gear wheel (8) positioned in the center of the said gear (7) on the lower surface. In addition, the driving means (6) comprises a pin (14) on its top surface, concentric with the wheel (8), protruding from the center of the gear (7), and a bearing (12) snap-fitted to the pin (14) and a flange (13) whereon the bearing (12) is placed. When the motion transmitter (5) is mounted on the driving means (6), the surface of the wheel (8) is seated on and touches the surface of the motion transmitter (5). As a force is applied on the protruding part of the gear (7) from the body (2), the gear wheel (8) rotates together with the gear (7) and the motion transmitter (5) is actuated by the driving means (6) (Figure 3 and Figure 4).

[0052] The first and second adjustment pulleys (9, 109) comprise a cylindrical, threaded first channel (11), that has a width at least equal to the width of the motion transmitter (5), that limits the movement of the motion transmitter (5) along the vertical axis; a hollow pin (14) that is concentric with the first channel (11), wherein the first shaft (4) and the second shaft (104) are inserted and that extends from the middle of the first channel (11) outward; a bearing (12) snap-fitted to the pin (14); and a flange (13) whereon the bearing (12) is placed. The first and second adjustment pulleys (9, 109) are fixed via the pin (13) to the base of the body (2) by means of a fastening member (Figure 5 and Figure 6).

[0053] In an embodiment of the present invention, the household appliance (1) comprises more than one tensioning pulley (10) that is disposed on the base of the body (2) and that stretches the motion transmitter (5) (belt).

[0054] The tensioning pulleys (10) are disposed on the base of the body (2) and provides the housing of the motion transmitter (5) and provides the maintaining of the tightness of the motion transmitter (5). The tensioning pulley (10) comprises a cylindrical second channel (110), that has a width

at least equal to the width of the motion transmitter (5), that limits the movement of the motion transmitter (5) along the vertical axis; a pin (14) that is concentric with the second channel (110) and extends from the center of the second channel (110) outward; a bearing (12) snap-fitted to the pin (14); and a flange (13) whereon the bearing is placed. The pulley (10) is fixed via the pin (14) to the base of the body (2) by means of a fastening member (Figure 7 and Figure 8).

[0055] The form of the motion transmitter (5) is determined by the positions of the driving means (6), the first and second adjustment pulleys (9, 109) and the tensioning pulleys (10). In an embodiment of the present invention, the driving means (6) is disposed in the middle of the bottom front edge of the household appliance (1). The inner surface of the motion transmitter (5) touches the driving means (6) and the first and second adjustment pulleys (9, 109). In this embodiment, four tensioning pulleys (10) are provided and fixed to the base of the body (2) symmetrically so as to form a trapezoid when their centers are joined. The inner surface of the motion transmitter (5) touches two pulleys (10), while the outer surface of the motion transmitter (5) touches the other two pulleys (10).

Claims

1. A household appliance (1) comprising a body (2); two front feet (not shown in the figures) that are disposed on the base of the body (2) and that enable the body (2) to stand on the floor whereon the same is placed; a first rear foot (3) and a second rear foot (103) that are disposed on the rear bottom of the body (2) on the right and left sides respectively; and a first shaft (4) that is attached to the first rear foot (3) and a second shaft (104) that is attached to the second rear foot (103), with their outer surfaces having the helical gear structure, and that enable the first and second feet (3, 103) to be mounted to the body (2) by being rotated, **characterized in that**

   - the first shaft (4) with right-hand helical gear, which allows fitting of the first rear foot (3) to the body (2) by rotating right,
   - the second shaft (104) with left-hand helical gear, which allows fitting of the second rear foot (103) to the body (2),
   - a driving means (6) that is disposed on the bottom front section of the body (2), that is controlled by the user from the front of the body (2) and that provides the adjustment of the height and leveling of the body (2),
   - a motion transmitter (5) that provides the mechanical connection between the driving means (6) and the first and second rear feet (3, 103), and
   - a first adjustment pulley (9) and a second adjustment pulley (109) fitted to the first shaft and the second shaft, respectively, which are rotated in the same direction by the driving means (6) and the motion transmitter (5), which are pivotally fixed to the body (2), each of which allows movement of the right or left side to which the body (2) is attached in opposite directions to each other, one upward and the other downward.

2. A household appliance (1) as in Claim 1, **characterized in that** the first adjustment pulley (9) which, when rotated right on the first shaft (4), moves the side of the body (2) whereto the same is attached downward, and when rotated left, moves the side of the body (2) whereto the same is attached upward.

3. A household appliance (1) as in Claim 1, **characterized in that** the second adjustment pulley (109) which, when rotated right on the second shaft (104), moves the side of the body (2) whereto the same is attached upward, and

when rotated left, moves the side of the body (2) whereto the same is attached downward.

4. A household appliance (1) as in Claim 1, **characterized in that** the motion transmitter (5) which is a toothed belt.
5. A household appliance (1) as in Claim 1, **characterized in that** the motion transmitter (5) that is a mechanism with a worm gear and/or a cog gear disposed between the driving means (6) and the first and second adjustment pulleys (9, 109).
6. A household appliance (1) as in Claim 1, **characterized in that** the driving means (6) comprising a circular gear (7) rotating on its center fixed to the body (2) when a force is applied by the user; a wheel (8) that is disposed on the lower surface and that is disposed in the center of the gear (7); a pin (14) that is disposed on the upper surface, that is concentric with the wheel (8) and that extends from the center of the gear (7) outward; a bearing (12) snap-fitted to the pin (14); and a flange (13) whereon the bearing (12) is placed.
7. A household appliance (1) as in Claim 1, **characterized in that** the first and second adjustment pulleys (9, 109) comprising a cylindrical, threaded first channel (11) that has a width at least equal to the width of the motion transmitter (5), that limits the movement of the motion transmitter (5) along the vertical axis; a hollow pin (14) that is concentric with the first channel (11), wherein the first or second shaft (4 or 104) is inserted, and that extends from the center of the first channel (11) outward; a bearing (12) snap-fitted to the pin (14); and a flange (13) whereon the bearing (12) is placed.
8. A household appliance (1) as in Claim 1, **characterized in that** more than one tensioning pulley (10) that is placed on the base of the body (2) and that provides the housing and the maintaining of the tightness of the motion transmitter (5).
9. A household appliance (1) as in Claim 8, **characterized in that** the tensioning pulley (10) comprising a cylindrical second channel (11) having a width at least equal to the width of the motion transmitter (5), that limits movement of the motion transmitter (5) along the vertical axis; a pin (14) that is concentric with the second channel (110) and that extends from the center of the second channel (11) outward; a bearing (12) snap-fitted to the pin (14); and a flange

(13) whereon the bearing (12) is placed.

Figure 1

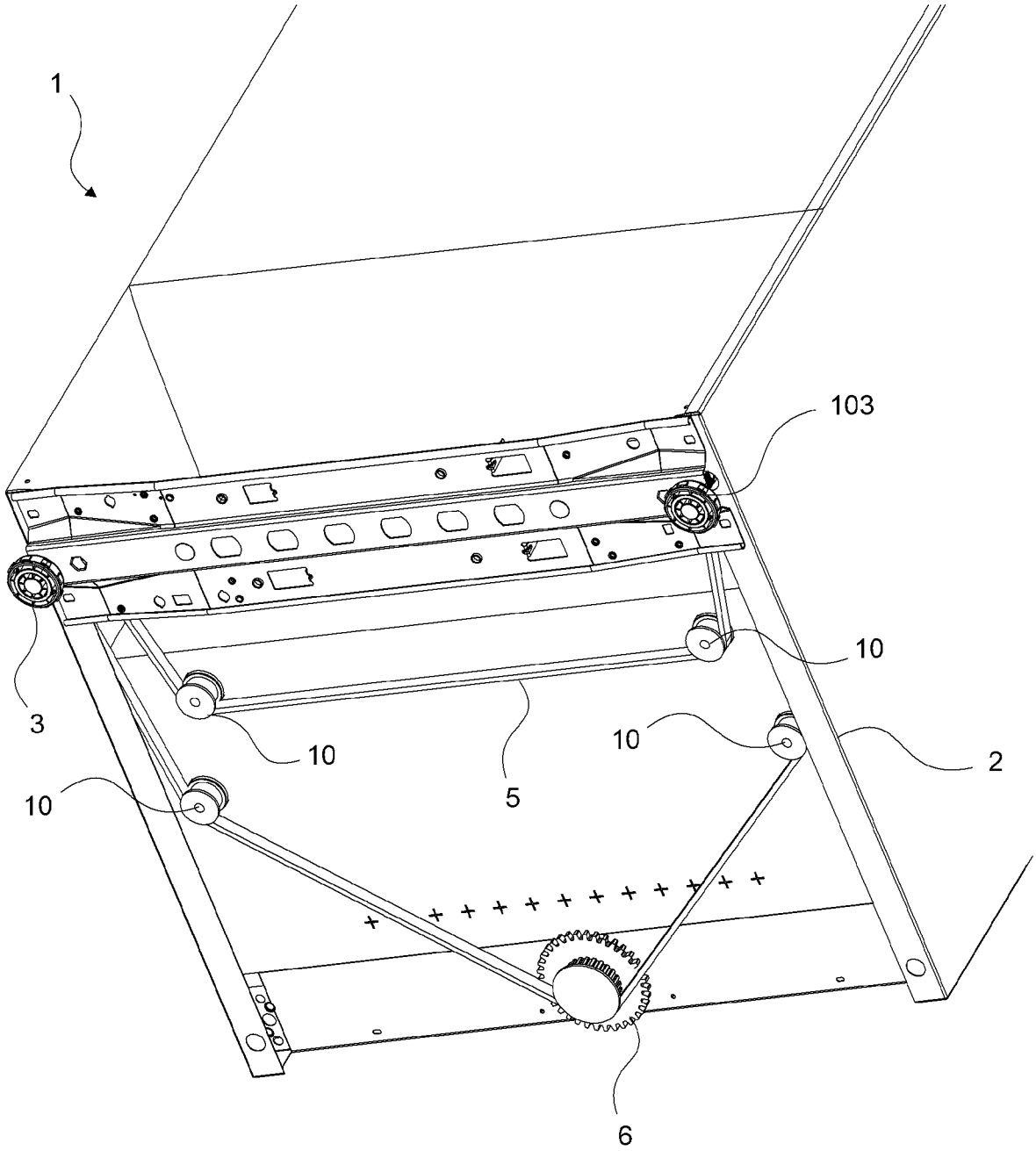


Figure 2

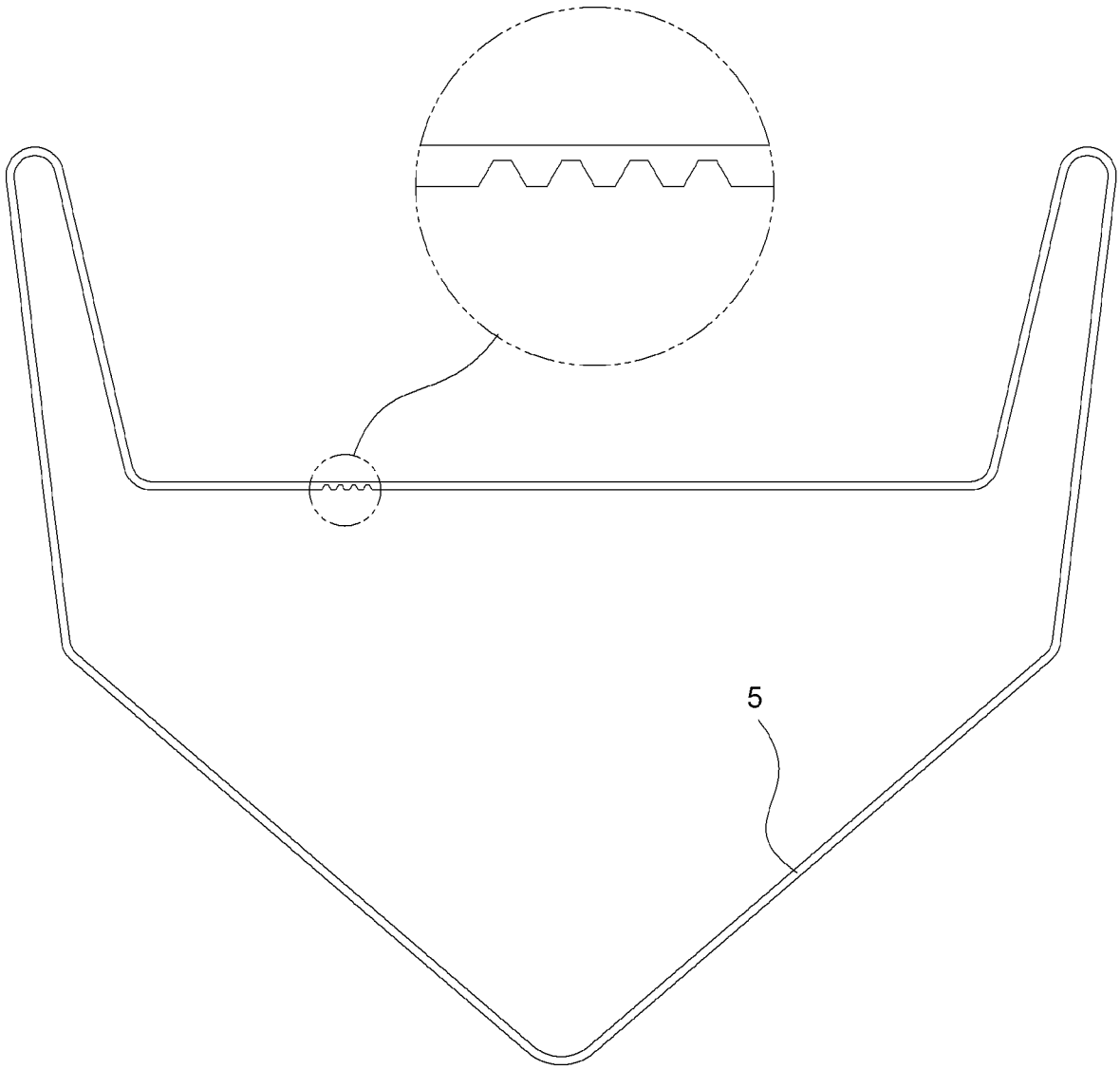


Figure 3

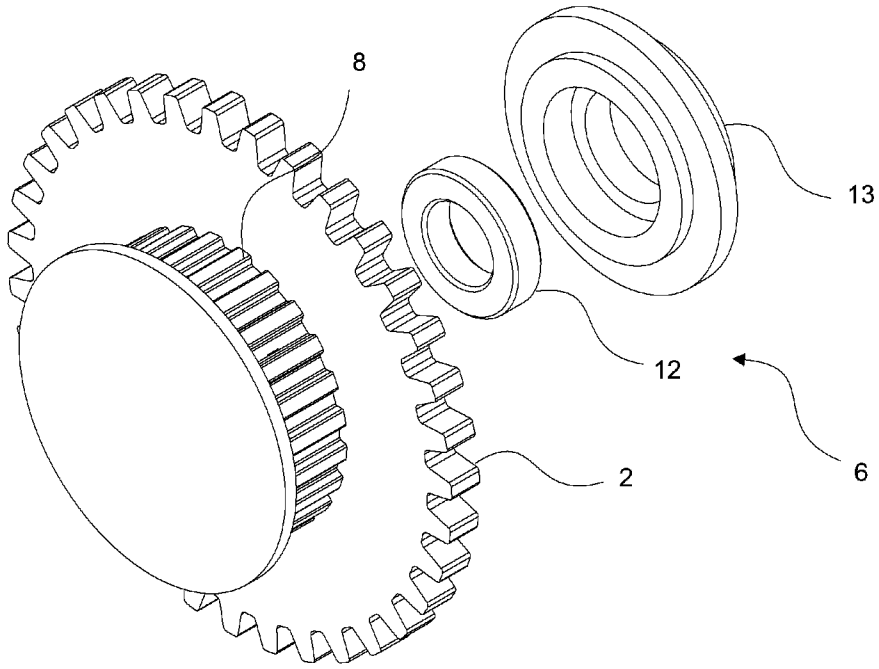


Figure 4

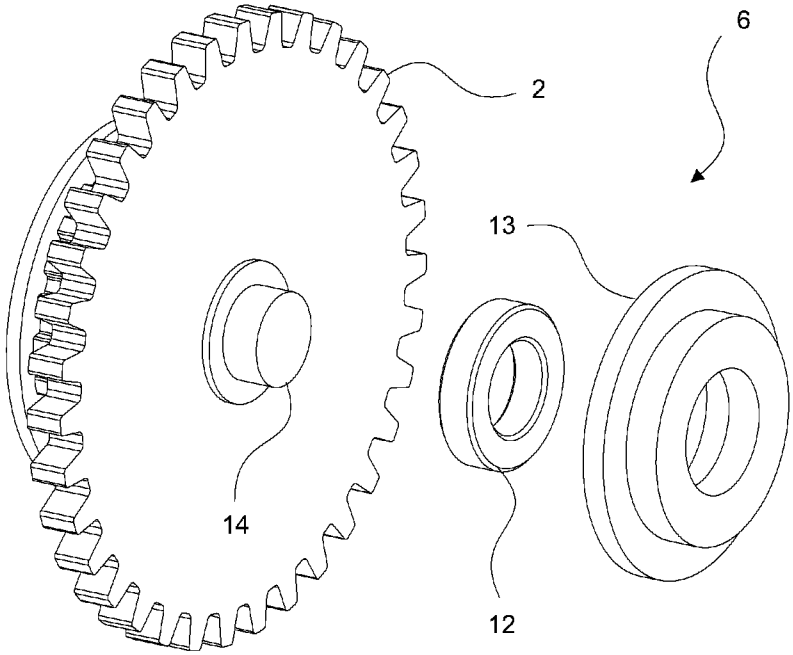


Figure 5

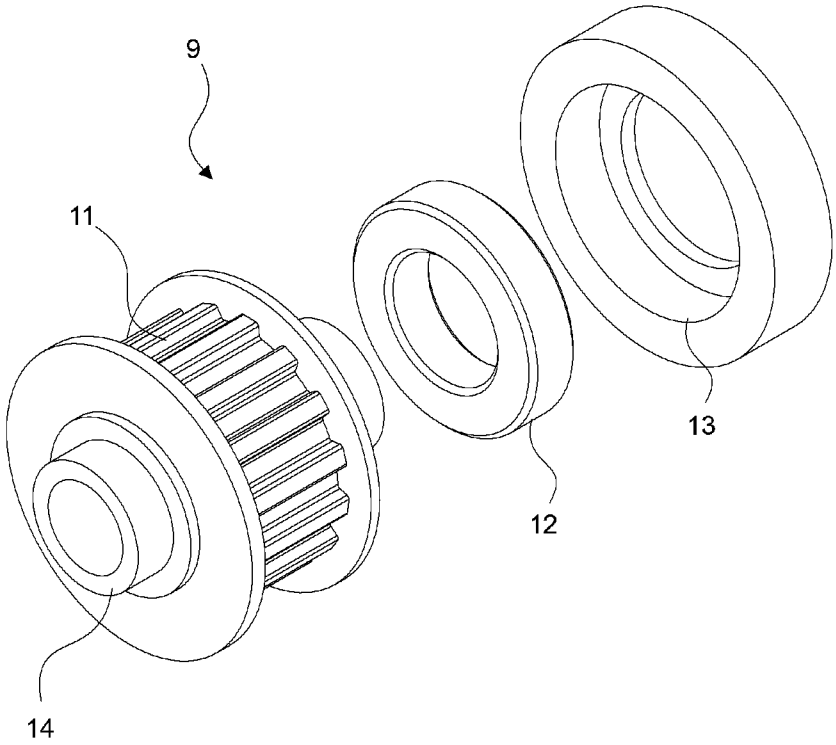


Figure 6

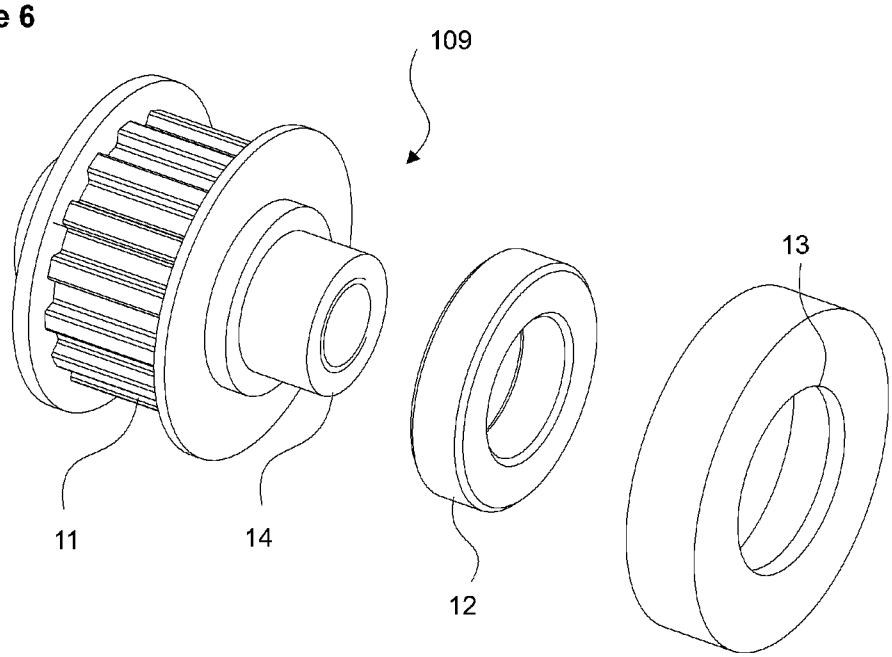


Figure 7

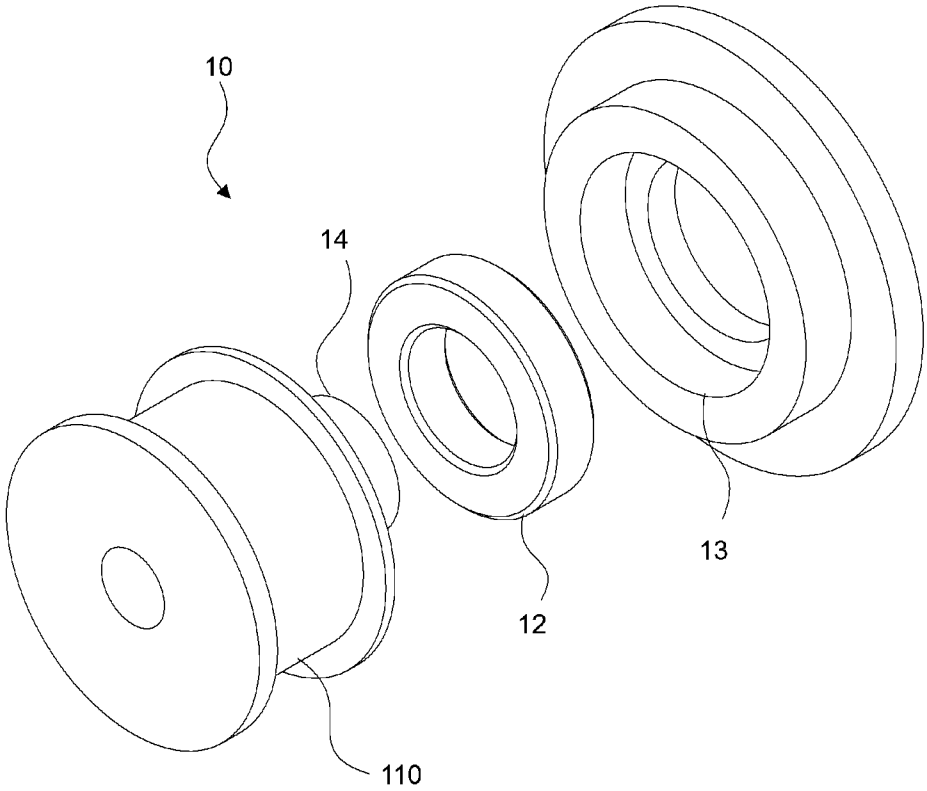


Figure 8

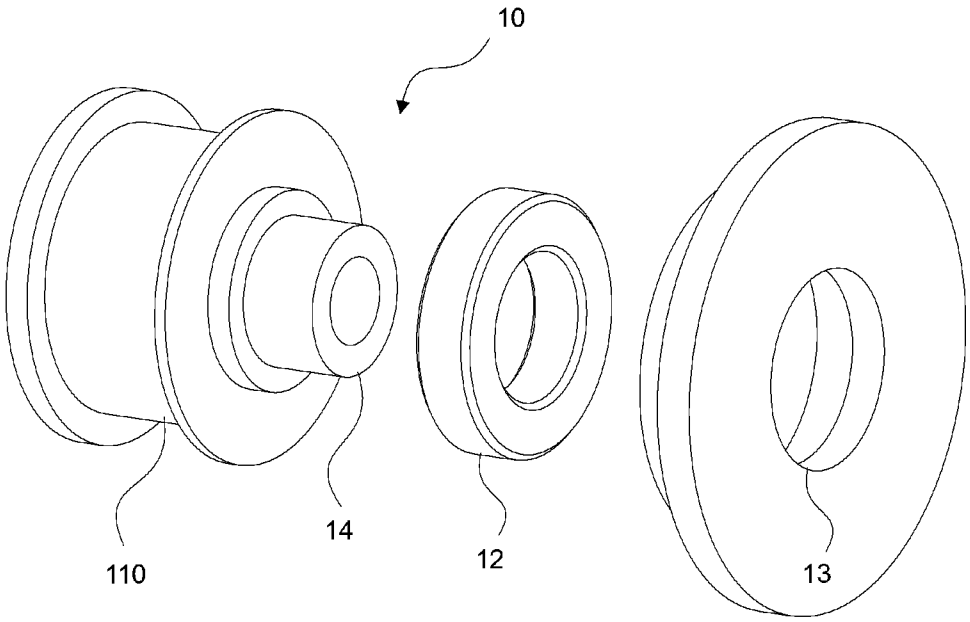


Figure 9

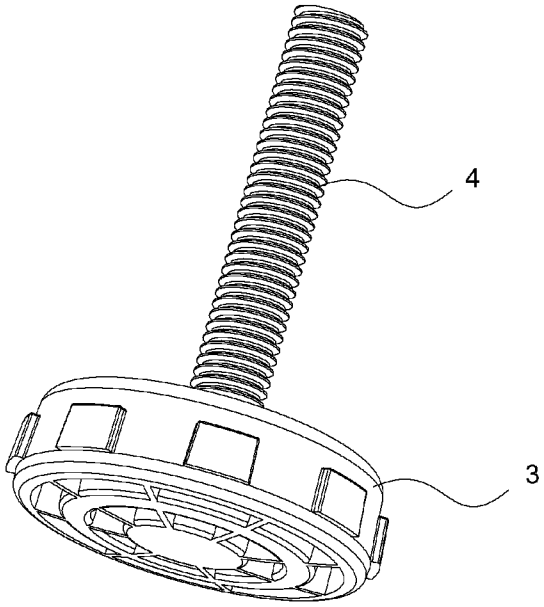


Figure 10

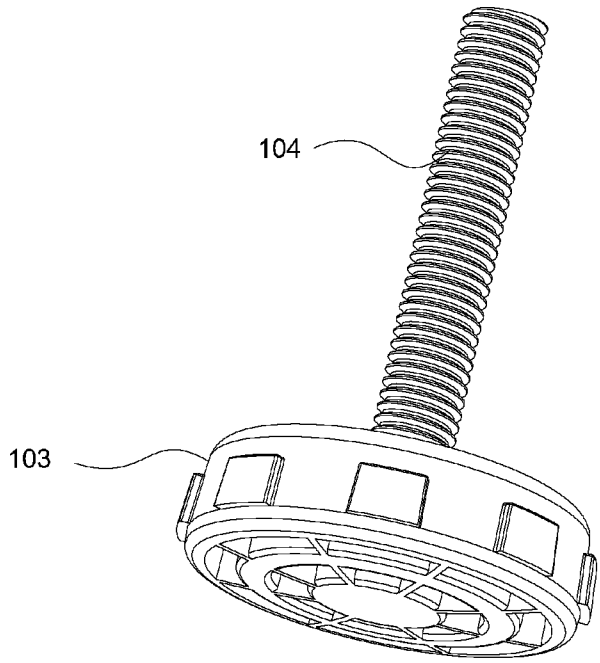


Figure 11

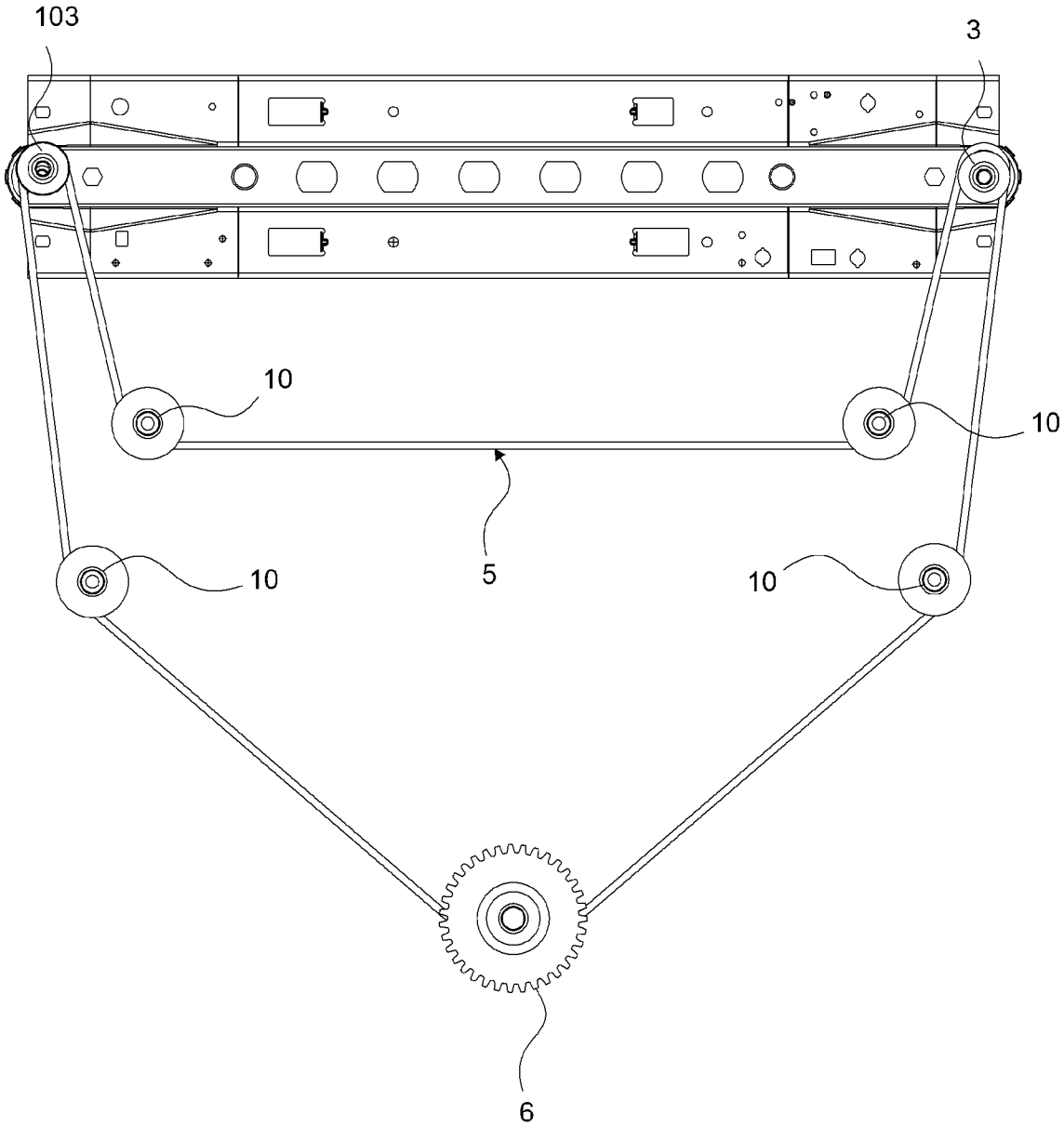


Figure 12

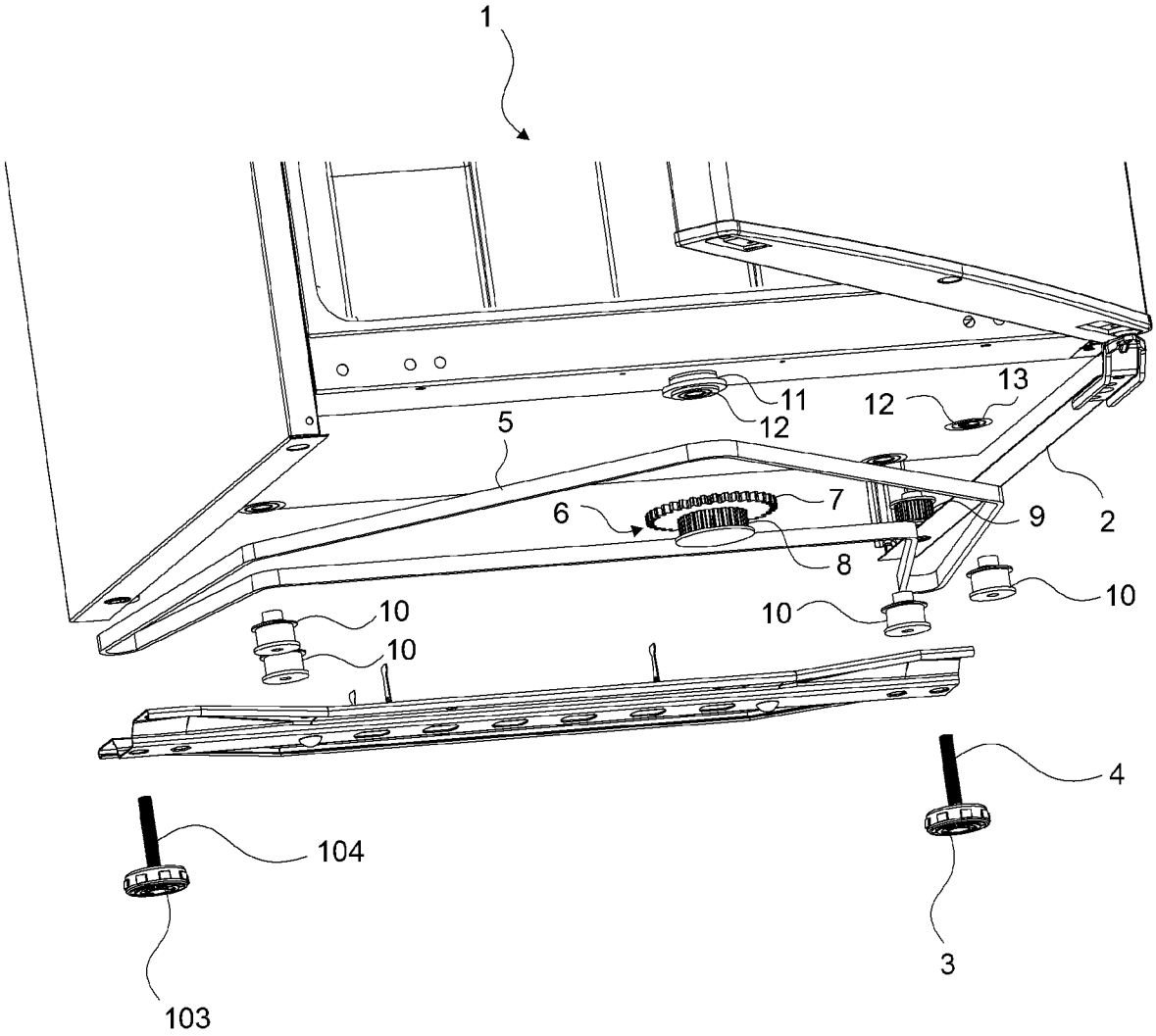
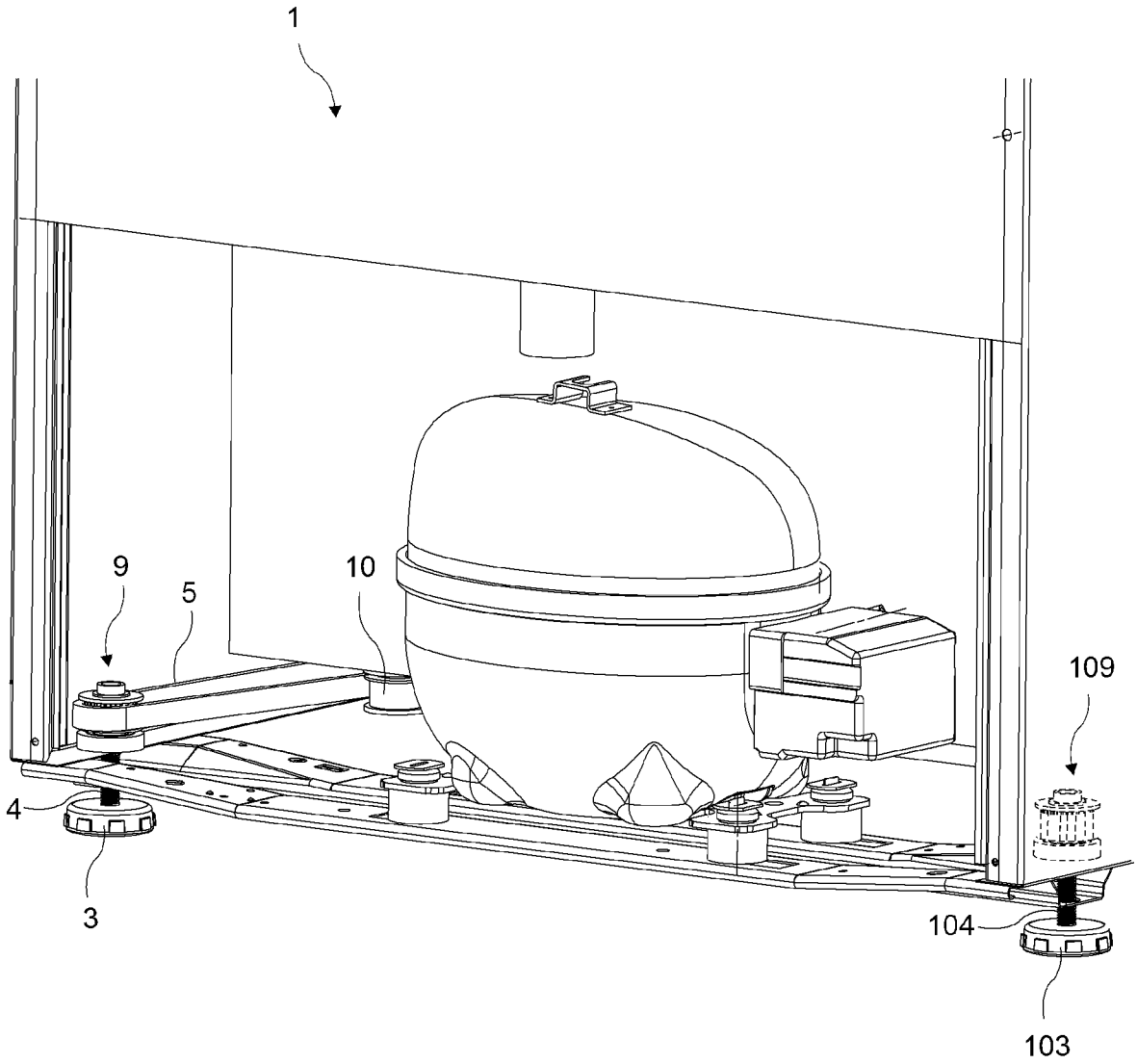


Figure 13



INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2016/062492

A. CLASSIFICATION OF SUBJECT MATTER
INV. A47L15/42 D06F39/12
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
A47L D06F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 2014/177227 A1 (ARCELIK AS [TR]; BASESME TUGRUL [TR]) 6 November 2014 (2014-11-06) paragraphs [0027], [0028]; figures 1,4,6,7a,7b	1
A	CN 201 346 192 Y (MIDEA HOLDING CO LTD [CN]) 18 November 2009 (2009-11-18) abstract; figure 2	1,4,6,7
A	JP 2013 165746 A (SUGIHARA TSUTOMU) 29 August 2013 (2013-08-29) figures 1-8	1-4,8,9
A	DE 91 12 657 U1 (NEUMANN, RUDI) 16 January 1992 (1992-01-16) figure 4	1,5

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[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

* Special categories of cited documents :

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Date of the actual completion of the international search	Date of mailing of the international search report
29 June 2016	08/07/2016

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