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(54) **A HOUSEHOLD APPLIANCE**

HAUSHALTSGERÄT

APPAREIL ÉLECTROMÉNAGER

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Description

[0001] The present invention relates to a household appliance wherein the height adjustment is performed by adjusting the feet thereof supporting the body thereof.

[0002] In household appliances such as the dishwasher, washing machine, dryer, oven or the refrigerator, the feet that support the body are height adjustable. The balance of the household appliance is provided by adjusting the height of the feet. Particularly the built-in household appliances are brought to a height accommodating with the cabin height after placing in a cabin, and the height adjustment of the household appliance is made by means of the feet. Reaching the rear feet is almost impossible after the built-in household appliance is placed in the cabin. Consequently, the movement of the rear foot is provided by the mechanisms controlled from the front side. By means of these mechanisms, the height adjustment of the rear feet can be made by means of an adjustment rod extending backward from a point at the front of the household appliance that can be easily accessible by the user or the service personnel. The height adjustment of the front feet can be made by rotating the foot around the axis thereof by means of a wrench. Under different conditions of utilization, reaching the front feet can also be problematic in the household appliance, for example if the household appliance is at a very low position then working with a wrench becomes difficult in the narrow gap between the base of the body and the floor and the household appliance body needs to be lifted up a little. In a built-in household appliance, since the upper side is also closed generally, lifting in situ is not possible either.

[0003] In the state of the art German Patent Document No DE4410554, the levelling members used in a built-in domestic appliance, particularly in a built-in refrigerator, are explained. The levelling members compose of a rotatable rod, operable from the front side of the domestic appliance body and a worm - worm gear set actuated by the rod and the feet at the rear are adjusted from the front side of the domestic appliance.

[0004] In the state of the art International Patent Application No WO2005/115199 a leveling system for a piece of furniture is explained.

[0005] State of the art document DE19528901 discloses a height adjustment mechanism wherein a groove is disposed on the vertical member and a cam is disposed at the casing in order to ensure that the vertical member does not rotate with respect to the casing and, thus, to the resting surface.

[0006] Further the state of the art documents EP1895040 discloses a household appliance in accordance with the preamble of Claim 1. However D1 does not disclose that the vertical member is pivotably mounted to the resting surface.

[0007] The aim of the present invention is the realization of a household appliance comprising a height adjustment mechanism that provides the height of the rear feet to be adjusted.

[0008] The household appliance realized in order to attain the aim of the present invention, explicated in the first claim and the respective claims thereof, comprises a height adjustment mechanism that provides the height of the rear feet to be adjusted. The height adjustment mechanism comprises an adaptor shaft that transmits the movement of the worm gear to the vertical member on the foot which is attached to the body by screwing. The cam on the worm gear and the groove on the adaptor shaft wherein the cam is seated provide the rotational motion around the axis to be transmitted.

[0009] In an embodiment of the present invention the height adjustment mechanism comprises a recess at the upper side of the vertical member providing the connection between the adaptor shaft and the vertical member and an extension disposed at the end of the adaptor shaft that is seated into the recess.

[0010] In an embodiment of the present invention the height adjustment mechanism comprises a biasing means that engages the adaptor shaft and the worm gear to each other. The biasing means is mounted to two hooks, one situated on the adaptor shaft and one on the worm gear.

[0011] In an embodiment of the present invention the height adjustment mechanism comprises a guide wherein the vertical member is borne.

[0012] In another embodiment of the present invention, the foot is produced from metal material and the adaptor shaft is produced from rigid plastic.

[0013] The household appliance realized in order to attain the aim of the present invention is illustrated in the attached figures, where:

[0014] Figure 1 - is the perspective view of a household appliance.

[0015] Figure 2 - is the perspective view of a height adjustment mechanism and a foot in mounted position on the body.

[0016] Figure 3 - is the exploded view of a height adjustment mechanism and a foot.

[0017] Figure 4 - is the partial cross sectional view of a height adjustment mechanism and a foot in mounted position on the body.

[0018] Figure 5 - is the cross sectional view of a height adjustment mechanism and a foot in mounted position on the body.

[0019] The elements illustrated in the figures are numbered as follows:

1. Household appliance
2. Body
3. Housing
4. Foot
5. Height adjustment mechanism
6. Resting surface
7. Vertical member
8. Shaft
9. Worm
10. Worm gear

- 11. Casing
- 12. Channel
- 13. Adaptor shaft
- 14. Cam
- 15. Groove
- 16. Recess
- 17. Extension
- 18. Biasing means
- 19. Hook
- 20. Guide
- 21. Upper lid
- 22. Lower lid
- 119. Hook

[0020] The household appliance (1) of the present invention, comprises a body (2), a housing (3) situated on the base of the body (2), a foot (4) mounted into the housing (3) and a height adjustment mechanism (5) that provides the height of the foot (4) to be adjusted.

[0021] The foot (4) comprises a resting surface (6) resting on the surface whereon the household appliance (1) is placed and a vertical member (7) that is pivotably mounted to the resting surface (6). Screw threads are provided on the outer surface of the vertical member (7) providing the vertical member (7) to be mounted to the housing (3) from below and the height thereof to be adjusted. The foot (4) is mounted to the housing (3) by being screwed by means of the screw threads on the vertical member (7).

[0022] The height adjustment mechanism (5) comprises,

- a shaft (8) at the lower side of the body (2), extending horizontally from the front surface of the body (2) to the rear and moved by being rotated around itself, providing the motion to be transmitted from the front backwards,
- a worm (9) rotated by the shaft (8),
- a worm gear (10) rotated by the worm (9) and that changes the movement direction thereof,
- a casing (11) mounted on the body (2) so as to be aligned with the foot (4) wherein the worm (9) and the worm gear (10) are disposed,
- a channel (12) disposed in the middle of the worm gear (10) and concentric with the vertical member (7),
- an adaptor shaft (13) that is borne in the channel (12) and engages with the vertical member (7),
- a cam (14) disposed at the inner surface of the channel (12) and
- a groove (15) disposed on the adaptor shaft (13), wherein the cam (14) is seated.

[0023] (Figure 3, Figure 4 and Figure 5).

[0024] After the built-in type of household appliance (1) is placed into the furniture, the shaft (8) is rotated around the axis thereof by the user when the height of the rear feet (4) is desired to be adjusted. The worm (9)

that also rotates around the axis thereof together with the shaft (8) provides the worm gear (10) to rotate around the axis thereof. The cam (14) at the inner surface of the channel (12) rotates the adaptor shaft (13) together with the worm gear (10) by means of the groove (15) wherein the cam (14) is seated. The adaptor shaft (13) rotates the vertical member (7) around the axis thereof where-with the adaptor shaft (13) is engaged. The vertical member (7) rotates around the axis thereof in the housing (3) by means of the screw threads thereon.

[0025] In an embodiment of the present invention, the height adjustment mechanism (5) comprises a recess (16) situated at the upper surface of the vertical member (7) and an extension (17) disposed at the end of the adaptor shaft (13) that transmits the motion of the adaptor shaft (13) to the vertical member (7) by being seated in the recess (16).

[0026] In another embodiment of the present invention, the height adjustment mechanism (5) comprises a biasing means (18) that engages the adaptor shaft (13) and the worm gear (10) with each other. The biasing means (18) with one end mounted to the worm gear (10) and the other end to the adaptor shaft (13), pulls the adaptor shaft (13) downwards and hence presses onward the vertical member (7). Thus, when the adaptor shaft (13) is placed into the casing (11), the connection between the adaptor shaft (13) and the vertical member (7) is prevented from breaking off. Furthermore, the biasing means (18) also provides the extension (17) to be seated in the recess (16) while the adaptor shaft (13) presses downwards.

[0027] In a variation of this embodiment, the height adjustment mechanism (5) comprises two hooks (19, 119), one disposed on the worm gear (10) and the other one on the adaptor shaft (13) whereto the ends of the biasing means (18) are attached.

[0028] In another embodiment of the present invention, the height adjustment mechanism (5) comprises a guide (20) disposed at the lower side of the casing (11), concentric with the channel (12) and wherein the vertical member (7) is disposed.

[0029] In another embodiment of the present invention, the casing (11) comprises an upper lid (21) and a lower lid (22) which are connected to each other by snap-fit method.

[0030] In another embodiment of the present invention, the foot (4) is produced from metal material and the adaptor shaft (13) from rigid plastic.

[0031] In the household appliance (1) of the present invention, the height adjustment of the rear foot (4) can be made from a point at the front side of the body (2) by means of the height adjustment mechanism (5). The height adjustment mechanism (5) provides the height of the household appliance (1) to be adjusted by rotating the vertical member (7), with screw threads on the outer surface thereof, around the axis thereof inside the housing (3) wherein the vertical member (7) is disposed. The adaptor shaft (13) that transmits the motion of the worm

gear (10) to the vertical member (7) functions like a screwdriver. Consequently, any kind of form does not need to be configured on the lateral surfaces of the vertical member (7) for transmitting motion from the height adjustment mechanism (5) to the foot (4). Accordingly, the production process of the foot (4) becomes easier.

[0032] It is to be understood that the present invention is not limited by the embodiments disclosed above and a person skilled in the art can easily introduce different embodiments. These should be considered within the scope of the protection postulated by the claims of the present invention.

Claims

1. A household appliance (1) comprising a body (2), a housing (3) situated on the base of the body (2), a foot (4) mounted into the housing (3), having a resting surface (6) resting on the surface and a vertical member (7) and a height adjustment mechanism (5) that provides the height of the foot (4) to be adjusted, having a shaft (8) at the lower side of the body (2), extending horizontally from the front surface of the body (2) to the rear and moved by being rotated around itself, providing the motion to be transmitted from the front backwards, a worm (9) rotated by the shaft (8), a worm gear (10) rotated by the worm (9) and that changes the movement direction thereof, a casing (11) wherein the worm (9) and the worm gear (10) are disposed, mounted on the body (2) so as to be aligned with the foot (4), a channel (12) disposed in the middle of the worm gear (10) and concentric with the vertical member (7), **characterized by** the vertical member (7) being pivotably being mounted to the resting surface (6) and the height adjustment mechanism (5) comprising

- an adaptor shaft (13) that is borne into the channel (12) and engages with the vertical member (7),
- a cam (14) disposed at the inner surface of the channel (12) and
- a groove (15) disposed on the adaptor shaft (13), wherein the cam (14) is seated.

2. A household appliance (1) as in Claim 1, **characterized by** the height adjustment mechanism (5) comprising a recess (16) situated at the upper surface of the vertical member (7) and an extension (17) disposed at the end of the adaptor shaft (13) that transmits the motion of the adaptor shaft (13) to the vertical member (7) by being seated in the recess (16).
3. A household appliance (1) as in Claim 1 or 2, **characterized by** the height adjustment mechanism (5) comprising a biasing means (18) that engages the adaptor shaft (13) and the worm gear (10) with each

other.

4. A household appliance (1) as in Claim 3, **characterized by** the height adjustment mechanism (5) comprising two hooks (19, 119), one disposed on the worm gear (10) and the other one on the adaptor shaft (13) where to the ends of the biasing means (18) are attached.
5. A household appliance (1) as in any one of the above Claims, **characterized by** the height adjustment mechanism (5) comprising a guide (20) disposed at the lower side of the casing (11), concentric with the channel (12) and wherein the vertical member (7) is disposed.
6. A household appliance (1) as in any one of the above Claims, **characterized by** the casing (11) comprising an upper lid (21) and a lower lid (22) which are connected to each other by the snap-fit method.
7. A household appliance (1) as in any one of the above Claims, **characterized by** the foot (4) that is produced from metal material and the adaptor shaft (13) that is produced from rigid plastic.

Patentansprüche

1. Haushaltsgesetz (1), umfassend einen Gehäusekörper (2), ein Gehäuse (3), das auf der Basis des Gehäusekörpers (2) angeordnet ist, einen Fuß (4), der in das Gehäuse (3) montiert ist und eine Ruhefläche (6) aufweist, die auf der Fläche ruht, und ein vertikales Element (7) und einen Höheneinstellmechanismus (5), der dafür sorgt, dass die Höhe des Fußes (4) eingestellt wird, mit einer Welle (8) an der unteren Seite des Gehäusekörpers (2), die sich horizontal von der Vorderfläche des Gehäusekörpers (2) nach hinten erstreckt und durch Drehen um sich selbst bewegt wird und dafür sorgt, dass die Bewegung von vorne nach hinten übertragen wird, einer Schnecke (9), die von der Welle (8) gedreht wird, einem Schneckenrad (10), das von der Schnecke (9) gedreht wird und die Bewegungsrichtung davon ändert, einem Kasten (11), in dem die Schnecke (9) und das Schneckenrad (10) angeordnet sind, und der derart am Gehäusekörper (2) montiert ist, dass er am Fuß (4) ausgerichtet ist, einem Kanal (12), der in der Mitte des Schneckenrades (10) angeordnet ist und zum vertikalen Element (7) konzentrisch ist, **dadurch gekennzeichnet, dass** das vertikale Element (7) schwenkbar an der Ruhefläche (6) ist und der Höheneinstellmechanismus (5) Folgendes umfasst
 - eine Adapterwelle (13), die im Kanal (12) getragen wird und in Eingriff mit dem vertikalen

Element (7) steht,

- einen Nocken (14), der an der Innenfläche des Kanals (12) angeordnet ist, und
- eine Nut (15), die an der Adapterwelle (13) angeordnet ist und in der der Nocken (14) sitzt.

2. Haushaltsgesetz (1) nach Anspruch 1, **dadurch gekennzeichnet, dass** der Höhengestellmechanismus (5) eine Vertiefung (16) umfasst, die an der Oberfläche des vertikalen Elements (7) angeordnet ist, und eine Verlängerung (17), die am Ende der Adapterwelle (13) angeordnet ist und die Bewegung der Adapterwelle (13) auf das vertikale Element (7) überträgt, indem sie in der Vertiefung (16) sitzt.
3. Haushaltsgesetz (1) nach Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** der Höhengestellmechanismus (5) ein Vorspannmittel (18) umfasst, das die Adapterwelle (13) und das Schneckenrad (10) miteinander in Eingriff bringt.
4. Haushaltsgesetz (1) nach Anspruch 3, **dadurch gekennzeichnet, dass** der Höhengestellmechanismus (5) zwei Haken (19, 119) umfasst, von denen einer am Schneckenrad (10) und der andere an der Adapterwelle (13) angeordnet ist, und an denen die Enden des Vorspannmittels (18) angebracht sind.
5. Haushaltsgesetz (1) nach einem der vorangehenden Ansprüche, **dadurch gekennzeichnet, dass** der Höhengestellmechanismus (5) eine Führung (20) umfasst, die an der Unterseite des Kastens (11) angeordnet ist und konzentrisch zu dem Kanal (12) ist, und in der das vertikale Element (7) angeordnet ist.
6. Haushaltsgesetz (1) nach einem der vorangehenden Ansprüche, **dadurch gekennzeichnet, dass** der Kasten (11) einen oberen Deckel (21) und einen unteren Deckel (22) umfasst, die durch Einrasten miteinander verbunden sind.
7. Haushaltsgesetz (1) nach einem der vorangehenden Ansprüche, **dadurch gekennzeichnet, dass** der Fuß (4) aus Metallmaterial hergestellt ist und die Adapterwelle (13) aus starrem Kunststoff hergestellt ist.

Revendications

1. Un électroménager (1) comprenant un corps (2), un logement (3) situé sur la base du corps (2), un pied (4) qui est monté dans le logement (3) et qui a une surface de support (6) qui s'appuie sur la surface et un élément vertical (7), un mécanisme de réglage en hauteur (5) qui permet l'ajustement de la hauteur du pied (4) et qui a un arbre (8) au côté inférieur du corps (2), s'étendant horizontalement de la surface avant du corps (2) à l'arrière et déplacé en étant tour-

né autour de lui-même, permettant la transmission du mouvement de l'avant vers l'arrière, une vis sans fin (9) tournée par l'arbre (8), un engrenage à vis sans fin (10) tourné par la vis sans fin (9) et qui change le sens du mouvement de celui-ci, un boîtier (11) où la vis sans fin (9) et l'engrenage à vis sans fin (10) sont disposés, qui est monté sur le corps (2) de manière à être aligné avec le pied (4), et un canal (12) qui est disposé au milieu de l'engrenage à vis sans fin (10) et qui est concentrique avec l'élément vertical (7),

caractérisé par l'élément vertical (7) qui est monté à la surface de support (6) de manière pivotante, et le mécanisme de réglage en hauteur (5) comprenant

- un arbre d'adaptateur (13) qui est supporté dans le canal (12) et qui vient en prise avec l'élément vertical (7),
- une came (14) disposée sur la surface intérieure du canal (12) et
- une rainure (15) qui est disposée sur l'arbre d'adaptateur (13) et où la came (14) est placée.

2. Un électroménager (1) selon la Revendication 1, **caractérisé par** le mécanisme de réglage en hauteur (5) comprenant un évidement (16) situé sur la surface supérieure de l'élément vertical (7) et une extension (17) disposée à l'extrémité de l'arbre d'adaptateur (13) qui transmet le mouvement de l'arbre d'adaptateur (13) à l'élément vertical (7) en étant placée dans l'évidement (16).
3. Un électroménager (1) selon la Revendication 1 ou 2, **caractérisé par** le mécanisme de réglage en hauteur (5) comprenant un ressort (18) qui engage l'arbre d'adaptateur (13) et l'engrenage à vis sans fin (10) l'un avec l'autre.
4. Un électroménager (1) selon la Revendication 3, **caractérisé par** le mécanisme de réglage en hauteur (5) comprenant deux crochets (19, 119), l'un disposé sur l'engrenage à vis sans fin (10) et l'autre disposé sur l'arbre d'adaptateur (13), auxquels les extrémités du ressort (18) sont attachées.
5. Un électroménager (1) selon l'une quelconque des revendications précédentes, **caractérisé par** le mécanisme de réglage en hauteur (5) comprenant un guide (20) qui est disposé au côté inférieur du boîtier (11), concentrique avec le canal (12) et dans lequel l'élément vertical (7) est disposé.
6. Un électroménager (1) selon l'une quelconque des revendications précédentes, **caractérisé par** le boîtier (11) comprenant un couvercle supérieur (21) et un couvercle inférieur (22) qui sont reliés l'un à l'autre par la méthode d'encliquetage.

7. Un électroménager (1) selon l'une quelconque des revendications précédentes, **caractérisé par** le pied (4) qui est produit de métal et l'arbre d'adaptateur (13) qui est produit de plastique rigide.

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Figure 1

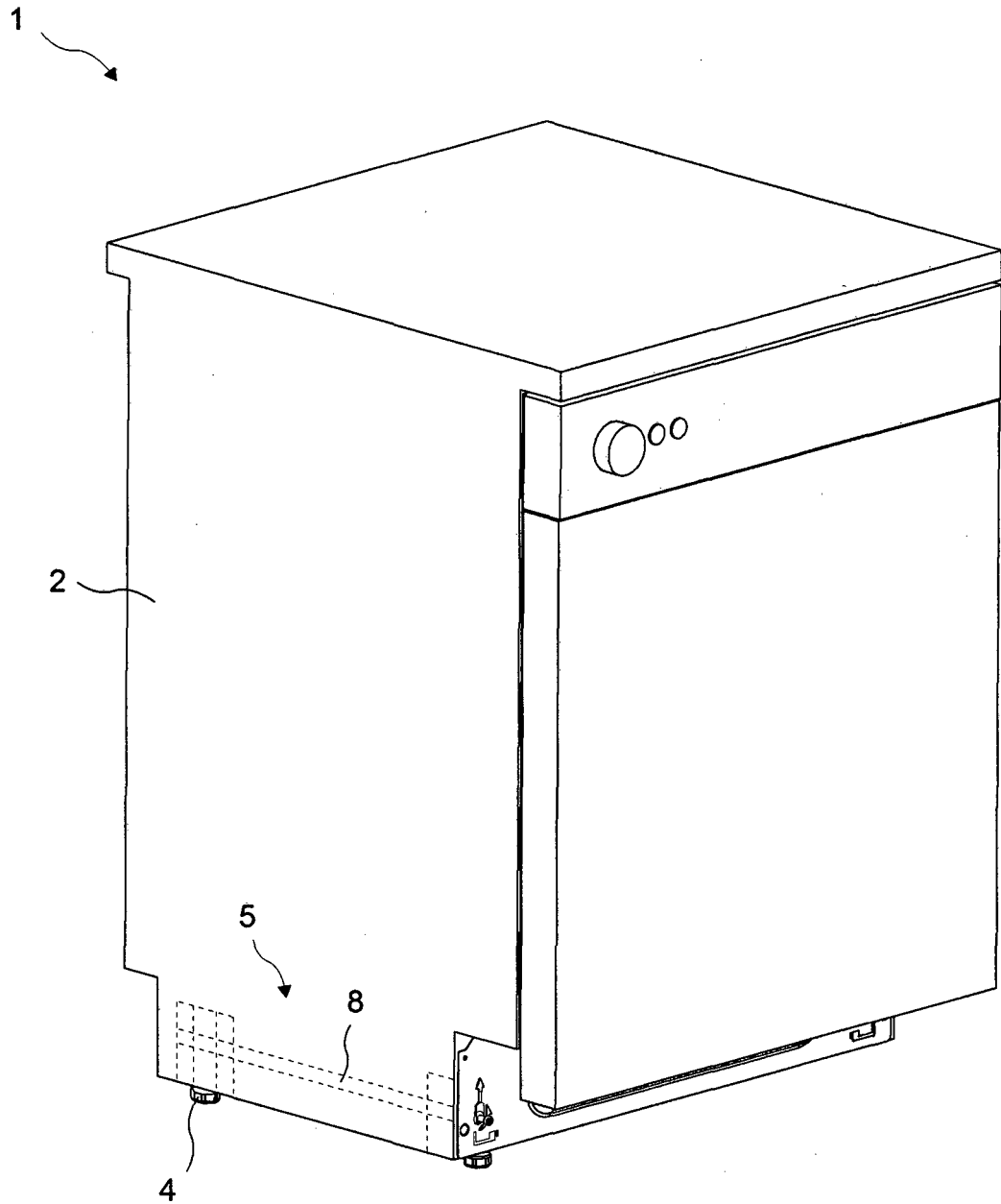


Figure 2

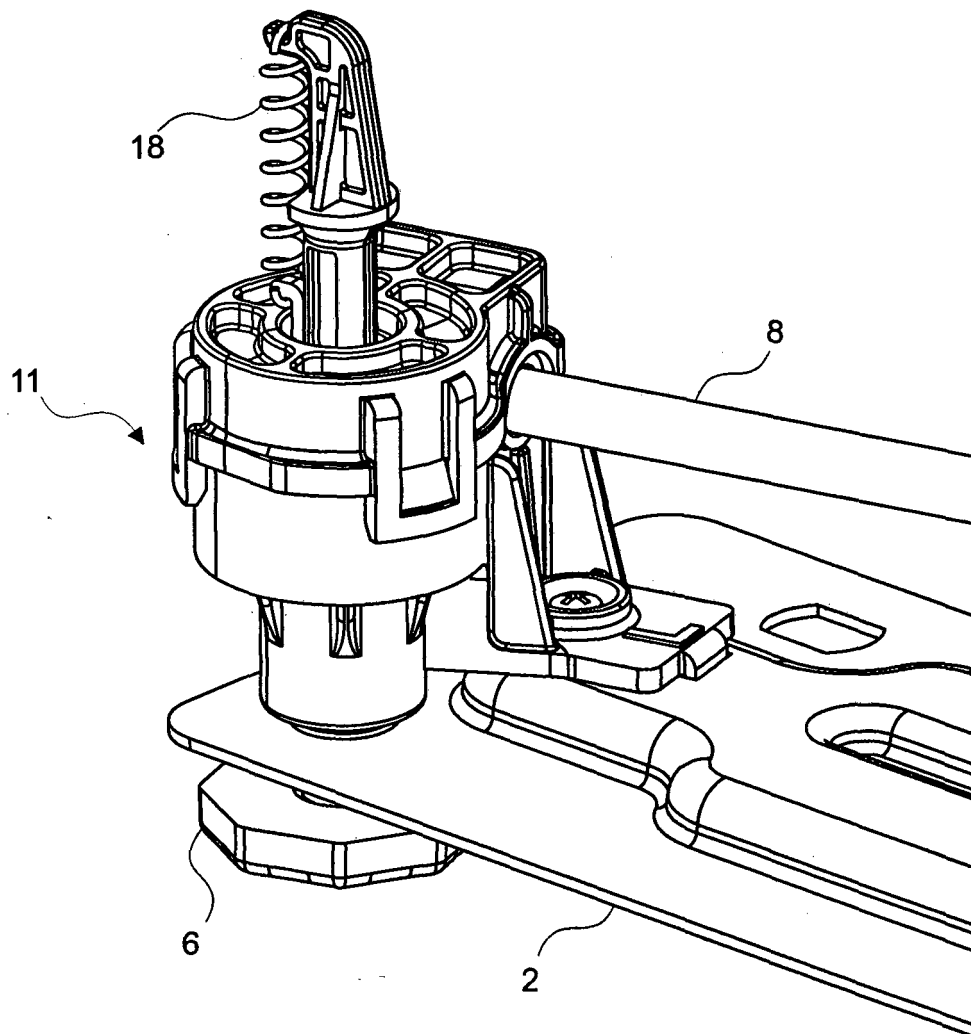


Figure 3

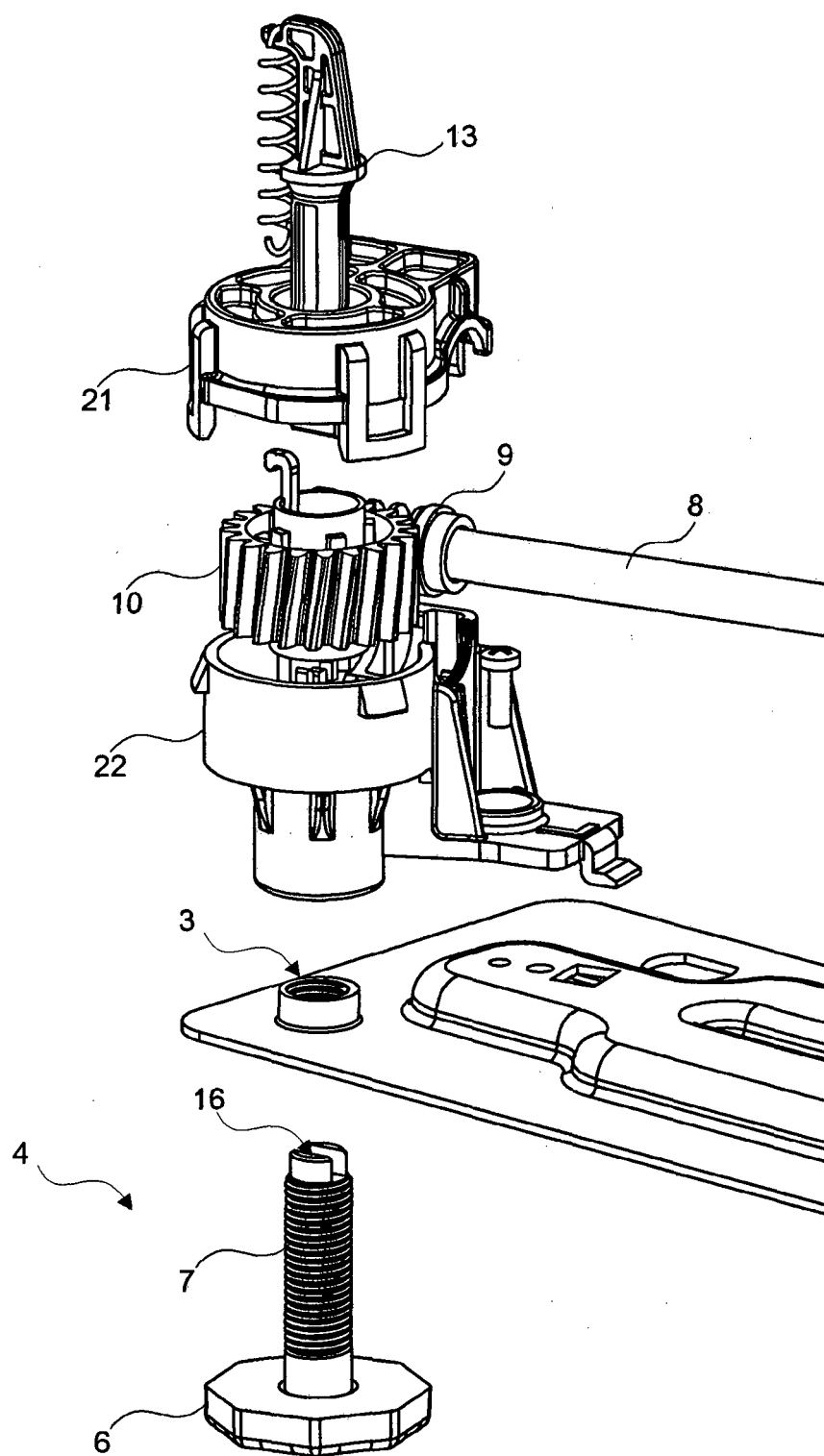


Figure 4

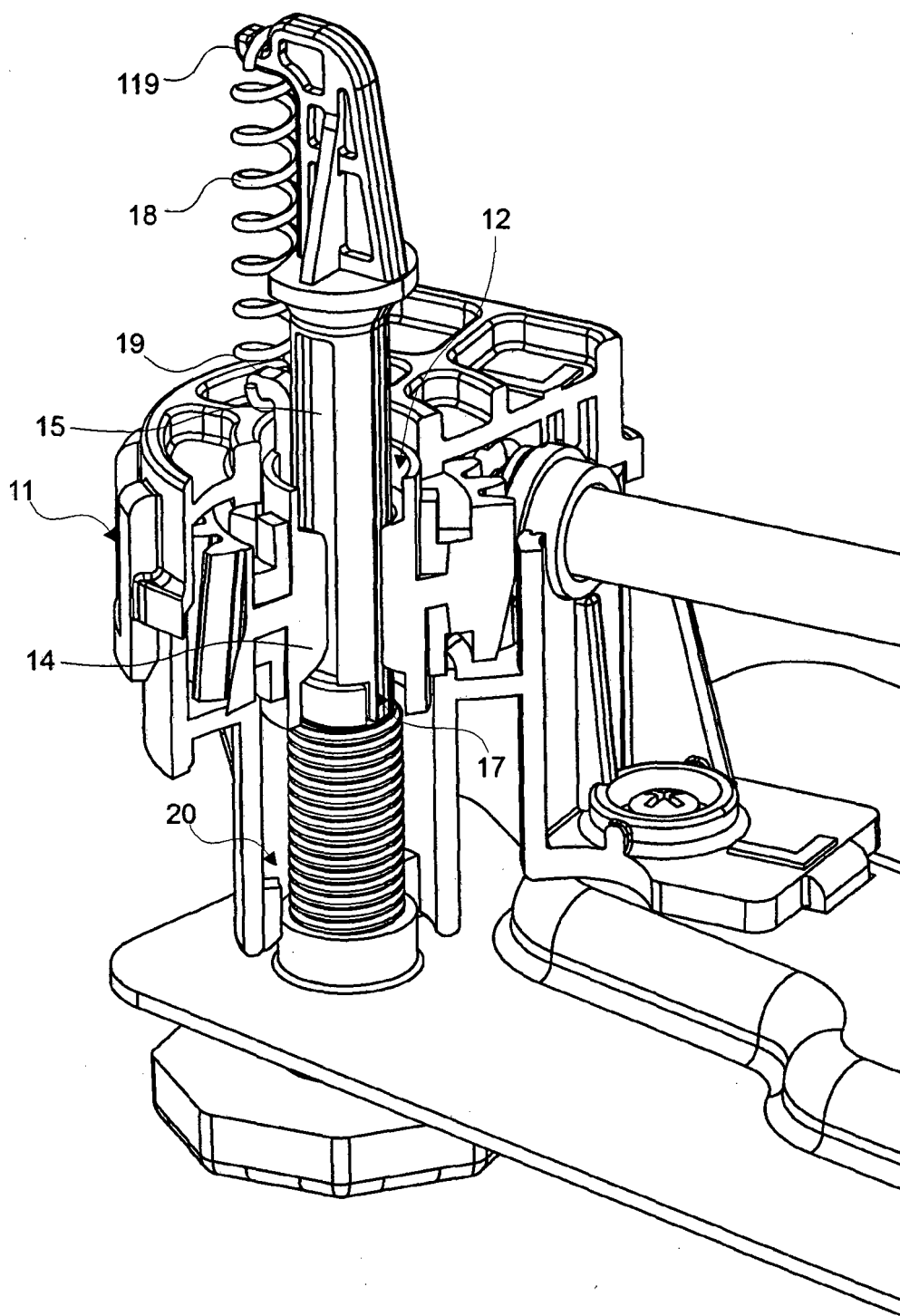
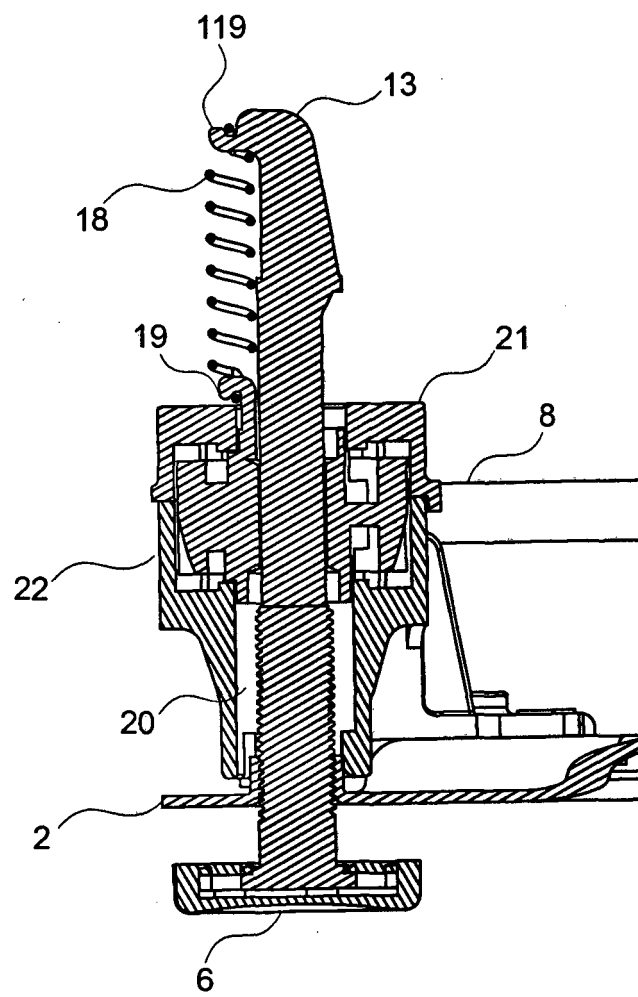


Figure 5



REFERENCES CITED IN THE DESCRIPTION

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