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(54) **A WASHER OR WASHER-DRYER COMPRISING A BAFFLE**

WASCHMASCHINE ODER WASCHTROCKNER MIT EINEM LEITBLECH

LAVE-LINGE OU SÈCHE-LINGE COMPRENANT UN DÉFLECTEUR

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Description

[0001] The present invention relates to a washer or washer-dryer comprising a baffle which filters the rinsing water.

[0002] Effective use of water resources, which are destroyed due to climate change, global warming and unconscious water consumption, gradually gains more importance. In washing machines and washer-dryers which combine washing and drying functions, it is a requirement in terms of energy efficiency that the cleaning of contaminated textile products is performed with the least amount of water and in the shortest time possible.

[0003] In the rinsing step, water is sent to the textile products cleaned with detergent in the washing step to remove the detergent. It is known that the detergent remaining on the textile at the end of the rinsing step is harmful for human health. Therefore, a high amount of water is consumed in the rinsing step and multiple rinsing cycles are carried out in order to reduce detergent residues and remove the detergent remaining on the textile surface at the levels set forth by the standards. Moreover, spin-drying is performed for rinsing purposes at high speeds to remove the detergent water on the textile, which causes an increase in energy consumption.

[0004] In the state of the art Korean Patent Document No. KR101059910B1, a filter unit is disclosed, which is positioned in the body at the lower section of the tube and which comprises a filter produced from a material such as nonwoven fabric, etc. in order to cleanse the dirt and detergent residues in the laundry washing cycle.

[0005] In the state of the art Patent Application No. KR20030012679A1, a washing machine is disclosed, comprising a filter unit which filters foreign particles such as fibers, etc. in order to decrease water consumption in the washing cycle. In another state of the art Patent Application No. US2008282747A1, a washing machine is disclosed, comprising a filter capable of removing foreign matter from water while agitating laundry.

[0006] The aim of the present invention is the realization of a washer or washer-dryer wherein the rinsing water which gets dirty with residues such as detergent, fibers, textile dyes, etc. remaining on the laundry after the first rinsing step is cleaned to be reused.

[0007] The washer or washer-dryer of the present invention comprises a baffle which filters the detergent, dye and textile fibers in the rinsing water during the rinsing step.

[0008] The washer or washer-dryer of the present invention comprises a baffle having at least one nonwoven fabric filter coated with cationic material and/or a cationic polymer filter. The clean water delivered onto the laundry in the first rinsing step is passed through the baffle comprising the filter before the second rinsing step to be cleaned and thus the filtered water can be reused in the rinsing steps.

[0009] The selected cationic polymer material and/or polymer mixtures are in liquid form according to their molecular weight and the proportion of monomers in the copolymer, and are in a form suitable to be applied/coated to the nonwoven fabric filter or in a hard and rigid form, and can be also used in solid form which is filled into the cylindrical filter body. The filter is detachably placed in a housing in the baffle. In an embodiment of the present invention, the filter can be directly attached into the baffle receptacle.

[0010] The nonwoven filter coated with cationic polymer material or the cationic polymer ball filter filters the detergent residues, textile dyes, dirt and fibers remaining in the water after the rinsing step so as to enable the water to be cleaned and reused in the rinsing steps.

[0011] The nonwoven filter in an embodiment of the present invention is produced from biodegradable and recycled materials.

[0012] By means of the present invention, a washer or washer-dryer is realized, which performs the washing process with less water and lower number of rinsing steps. Moreover, the amount of dirt in the waste water generated at the end of the washing cycle is reduced.

[0013] The model embodiments relating to a washer or washer-dryer comprising the baffle realized in order to attain the aim of the present invention are illustrated in the attached figures, where:

Figure 1 - is the front view of the washer or washer-dryer of the present invention.

Figure 2 - is the perspective view of the washer or washer-dryer of the present invention in an embodiment wherein the front and top panels thereof are removed.

Figure 3 - is the exploded view of the baffle in the embodiment of the washer or washer-dryer of the present invention comprising the polymer filter.

Figure 4 - is the detailed view of the polymer filter of the washer or washer-dryer of the present invention.

Figure 5 - is the exploded view of the baffle comprising the nonwoven fabric filter in an embodiment of the washer or washer-dryer of the present invention.

Figure 6 - is the front view of the tub of the washer or washer-dryer of the present invention.

Figure 7 - is the view of the cross-section A-A in Figure 6 in the embodiment wherein the tub comprises the polymer filter baffle.

Figure 8 - is the view of the cross-section A-A in Figure 6 in the embodiment wherein the tub comprises the baffle having the nonwoven fabric filter.

Figure 9 - is the detailed view of the Area A in Figure 8 showing the movements of the shutter when the water reaches the baffle.

[0014] The elements illustrated in the figures are numbered as follows:

1. Washer or washer-dryer

2. Body
3. Tub
4. Drum
5. Baffle
6. Filter
7. Nozzle
8. Lid
9. Housing
10. Filter body
11. Pin
12. Upper plate
13. First opening
14. Second opening
15. Discharge opening
16. Spring
17. First ring
18. Second ring
19. Sealing member
20. Screw thread
21. Shutter
22. Channel
23. Pipe
24. Sensor
25. Control unit

[0015] The washer or washer-dryer (1) comprises a body (2); a drum (4) which is disposed in the body (2) and wherein the laundry is loaded; a tub (3) wherein the drum (4) is disposed; and a baffle (5) which is provided in the drum (4), which has at least one nozzle (7) providing the delivery of water into the drum (4) and which tumbles the laundry.

[0016] The washer or washer-dryer (1) of the present invention comprises the baffle (5) having at least one filter (6) with cationic polymer material filtering residues in the water such as detergent, dye, etc., at least one housing (9) suitable for the placement of the filter (6), and a lid (8) which covers the housing (9). Waste materials such as detergent, textile dye, etc. mixing with the water during the rinsing step are anionic due to their chemical characteristics. By means of the filter (6) having cationic polymer material which is placed into the baffle (5) with the use of the housing (9), the anionic loads in the water are retained by the filter (6) and thus the rinsing water is cleaned and used more than once in the washing cycle. Moreover, by means of the lid (8), the filter (6) can be reached without detaching the baffle (5) from the drum (4), and the filter (6) can be changed.

[0017] In an embodiment of the present invention, the cationic polymer material of the filter (6) is at least one polymer selected from among acrylate-based copolymer, acrylic acid homopolymer, polyacrylamide, acrylic acid-acrylamide copolymer and n-vinyl pyrrolidone - acrylic acid copolymer mixture.

[0018] In an embodiment of the present invention, the washer or washer-dryer (1) comprises the filter (6) comprising a filter body (10) having an upper plate (12), a first opening (13) provided on the upper plate (12), a second opening (14) on the filter body (10) aligning with the first opening (13), a pin (11) disposed between the first opening (13) and the second opening (14), and a spring (16) surrounding the pin (11) to enable the pin (11) to be moved in the filter body (10); and the baffle (5) having the lid (8) which covers the second opening (14), which detachably connects the filter (6) to the housing (9) and which comprises a discharge opening (15) thereon. In said embodiment of the present invention, the filter body (10) is placed into the housing (9). The filter body (10) contains cationic polymer material therein. The filter body (10) is preferably cylindrical and has the upper plate (12). The second opening (14) aligning with the upper plate (12) is provided on the filter body (10). The upper surface of the pin (11) is placed between the first opening (13) and the second opening (14) so as to be flush with the first opening (13). The pin (11) and the spring (16) move with the pressure of the water reaching the upper plate (12) during the rinsing step and the filtered water is delivered into the drum (4) through the discharge hole (15) provided on the lid (8).

[0019] In an embodiment of the present invention, the filter (6) comprises the pin (11) having the a first ring (17) placed into the first opening (13) and a second ring (18) placed into the discharge hole (15). Thus, the pin (11) is tightly mounted into the filter body (10) and does not move in case there is no water pressure in the rinsing step.

[0020] In an embodiment of the present invention, the filter (6) comprises two sealing members (19) one placed between the upper plate (12) and the first ring (17) and the other placed between the discharge hole (15) and the second ring (18). By means of the sealing member (19), the water is prevented from leaking into the filter body (10) except the rinsing step, and thus the economic life of the filter (6) is extended.

[0021] In an embodiment of the present invention, the baffle (5) comprises screw threads (20) on the lid (8) and the filter body (10) which detachably connect the lid (8) and the filter body (10) to each other. By means of the screw threads (20) provided on the lid (8) and the filter body (10), the filter (6) can be detachably attached to the baffle (5) by being rotated and the filter (6) can be replaced when the economic life thereof expires.

[0022] In an embodiment of the present invention, the baffle (5) comprises the filter body (10) which is a nonwoven fabric coated with cationic polymer material, and a shutter (21) which is placed between the filter (6) and the baffle (5) and which allows the passage of the rinsing water to the filter body (10). In this embodiment, the filter (6) can filter textile fiber wastes in addition to textile dye and detergent wastes thanks to the nonwoven fabric structure thereof.

[0023] In the embodiment of the present invention wherein the filter body (10) is nonwoven fabric coated with cationic polymer material, the washer or washer-dryer (1) comprises a pipe (23) placed at one side of the baffle (5), and the lid (8) having a channel (22) which enables the lid (8) to be opened/closed by pivoting around

the pipe so as to provide access to the filter (6). The filter body (10) which is nonwoven fabric coated with cationic polymer material has a wide surface and placed into a housing (9) which is wide like a receptacle in the baffle (5). By means of the structure allowing the lid (8) to be opened from the baffle (5) by pivoting, the entire housing (9) can be accessed, and the filter (6) can be easily detached from the baffle (5), when required, and a new filter (6) can be attached into the baffle (5).

[0024] In an embodiment of the present invention, the washer or washer-dryer (1) comprises a control unit (25) which enables the rinsing water containing detergent, dust, textile fiber and textile dye residues to be passed through the baffle (5) to be filtered during the second and subsequent rinsing steps. Thus, the clean water used in the washing cycle is not passed through the baffle (5) and the economic life of the filter (6) is not unnecessarily decreased.

[0025] In an embodiment of the present invention, the washer or washer-dryer (1) comprises a sensor (24) which measures the amount of residues in the rinsing water and the control unit (25) which warns the user when the economic life of the filter (6) expires according to the data received from the sensor (24).

[0026] By means of the present invention, a washer or washer-dryer (1) is realized, comprising the baffle (5) having the filter (6) which filters the residues in the water such as detergent, dye, fiber, etc.

Claims

1. A washer or washer-dryer (1) **comprising** a body (2); a drum (4) which is disposed in the body (2) and wherein the laundry is loaded; a tub (3) wherein the drum (4) is disposed; and a baffle (5) which is provided in the drum (4), which has at least one nozzle (7) providing the delivery of water into the drum (4) and which tumbles the laundry, the baffle (5) having at least one filter (6) filtering residues in the water such as detergent, dye, etc., at least one housing (9) suitable for the placement of the filter (6), and a lid (8) which covers the housing (9) **characterized by** the filter (6) with cationic polymer material comprising a filter body (10) having an upper plate (12), a first opening (13) provided on the upper plate (12), a second opening (14) on the filter body (10) aligning with the first opening (13), a pin (11) disposed between the first opening (13) and the second opening (14), and a spring (16) surrounding the pin (11) to enable the pin (11) to be moved in the filter body (10); and the baffle (5) having the lid (8) which covers the second opening (14), which detachably connects the filter (6) to the housing (9) and which comprises a discharge opening (15) thereon, the pin having a first ring (17) placed into the first opening (13) and a second ring (18) placed into the discharge hole (15) and the filter comprising two sealing members (19) one placed between the upper plate (12) and the first ring (17) and the other placed between the discharge hole (15) and the second ring (18).

2. A washer or washer-dryer (1) as in Claim 1, **characterized by** the filter (6) comprising at least one cationic polymer material selected from among acrylate-based copolymer, acrylic acid homopolymer, polyacrylamide, acrylic acid-acrylamide copolymer and n-vinyl pyrrolidone - acrylic acid copolymer mixture.

3. A washer or washer-dryer (1) as in any one of the Claims 1 or 2, **characterized by** the baffle (5) comprising screw threads (20) on the lid (8) and the filter body (10) which detachably connect the lid (8) and the filter body (10) to each other.

4. A washer or washer-dryer (1) as in Claim 1 or 2, **characterized by** the baffle (5) comprising the filter body (10) which is a nonwoven fabric coated with cationic polymer material, and a shutter (21) which is placed between the filter (6) and the baffle (5) and which allows the passage of the rinsing water to the filter body (10).

5. A washer or washer-dryer (1) as in Claim 4, **characterized by** a pipe (23) placed at one side of the baffle (5), and the lid (8) having a channel (22) which enables the lid (8) to be opened/closed by pivoting around the pipe so as to provide access to the filter (6).

6. A washer or washer-dryer (1) as in any one of the above claims, **characterized by** a control unit (25) which enables the rinsing water containing detergent, dust, textile fiber and textile dye residues to be passed through the baffle (5) to be filtered during the second and subsequent rinsing steps.

7. A washer or washer-dryer (1) as in Claim 6, **characterized by** a sensor (24) which measures the amount of residues in the rinsing water and the control unit (25) which warns the user when the economic life of the filter (6) expires according to the data received from the sensor (24).

Patentansprüche

1. Eine Waschmaschine oder Waschtrockner (1) umfasst einen Körper (2); eine Trommel (4), die in dem Körper (2) angeordnet ist und in die die Wäsche geladen wird; eine Wanne (3), in der die Trommel (4) angeordnet ist; und ein Ablenkblech (5), das in der Trommel (4) vorgesehen ist, das mindestens eine Düse (7) aufweist, die die Abgabe von Wasser in die Trommel (4) bereitstellt und die Wäsche wendet, wo-

bei das Ablenkblech (5) mindestens einen Filter (6) aufweist, der Rückstände in dem Wasser, wie Waschmittel, Farbstoff usw., filtert, mindestens ein Gehäuse (9), das für die Platzierung des Filters (6) geeignet ist, und einen Deckel (8), der das Gehäuse (9) abdeckt, **gekennzeichnet ist sie dadurch,** dass der Filter (6) mit kationischem Polymermaterial einen Filterkörper (10) mit einer oberen Platte (12), eine an der oberen Platte (12) vorgesehene erste Öffnung (13), eine mit der ersten Öffnung (13) fluchtende zweite Öffnung (14) am Filterkörper (10), einen zwischen der ersten Öffnung (13) und der zweiten Öffnung (14) angeordneten Stift (11) und eine den Stift (11) umgebende Feder (16) aufweist, um den Stift (11) im Filterkörper (10) bewegen zu können und das Ablenkblech (5) den Deckel (8) aufweist, der die zweite Öffnung (14) abdeckt, der den Filter (6) lösbar mit dem Gehäuse (9) verbindet und der eine Auslassöffnung (15) aufweist, wobei der Stift einen ersten Ring (17) aufweist, der in der ersten Öffnung (13) angeordnet ist, und einen zweiten Ring (18), der in der Auslassöffnung (15) angeordnet ist, und der Filter zwei Dichtungselemente (19) aufweist, von denen eines zwischen der oberen Platte (12) und dem ersten Ring (17) und das andere zwischen der Auslassöffnung (15) und dem zweiten Ring (18) angeordnet ist.

2. Eine Waschmaschine oder Waschtrockner (1), wie in Anspruch 1 aufgeführt, **ist dadurch gekennzeichnet, dass** der Filter (6) mindestens ein kationisches Polymermaterial umfasst, das aus einem Copolymer auf Acrylatbasis, einem Acrylsäure-Homopolymer, einem Polyacrylamid, einem Acrylsäure-Acrylamid-Copolymer und einem n-Vinylpyrrolidon-Acrylsäure-Copolymer-Gemisch ausgewählt ist.

3. Eine Waschmaschine oder Waschtrockner (1), wie in Anspruch 1 oder 2 aufgeführt, **ist dadurch gekennzeichnet, dass** das Ablenkblech (5) Schraubgewinde (20) am Deckel (8) und am Filterkörper (10) aufweist, die den Deckel (8) und den Filterkörper (10) lösbar miteinander verbinden.

4. Eine Waschmaschine oder Waschtrockner (1), wie in Anspruch 1 oder 2 aufgeführt, **ist dadurch gekennzeichnet, dass** das Ablenkblech (5) den Filterkörper (10), der ein mit kationischem Polymermaterial beschichteter Vliesstoff ist, und einen Verschluss (21) umfasst, der zwischen dem Filter (6) und dem Ablenkblech (5) angeordnet ist und der den Durchgang des Spülwassers zum Filterkörper (10) ermöglicht.

5. Eine Waschmaschine oder Waschtrockner (1), wie in Anspruch 4 aufgeführt, **ist dadurch gekennzeichnet, dass** ein Rohr (23) an einer Seite des Ablenkblechs (5) angeordnet ist und der Deckel (8) einen Kanal (22) aufweist, der das Öffnen/Schließen des Deckels (8) durch Schwenken um das Rohr ermöglicht, um den Zugang zum Filter (6) zu ermöglichen.

6. Eine Waschmaschine oder Waschtrockner (1), wie in einem der vorherigen Ansprüchen aufgeführt, **ist dadurch gekennzeichnet, dass** eine Steuereinheit (25), die es ermöglicht, dass das Spülwasser, das Waschmittel-, Staub-, Textilfaser- und Textilfarbstoffreste enthält, durch das Ablenkblechs (5) geleitet wird, um während des zweiten und der folgenden Spülschritte gefiltert zu werden.

7. Eine Waschmaschine oder Waschtrockner (1), wie in Anspruch 6 aufgeführt, **ist dadurch gekennzeichnet, dass** ein Sensor (24), der die Menge an Rückständen im Spülwasser misst, und die Steuereinheit (25), die den Benutzer warnt, wenn die wirtschaftliche Lebensdauer des Filters (6) gemäß den vom Sensor (24) erhaltenen Daten abläuft.

Revendications

1. Une laveuse ou une laveuse-sécheuse (1) **comprenant** un corps (2) ; un tambour (4) qui est disposé dans le corps (2) et dans lequel le linge est chargé ; une cuve (3) dans laquelle le tambour (4) est disposé ; et un déflecteur (5) placé dans le tambour (4), doté d'au moins une buse (7) assurant l'alimentation en eau du tambour (4) et le culbutage du linge, le déflecteur (5) comportant au moins un filtre (6) filtrant les résidus présents dans l'eau, tels que les détergents, les colorants, etc. , au moins un boîtier (9) adapté au placement du filtre (6), et un couvercle (8) qui couvre le boîtier (9) **caractérisé par** le filtre (6) avec un matériau polymère cationique comprenant un corps de filtre (10) ayant une plaque supérieure (12), une première ouverture (13) prévue sur la plaque supérieure (12), une deuxième ouverture (14) sur le corps de filtre (10) s'alignant avec la première ouverture (13), une broche (11) disposée entre la première ouverture (13) et la deuxième ouverture (14),et un ressort (16) entourant l'axe (11) pour permettre à l'axe (11) de se déplacer dans le corps du filtre (10) ; et le déflecteur (5) comportant le couvercle (8) qui couvre la seconde ouverture (14), qui relie de manière amovible le filtre (6) au boîtier (9) et qui comporte un orifice d'évacuation (15), la tige comportant un premier anneau (17) placé dans la première ouverture (13) et un second anneau (18) placé dans l'orifice d'évacuation (15) et le filtre comportant deux éléments d'étanchéité (19), l'un placé entre la plaque supérieure (12) et le premier anneau (17) et l'autre placé entre l'orifice d'évacuation (15) et le second anneau (18).

2. Une laveuse ou une laveuse-sécheuse (1) selon la déclaration 1, **caractérisée par le fait que** le filtre (6) comprend au moins un matériau polymère cationique choisi parmi le copolymère à base d'acrylate, l'homopolymère d'acide acrylique, le polyacrylamide, le copolymère d'acide acrylique-acrylamide et le mélange de copolymères de n-vinyl-pyrrolidone et d'acide acrylique.

3. Une laveuse ou une laveuse-sécheuse (1) selon l'une quelconque des déclarations 1 ou 2, **caractérisée par le fait que** le déflecteur (5) comprend des filetages (20) sur le couvercle (8) et le corps de filtre (10) qui relient de manière amovible le couvercle (8) et le corps de filtre (10) l'un à l'autre.

4. Une laveuse ou une laveuse-sécheuse (1) selon la déclaration 1 ou 2, **caractérisée par** le déflecteur (5) comprenant le corps de filtre (10) qui est un tissu non tissé enduit d'un matériau polymère cationique, et un obturateur (21) qui est placé entre le filtre (6) et le déflecteur (5) et qui permet le passage de l'eau de rinçage vers le corps de filtre (10).

5. Une laveuse ou une laveuse-sécheuse (1) selon la déclaration 4, **caractérisée par** un tuyau (23) placé d'un côté du déflecteur (5), et le couvercle (8) ayant un canal (22) qui permet d'ouvrir/de fermer le couvercle (8) en pivotant autour du tuyau de façon à donner accès au filtre (6).

6. Une laveuse ou une laveuse-sécheuse (1) selon l'une quelconque des déclarations précédentes, **caractérisée par** une unité de commande (25) qui permet de faire passer l'eau de rinçage contenant du détergent, de la poussière, des résidus de fibres textiles et de colorants textiles à travers le déflecteur (5) pour être filtrée lors de la deuxième étape de rinçage et des étapes suivantes.

7. Une laveuse ou une laveuse-sécheuse (1) selon la déclaration 6, **caractérisée par** un capteur (24) qui mesure la quantité de résidus dans l'eau de rinçage et l'unité de commande (25) qui avertit l'utilisateur lorsque la durée de vie économique du filtre (6) expire en fonction des données reçues du capteur (24).

Figure 1

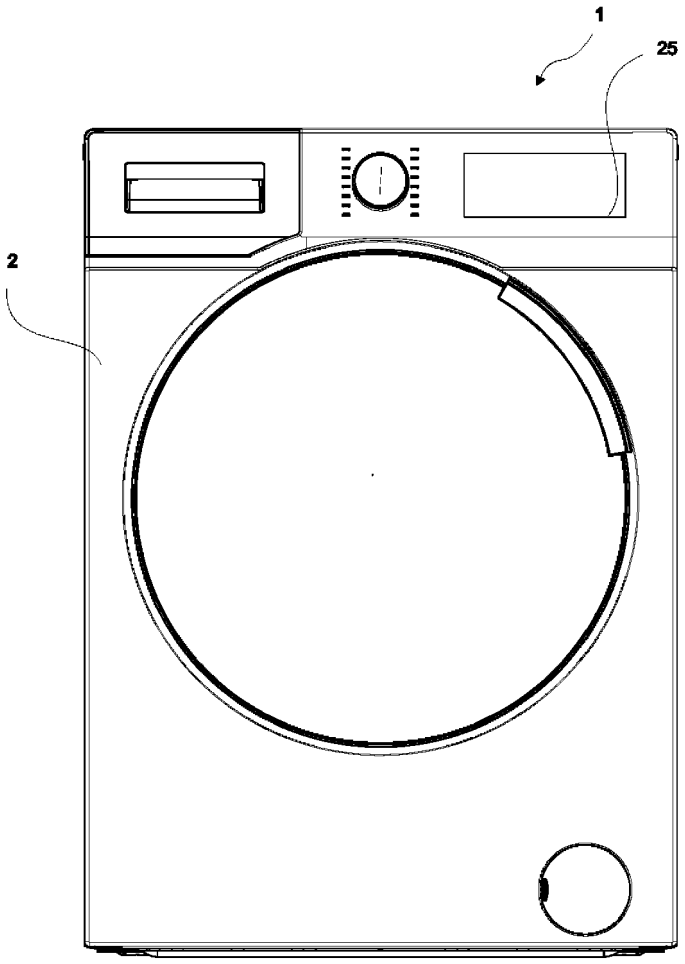


Figure 2

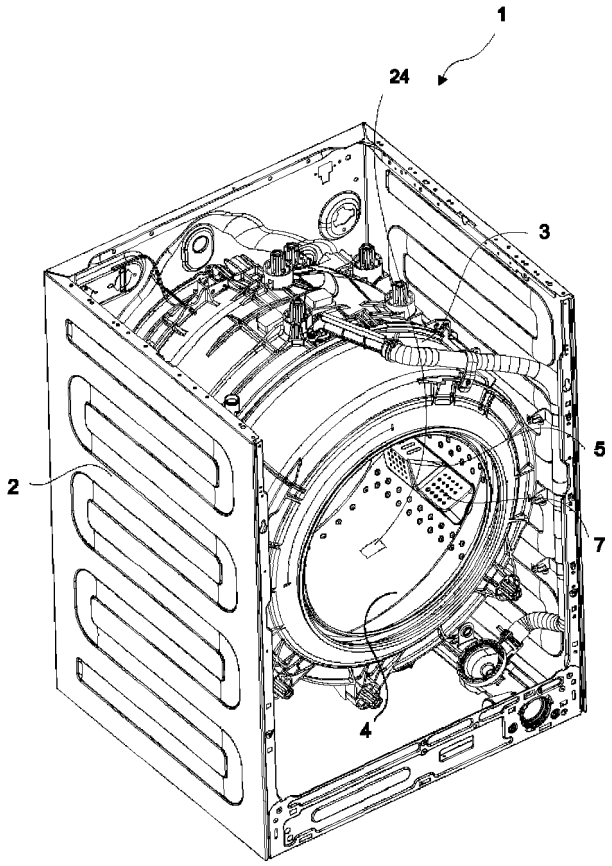


Figure 3

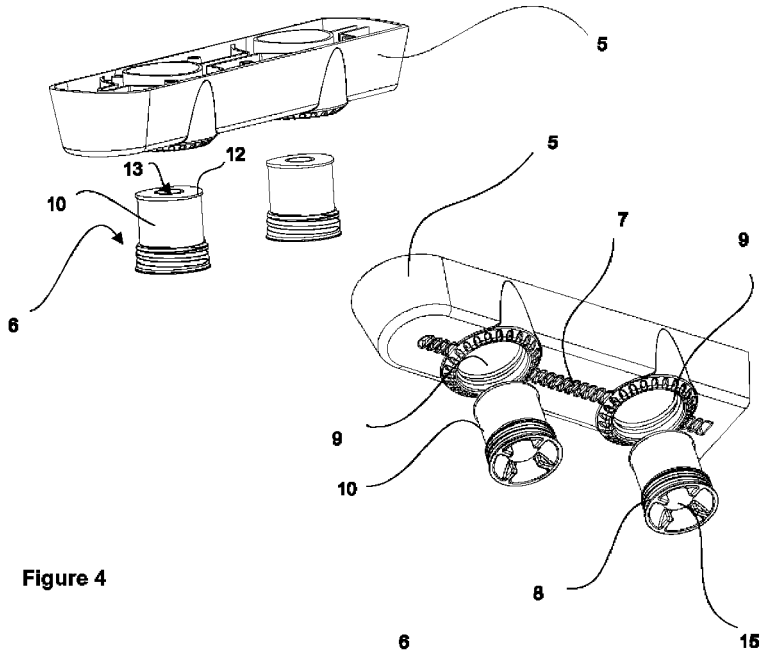


Figure 4

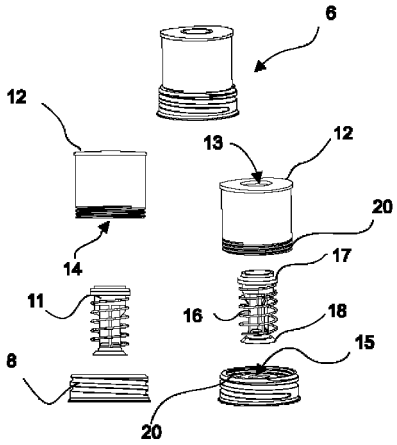


Figure 5

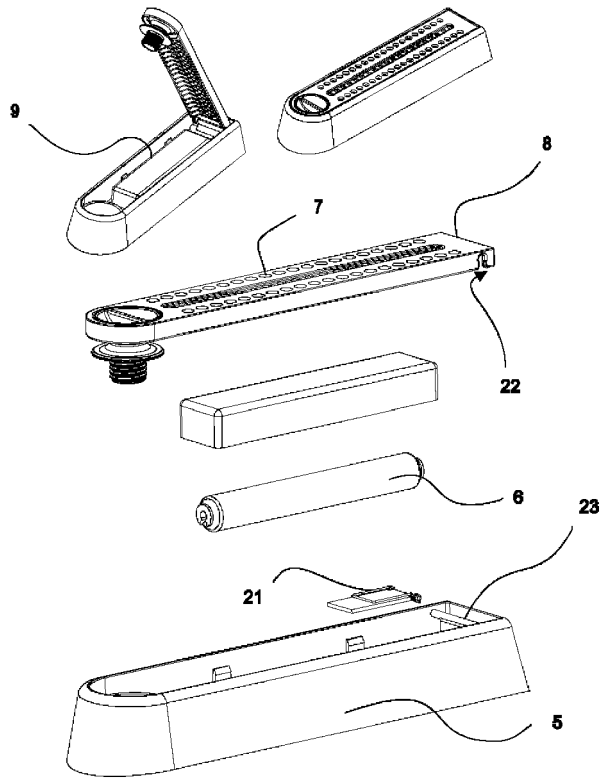


Figure 6

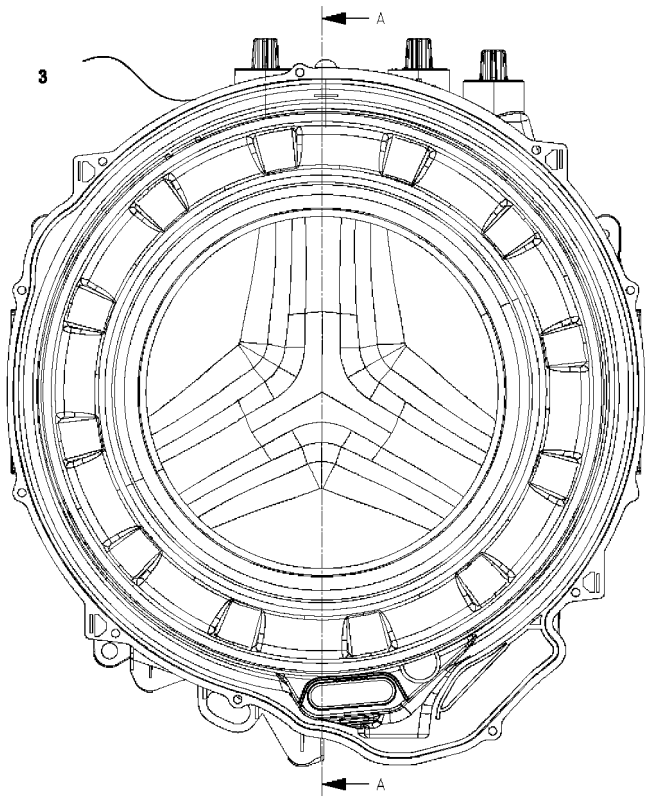


Figure 7

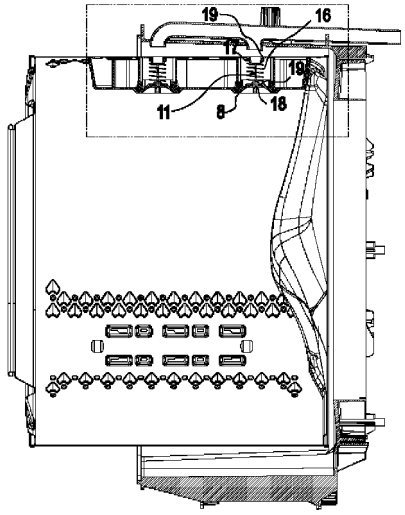


Figure 8

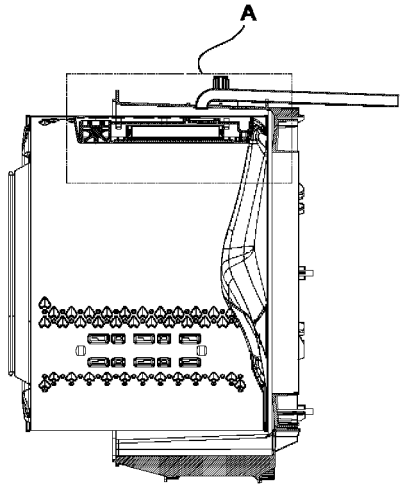
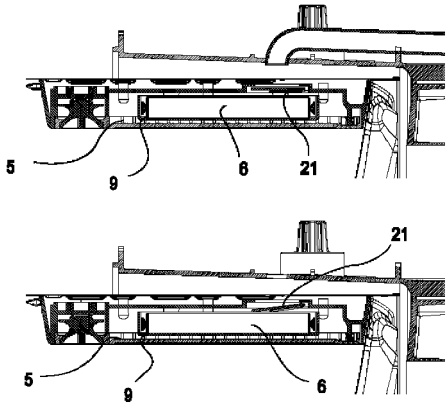


Figure 9



REFERENCES CITED IN THE DESCRIPTION

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