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(54) **DRUM WASHING MACHINE AND CONTROL METHOD**

(57) The disclosure discloses a drum washing machine, which comprises a tank body (1), an outer drum (2) and an inner drum (3), wherein the inner drum (3) comprises a hole area (4) which is provided with holes and a hole-free area (5) which is closed; a sealing assembly (6) is arranged between the inner drum (3) and the outer drum (2) on at least one side of the hole area (4); and a sealed region (8) is defined by the sealing assembly (6), the hole-free area (5) of the inner drum (3) and the outer drum (2). Effective water intake and drainage can be achieved through the hole area (4) of the inner drum (3) of the washing machine, and meanwhile, flushing can be implemented conveniently so as to avoid residues; the hole-free area (5) of the inner drum (3) cooperates with the sealing assembly (6) to form the sealed region (8) between the inner drum and the outer drum, so as to effectively prevent crossed flowing of washing sewage and to avoid dirt accumulation between the inner drum and the outer drum; and with the application of the dirt-avoiding washing mode, the cleaning-free function of the drum washing machine is achieved.

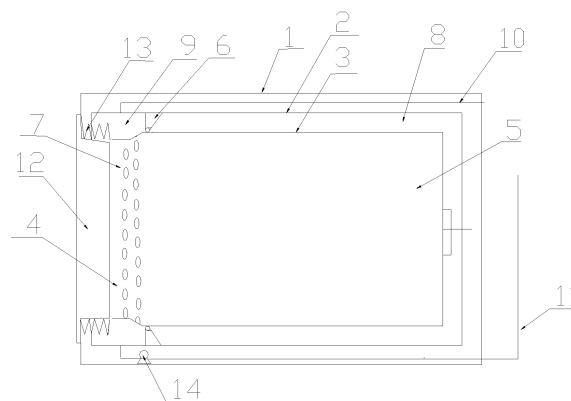


Fig. 1

Description**TECHNICAL FIELD**

[0001] The present disclosure relates to the field of household appliances, and in particular to a drum washing machine and a control method.

BACKGROUND

[0002] At present, for users, a space between an inner drum and an outer drum of an existing drum washing machine is a sealed region which cannot be directly cleaned. After a period of use of the region, certain dirt will adhere to and be accumulated in the space, and if the dirt is not cleared for a long time, secondary pollution can be caused to clothes in a clothes washing process, which not only results in odor in the washing machine but also brings about the influence on body health due to secondary pollution to washed clothes.

[0003] Currently, the following processing approaches are mainly adopted to clean the inner and outer drums of the washing machines: 1, flushing the inner drums by water flow, so as to reduce dirt adhering to the inner drums; 2, cleaning the washing machines periodically by virtue of tank cleaning agents, so as to remove the dirt; 3, providing a hole-free inner drum in a pulsator washing machine so as to avoid dirt, which cannot avoid dust accumulation between inner and outer drums. However, the approaches have the following shortcomings: water flow flushing is not thorough; it is long in consumed time, time-consuming and labor-consuming and it is high in cost in cleaning with agents; and dirt remains in a space, which serves as a drainage channel, between pulsator hole-free drums.

[0004] As prescribed within Chinese patent of application number 201410215346.3, the disclosure relates to a drum washing machine. The drum washing machine comprises a housing, wherein an inner drum and an outer drum are arranged in the housing; a door seal is arranged between the outer drum and the housing; the inner drum is connected to a driving device. The inner drum is a hole-free inner drum, and the inner drum is a conical drum that drum bottom is smaller than drum opening in diameter; the drum opening of the inner drum shrinks inwards in an arc-shaped form; a water intake conduit is arranged on the door seal; one end of the water intake conduit is connected to a washing water rapid heating device; the other end of the water intake conduit penetrates through the door seal and extends into the inner drum; and a drainage port and a water pressure detection device are arranged on the outer drum. According to the technical feature that the hole-free inner drum is adopted, a goal of saving washing water can be achieved; drainage holes are formed in the outer drum; however, dirt can still remain between the inner drum and the outer drum at the bottom; and problems still exist.

[0005] In view of this, the present disclosure is provid-

ed.

SUMMARY

[0006] In order to overcome shortcomings of the prior art, the present disclosure provides a cleaning-free drum washing machine. In the present disclosure, water intake and drainage can be achieved through a hole area of an inner drum of the washing machine, and meanwhile, flushing can be implemented conveniently so as to avoid residues; a hole-free area of the inner drum cooperates with a sealing assembly to form a sealed region between the inner drum and an outer drum so as to avoid crossed flowing of washing sewage and to avoid dirt accumulation between the inner drum and the outer drum; and with the application of the dirt-avoiding washing mode, cleaning-free of the drum washing machine is achieved.

[0007] To solve the technical problem mentioned above, a technical solution as follows is adopted.

[0008] The first object of the disclosure is to provide a drum washing machine, including a housing, an outer drum and an inner drum, wherein the inner drum comprises a hole area which is provided with holes and a hole-free area; a sealing assembly is arranged between the inner drum and the outer drum on at least one side of the hole area; and a sealed region is defined by the sealing assembly, the hole-free area of the inner drum and the outer drum.

[0009] Furthermore, the sealing assembly is fixedly arranged on the inner wall of the outer drum and is in dynamic seal with the outer wall of the inner drum.

[0010] Furthermore, a water intake and drainage space is defined by the sealing assembly, the hole area of the inner drum and the outer drum; and the water intake and drainage space is in fluid communication with the interior of the inner drum.

[0011] Furthermore, a water intake pipeline and a drainage pipeline are arranged between the housing and the outer drum; and the water intake pipeline and the drainage pipeline communicate with the water intake and drainage space.

[0012] Furthermore, a water outlet of the water intake pipeline is arranged on the outer drum wall of the water intake and drainage space and corresponds to the part, at the upper part of the inner drum, of the hole area; a water inlet of the drainage pipeline is arranged on the outer drum wall of the water intake and drainage space and corresponds to the part, at the lower part of the inner drum, of the hole area; and a drainage pump is arranged on the drainage pipeline.

[0013] Furthermore, the hole area is arranged at the side, close to an laundry input port, of the inner drum; the sealing assembly is arranged at the side, away from the laundry input port, of the hole area; and the sealed region is defined by the sealing assembly, the hole-free area of the inner drum and the outer drum.

[0014] Furthermore, the water intake and drainage space is defined by the sealing assembly, a sealing win-

dow pad of an observing window of the washing machine, the hole area of the inner drum and the outer drum; and the water intake pipeline and the drainage pipeline of the washing machine communicate with the water intake and drainage space.

[0015] Furthermore, a guiding structure, by which water is guided from the hole-free area to the hole area, is arranged on the inner surface of the hole-free area of the inner drum.

[0016] The second object of the disclosure is to provide a control method for the drum washing machine, which at least comprises a washing process, a rinsing process and a dewatering process, wherein during the washing process or the rinsing process of the washing machine, water, which is supplied, enters the hole-free area from the hole area of the inner drum; and during drainage or the dewatering process of the washing machine, water enters the hole area from the hole-free area.

[0017] Furthermore, after the washing process or rinsing process is completed, water is supplied by the washing machine to flush the water intake and drainage space to thoroughly flush away sewage.

[0018] With the application of the technical solution, the present disclosure, in comparison with the prior art, has the following beneficial effects:

(1) The inner drum of the washing machine provided by the present disclosure comprises the hole area and the hole-free area, namely the inner drum is merely locally provided with water intake and drainage holes; the hole-free area of the inner drum cooperates with the sealing assembly for effectively separating the inner drum from the outer drum so as to prevent crossed flowing of washing sewage and to avoid dirt accumulation between the inner drum and the outer drum; and therefore, a dirt-avoiding washing mode is achieved.

(2) Water intake and drainage can be effectively achieved through the hole area of the inner drum of present disclosure; and meanwhile, after drainage of such processes as washing or rinsing, the water intake and drainage space for water intake and drainage can be conveniently flushed, so as to further avoid dirt residues.

(3) The hole area of the inner drum of the present disclosure is preferably arranged at the front end of the drum body and is close to the laundry input port, so that coordination with a water intake and drainage system of the existing washing machine can be achieved; the inner and outer drums can be separated merely by arranging the sealing assembly at one location; in addition, modification and adding can be implemented on the basis of the existing washing machine; and therefore, the washing machine is low in modification cost and easy to implement.

[0019] The specific embodiments of the disclosure will be further described in detail below in combination with

the drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0020] The drawings, as one part of the present disclosure, are provided for further understanding of the present disclosure; schematic embodiments of the present disclosure and illustrations are used for explaining the present disclosure, but not intended to limit the present disclosure. Obviously, the drawings hereinafter are merely some embodiments; and other drawings can be obtained by normal technicians of the field on the basis of the drawings under the precondition of not making creative work.

[0021] In the drawings:

Fig. 1 is a structural schematic diagram of a drum washing machine of the present disclosure.

[0022] In the figure, 1. housing, 2. outer drum, 3. inner drum, 4. hole area, 5. hole-free area, 6. sealing assembly, 7. water intake and drainage hole, 8. sealed region, 9. water intake and drainage space, 10. water intake pipeline, 11. drainage pipeline, 12. observing window, 13. sealing window pad, and 14. drainage pump.

[0023] It is noted that those drawings and text descriptions just explain concept of the present disclosure to technicians of the field by referring to specific embodiments, not aiming at limiting the concept scope of the present disclosure in any forms.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0024] For clearer understanding of purposes, technical solutions and advantages of the embodiments of the present disclosure, the technical solution in the embodiments is clearly and completely described in the combination with the drawings in the embodiments of the present disclosure; the embodiments hereinafter are used for explaining the present disclosure, not intended to limit the scope of the present disclosure.

[0025] It is noted that in the descriptions of the present disclosure, orientations or positional relations indicated by "up", "down", "front", "rear", "left", "right", "vertical", "inner", "outer" and the like in terms are shown based on the drawings and are only provided for convenient and simplified description of the present disclosure, rather than indicating or implicating that the mentioned device or element must have specific orientations or be constructed or operated in specific orientation, thus being not intended to limit the present disclosure.

[0026] In the descriptions of the present disclosure, it is noted that 'installing', 'connected to' and 'connecting' in the terms are expansive understanding, otherwise clear specifications and limitations, for example, fixed connection, detachable connection or integrated connection, mechanical connection, electrical connection, direct connection or indirect connection through an intermediate. For normal technicians of the field, specific meanings of the terms in the present disclosure can be understood

in accordance with specific situations.

Embodiment I

[0027] As shown in Fig. 1, the embodiment provides a cleaning-free drum washing machine, comprising a housing 1, an outer drum 2 and an inner drum 3, wherein the inner drum 3 comprises a hole area 4 which is provided with holes and a hole-free area 5 which is closed; a sealing assembly 6 is arranged between the inner drum on at least one side of the hole area 4 and the outer drum; and a sealed region 8 is defined by the sealing assembly 6, the hole-free area of the inner drum and the outer drum.

[0028] In the existing washing machines, a region between an inner drum and an outer drum can store water and can cause easy accumulation of dirt, and the region cannot be directly cleaned; and the region cannot be thoroughly cleaned by virtue of existing cleaning methods which are time-consuming and labor-consuming. While according to the drum washing machine provided by the present disclosure, the inner drum is locally provided with holes in the drum wall, namely a hole area is defined, and other parts define a closed hole-free area, wherein water intake and drainage can be implemented through holes in the hole area of the inner drum, and the holes can be distributed in one or more circles, so that effective water intake and drainage of the washing machine can be achieved. By virtue of the hole-free area of the inner drum, a sealed region between the inner drum and the outer drum is formed, so as to prevent invasion of sewage and to avoid dirt accumulation.

[0029] According to the embodiment, the sealing assembly is arranged in coordination with the inner drum, so that a region between the hole area and the outer drum and a region between the hole-free area and the outer drum are hermetically separated, and crossed flowing of sewage is prevented. The sealing assembly is arranged at one side or two sides of the hole area of the inner drum, so that the sealed region is defined by the sealing assembly, the hole-free area of the inner drum and the outer drum; and the size of the sealed region can be adjusted by setting the positions and number of the sealing assemblies. The hole area of the inner drum can be arranged at one side of the inner drum, such as the side close to the laundry input port, and the hole area can also be arranged in the middle of the inner drum; and the position of the sealing assembly is determined in accordance with the position of the hole area. The sealing assembly is arranged at the back side of the hole area when the hole area is arranged at the front side of the inner drum, namely the side close to the laundry input port, and the sealed region, which is free from water, is formed between the hole-free area at the middle and back parts of the inner drum and the outer drum.

[0030] Furthermore, the sealing assembly 6 is fixedly arranged on the inner wall of the outer drum 2 and is in dynamic seal with the outer wall of the inner drum 3.

[0031] According to the embodiment, the sealing as-

sembly can be fixedly arranged on the inner wall of the outer drum in any fixing manner; the sealing assembly is matched with a distance between the inner drum and the outer drum and is in dynamic seal with the outer wall of the inner drum, and sealing can be still achieved under a circumstance that the inner drum is rotated; and in addition, the sealing assembly is convenient to install and is easy to replace.

[0032] According to the embodiment, the sealing assembly comprises a seal ring and a fixing piece; the seal ring is connected to the inner wall of the outer drum by virtue of the fixing piece; and the fixing piece can be a bolt and the like. The seal ring comprises a fixed ring, a connecting part, a dynamic seal ring and a pre-tightening ring. The fixed ring is connected to the dynamic seal ring by virtue of the connecting part; the fixed ring, the connecting part and the dynamic seal ring are integrally molded into a whole body; the fixed ring is arranged on the outer circle of the dynamic seal ring and is connected to the inner wall of the outer drum; the inner wall of the dynamic seal ring is in dynamic seal with the outer wall of the inner drum; the pre-tightening ring is arranged on the outer wall of the dynamic seal ring; and the pre-tightening ring is used for implementing pre-tightening of the sealing assembly.

Embodiment II

[0033] As shown in Fig. 1, the embodiment I is further limited; a water intake and drainage space 9, which is used for implementing water intake and drainage, is defined by the sealing assembly 6, the hole area 4 of the inner drum and the outer drum 2; and the water intake and drainage space 9 is in fluid communication with the interior of the inner drum.

[0034] The sealing assembly is arranged at one side or two sides of the hole area; a water intake and drainage space, which is used for implementing water intake and drainage, can be defined by the sealing assembly, the hole area of the inner drum and the outer drum while the sealed region is formed; and the water intake and drainage space is in fluid communication with the interior of the inner drum through holes of the hole area, so that water intake and drainage of the washing machine can be achieved. When the hole area is arranged at the side close to the laundry input port, the sealing assembly can be arranged at the side, away from the laundry input port, of the hole area, so that the water intake and drainage space is defined by a sealing window pad of an observing window, the hole area of the inner drum, the outer drum and the sealing assembly; and the sealed region is defined by the sealing assembly, the hole-free area of the inner drum and the outer drum.

[0035] Furthermore, a water intake pipeline 10 and a drainage pipeline 11 are arranged between the housing 1 and the outer drum 2; and the water intake pipeline 10 and the drainage pipeline 11 communicate with the water intake and drainage space 9.

[0036] The water intake pipeline and the drainage pipeline of the washing machine are arranged between the housing and the outer drum and communicate with the water intake and drainage space which is formed between the inner drum and the outer drum, so that water intake and drainage of the washing machine can be achieved. The water intake pipeline and the drainage pipeline can penetrate through the outer drum wall of the water intake and drainage space and be hung in the water intake and drainage space, with openings corresponding to the hole area on the inner drum; openings of the water intake pipeline and the drainage pipeline can also be directly arranged on the outer drum wall on which the water intake and drainage space is formed and correspond to the hole area on the inner drum. During washing or rinsing, the water intake and drainage space can be flushed by water which is supplied after drainage; the water intake and drainage space, which is relatively small in volume, is also relatively small in contact area with the inner drum, so that the water intake and drainage space can be thoroughly flushed by water, so as to avoid sewage residues.

[0037] Furthermore, a water outlet of the water intake pipeline 10 is arranged on the outer drum wall of the water intake and drainage space 9 and corresponds to the part, at the upper part of the inner drum, of the hole area 4; and a water inlet of the drainage pipeline 11 is arranged on the outer drum wall of the water intake and drainage space 9 and corresponds to the part, at the lower part of the inner drum, of the hole area 4.

[0038] The water intake pipeline is arranged at the upper end of the washing machine; the water outlet of the water intake pipeline is arranged on the outer drum wall of the water intake and drainage space and corresponds to the part, at the upper part of the inner drum, of the hole area, so that a water flow can enter from the upper end; therefore, clothes can be soaked, and the water intake and drainage space can be flushed by water which is supplied after drainage, so as to remove sewage residues. The drainage pipeline is arranged at the lower end of the washing machine; and the water inlet of the drainage pipeline is arranged on the outer drum wall of the water intake and drainage space and corresponds to the part, at the lower part of the inner drum, of the hole area, so as to facilitate collection and discharge of washing water.

[0039] A drainage pump 14 can be arranged on the drainage pipeline, so as to offer power for drainage; or a drainage valve can be arranged, so as to control discharge of water flow.

Embodiment III

[0040] As shown in Fig. 1, the hole area 4 of the inner drum 3 of the embodiment is arranged at the side close to the laundry input port; the sealing assembly 6 is arranged at the side, away from the laundry input port, of the hole area; and the sealed region is defined by the sealing assembly 6, the hole-free area 5 of the inner drum

and the outer drum 2.

[0041] The hole area of the inner drum is arranged at the side close to the laundry input port, and other parts define the hole-free area; more preferably, the hole area of the inner drum is arranged at a front flange of the drum body of the drum washing machine; the holes are arranged in one or more circles, so that the sealed region can be defined by the sealing assembly, the hole-free area of the inner drum and the outer drum merely by arranging the sealing assembly at one location at the side, away from the laundry input port, of the hole area. Therefore, a cleaning-free region, which can prevent invasion of sewage, can be formed between a large part of inner drum and the outer drum.

[0042] Furthermore, the water intake and drainage space is defined by the sealing assembly 6, a sealing window pad 13 of an observing window 12 of the washing machine, the hole area 4 of the inner drum and the outer drum 2; and the water intake pipeline 10 and the drainage pipeline 11 of the washing machine communicate with the water intake and drainage space.

[0043] The hole area of the inner drum is arranged at the side close to the laundry input port; preferably, the hole area of the inner drum is arranged at the front flange of the drum body of the drum washing machine; the water intake and drainage space, which is used for implementing water intake and drainage, is defined by a sealing window pad of an observing window of an existing washing machine, the hole area of the inner drum and the sealing assembly at one location. Meanwhile, the water intake pipeline and the drainage pipeline communicate with the water intake and drainage space, so as to implement water intake and drainage. Therefore, coordination with the water intake and drainage system of the existing washing machine can be achieved, and the inner and outer drums can be separated by virtue of the sealing assembly at one location; and modification and adding can be implemented on the basis of the existing clothes washing machine; therefore, the drum washing machine is low in modification cost and easy to implement.

Embodiment IV

[0044] According to the embodiment, a guiding structure, by which water is guided from the hole-free area to the hole area, is arranged on the inner surface of the hole-free area of the inner drum.

[0045] A guiding structure, such as a guiding groove and the like, is arranged on the hole-free area of the inner drum for guiding water from the hole-free area to the hole area for drainage; and therefore, a drainage effect is enhanced, drainage efficiency is improved and water accumulation is avoided.

Embodiment V

[0046] According to the embodiment, the present disclosure provides a control method of the cleaning-free

drum washing machine, wherein the control method at least comprises a washing process, a rinsing process and a dewatering process; during washing process or rinsing process, water, which is supplied, enters the hole-free area 5 from the hole area 4 of the inner drum; and during drainage of the washing machine or drainage of the dewatering process, water enters the hole area 4 from the hole-free area 5.

[0047] When the washing process or the rinsing process is started, tap water enters the water intake and drainage space between the outer drum and the hole area of the inner drum from the water intake pipeline, and the water flows into the inner drum from the hole area and enters the hole-free area. When drainage is implemented or the dewatering process is started, water in the inner drum enters the hole area from the hole-free area, or the water, guided by the guiding structure, enters the hole area from the hole-free area, enters the water intake and drainage space at the bottom from the hole area and is discharged from the drainage pipeline. Therefore, effective water intake and drainage of the washing machine can be achieved; meanwhile, invasion of the sewage can be prevented by the sealed region between the large part of inner drum and the outer drum, so that dirt accumulation can be prevented; and cleaning can be avoided.

[0048] Furthermore, after the washing process or the rinsing process is completed, water is supplied by the washing machine to flush the water intake and drainage space, so that sewage can be thoroughly flushed away.

[0049] After drainage of the washing or rinsing process, water is supplied by the washing machine once again so as to flush the water intake and drainage space between the inner drum and the outer drum; and therefore, the residual sewage can be further flushed away and residues can be prevented.

[0050] Washing process is as follows.

[0051] Water intake: during washing, the observing window 12 is closed, tap water enters a space between the outer drum and the hole area of the inner drum from the water intake pipeline 10 so as to flush the water intake and drainage space 9, and the water enters the inner drum 3 of the washing machine from the hole area 4 of the inner drum until reaching a proper level; at this moment, no water enters the sealed region 8, and water exists in the water intake and drainage space 9 and the inner drum 3.

[0052] Washing and drainage: after water intake, the inner drum, which is driven by a motor, is rotated at a certain rotating-stopping ratio so as to conduct washing. After washing, the drainage pump is turned on so as to conduct drainage; and washing water in the inner drum enters the bottom lowest point of the water intake and drainage space through water intake and drainage holes of the hole area 4 and is discharged from the drainage pipeline 11.

[0053] Flushing: water is supplied by the washing machine through the water intake pipeline 10 to flush the water intake and drainage space, so as to thoroughly

flush away the sewage; and free water is discharged out from the drainage pipeline 11.

[0054] Dewatering: the inner drum 3 undergoes dewatering; water is guided to the hole area 4 from the hole-free area 5 of the inner drum through the guiding structure which is arranged on the inner surface of the inner drum 3, the water passes through the lower lowest point of the water intake and drainage space, and enters the drainage pipeline 11 to be discharged.

[0055] Then, the process is repeated until rinsing and washing are completed.

[0056] Obviously, the above-mentioned embodiments are merely preferred embodiments of the disclosure, but not intended to limit the disclosure in any form. Those of ordinary skill in the art can make some changes or modifications to the above-mentioned technical contents into the equivalent embodiments in equivalent variation without departing from the scope of the technical solution of the present disclosure, and contents not departing from the technical solution of the present disclosure and subjected to any simple change, equivalent variation and modification of the above embodiments in accordance with the technical essence of the present disclosure should still fall into the scope of the present disclosure.

Claims

1. A drum washing machine, comprising a housing, an outer drum and an inner drum, wherein the inner drum comprises a hole area provided with holes and a hole-free area; a sealing assembly is arranged between the inner drum and the outer drum on at least one side of the hole area; and a sealed region is defined by the sealing assembly, the hole-free area of the inner drum and the outer drum.
2. The drum washing machine according to claim 1, wherein the sealing assembly is fixedly arranged on an inner wall of the outer drum and is in a dynamic seal with an outer wall of the inner drum.
3. The drum washing machine according to claim 1 or 2, wherein a water intake and drainage space is defined by the sealing assembly, the hole area of the inner drum and the outer drum; and the water intake and drainage space is in communication with an interior of the inner drum.
4. The drum washing machine according to claim 3, wherein a water intake pipeline and a drainage pipeline are arranged between the housing and the outer drum; and the water intake pipeline and the drainage pipeline are communicated with the water intake and drainage space.

5. The drum washing machine according to claim 4,
wherein a water outlet of the water intake pipeline is
arranged on a wall of the outer drum defining the
water intake and drainage space and corresponds
to the hole area at an upper part of the inner drum; 5
and
a water inlet of the drainage pipeline is arranged on
the wall of the outer drum defining the water intake
and drainage space and corresponds to the hole ar-
ea at a lower part of the inner drum. 10

6. The drum washing machine according to claim 1,
wherein the hole area of the inner drum is arranged
at a side close to an laundry input port;
the sealing assembly is arranged at a side, away 15
from the laundry input port, of the hole area; and
the sealed region is defined by the sealing assembly,
the hole-free area of the inner drum and the outer
drum. 20

7. The drum washing machine according to claim 6,
wherein a water intake and drainage space is defined
by the sealing assembly, a sealing window pad of
an observing window of the washing machine, the
hole area of the inner drum and the outer drum; and 25
the water intake pipeline and the drainage pipeline
of the washing machine are communicated with the
water intake and drainage space.

8. The drum washing machine according to any one of 30
claims 1-7, wherein a guiding structure for guiding
water from the hole-free area to the hole area, is
arranged on an inner surface of the hole-free area
of the inner drum. 35

9. A control method of the drum washing machine ac-
cording to any one of claims 1-8, at least comprising
a washing process, a rinsing process and a dewater-
ing process, wherein
during the washing process or the rinsing process 40
of the washing machine, water supplied enters the
hole-free area from the hole area of the inner drum;
and
during a drainage or the dewatering process of the
washing machine, water enters the hole area from 45
the hole-free area.

10. The control method according to claim 9, wherein
after the washing process or rinsing process, water
is supplied by the washing machine to flush the water 50
intake and drainage space to thoroughly flush away
sewage.

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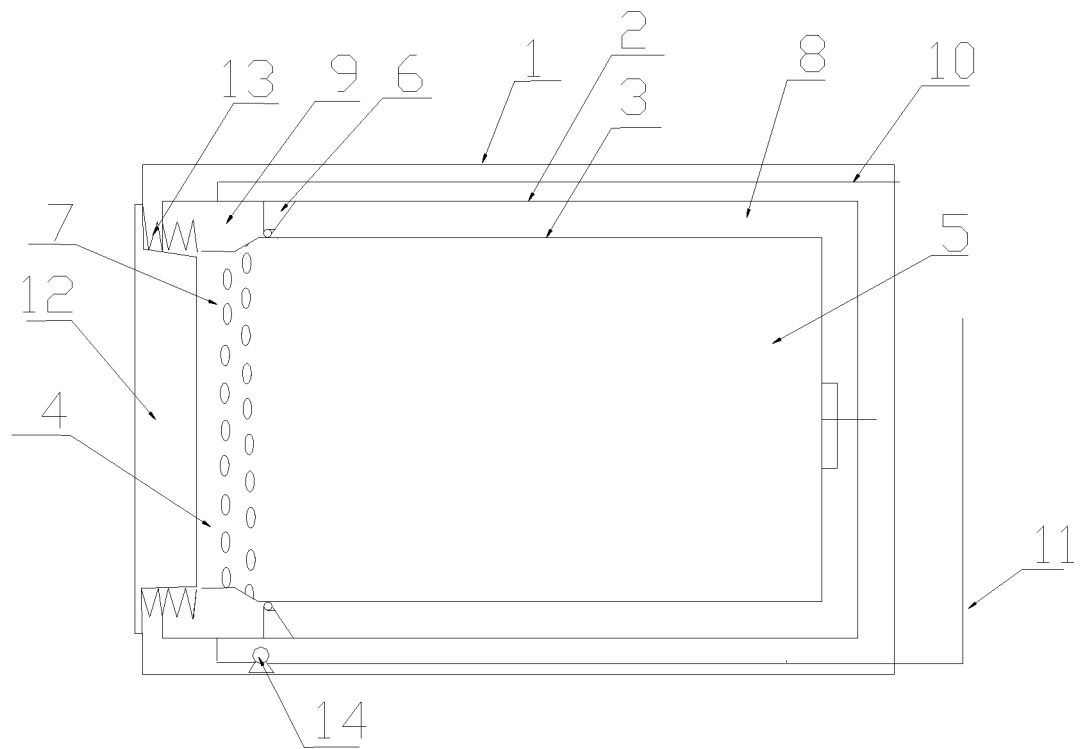


Fig. 1

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2017/105611

A. CLASSIFICATION OF SUBJECT MATTER

D06F 37/04 (2006.01) i

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)

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)

CNABS, CNTXT, DWPI, SIPOABS, CNKI: 滚筒, 内筒, 内桶, 滚桶, 外筒, 外桶, 水桶, 水筒, 水槽, 无孔, 有孔, 开孔, 密封, drum, basket, cylinder, tumble, roller, tub, tank, cask, barrel, container, non, without, hole?, opening, seal+

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	CN 104005201 A (HEFEI RONGSHIDA SANYO ELECTRIC CO., LTD.), 27 August 2014 (27.08.2014), description, paragraph [0010], and figure 1	1-10
A	CN 105568616 A (HISENSE (SHANDONG) REFRIGERATOR CO., LTD.), 11 May 2016 (11.05.2016), entire document	1-10
A	JP 2013141508 A (SHARP KK), 22 July 2013 (22.07.2013), entire document	1-10

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* Special categories of cited documents:	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	
"E" earlier application or patent but published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search 09 January 2017	Date of mailing of the international search report 16 January 2018
Name and mailing address of the ISA State Intellectual Property Office of the P. R. China No. 6, Xitucheng Road, Jimenqiao Haidian District, Beijing 100088, China Facsimile No. (86-10) 62019451	Authorized officer GUO, Xu Telephone No. (86-10) 62084600

Form PCT/ISA/210 (second sheet) (July 2009)

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Patent Documents referred in the Report	Publication Date	Patent Family	Publication Date
CN 104005201 A	27 August 2014	CN 104005201 B	14 September 2016
CN 105568616 A	11 May 2016	None	
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REFERENCES CITED IN THE DESCRIPTION

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