

WASHING MACHINE

BACKGROUND

1. Technical Field

5 [0001] The present disclosure relates to a washing machine.

2. Description of the Related Art

[0002] A conventional washing machine configured to capture lint and the like by a drainage filter has been proposed.

10 [0003] This washing machine includes: a water tub elastically supported inside a main body; an accommodation tank rotatably provided inside the water tub; a water supply unit configured to supply water to the water tub; a motor configured to rotate a washing tub; and a drainage path configured to drain water in the water tub. The washing machine further includes: a drainage pump disposed in the drainage path and configured to suck and
15 drain water; a filter case provided in the drainage path and including a drainage filter configured to capture foreign matters; and a circulating pump provided in a circulation path passing through the filter case and configured to circulate washing water. Furthermore, the drainage filter is configured to filtrate washing water circulating through the circulation path by the operation of the circulating pump and capture lint and the like
20 contained in the washing water (for example, see Patent Literature 1).

Citation List

[0004] Patent Literature 1: Japanese Unexamined Patent Application Publication No. 2016-146984

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SUMMARY

[0005] However, there was a risk that the conventional washing machine would cause clogging of the drainage filter with lint and the like and drainage failure. Furthermore, for the purpose of preventing clogging of the drainage filter, a user needed to frequently take
30 care of the drainage filter

[0006] The present disclosure provides a washing machine capable of reducing the time and effort of a user for cleaning by pulverizing dusts and wastes captured by a filter.

[0007] The washing machine according to the present disclosure includes: a water tub elastically supported inside a main body; a rotating drum rotatably disposed inside the

water tub; a water supply unit configured to supply water to the rotating drum or the water tub; a motor configured to rotate the rotating drum; and a drainage path configured to drain water in the water tub. The washing machine further includes: a drainage pump disposed in the drainage path and configured to suck and drain water; a filter provided in the
5 drainage path and configured to capture foreign matters; and a controller configured to sequentially control a washing operation including a washing step, a rinsing step, and a dewatering step. Furthermore, in a drainage operation to be performed by the drainage pump, the controller intermittently drives the drainage pump.

[0008] The washing machine according to the present disclosure is capable of reducing
10 the time and effort of a user for cleaning by pulverizing dusts and wastes captured by the filter.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] FIG. 1 is an exploded perspective view of a washing machine according to a first
15 embodiment.

FIG. 2 is a longitudinal cross-sectional view of the washing machine according to the first embodiment.

FIG. 3A is a diagram illustrating a state in which lint has accumulated on a dry filter in a drying path of the washing machine according to the first embodiment.

20 FIG. 3B is a diagram illustrating a state in which lint accumulating on the dry filter in the drying path of the washing machine according to the first embodiment has been washed away.

FIG. 4A is a perspective view of a principal part around the filter of the washing machine according to the first embodiment.

25 FIG. 4B is a perspective view of the principal part around the filter of the washing machine according to the first embodiment in a state in which the filter is removed.

FIG. 5A is a schematic diagram illustrating a water flow during the circulation of water inside the filter of the washing machine according to the first embodiment.

30 FIG. 5B is a schematic diagram illustrating a water flow during the drainage of water inside the filter of the washing machine according to the first embodiment.

FIG. 6 is a flow chart of operation of the washing machine according to the first embodiment.

DETAILED DESCRIPTIONS

[0010] Hereinafter, an embodiment will be described in detail with reference to the drawings. Note that the present invention is not limited by the accompanying drawings and the following description.

[0011] (First Embodiment)

5 Hereinafter, a first embodiment will be described using FIG. 1 to FIG. 4A and FIG. 4B.

[0012] (Configuration of Washing Machine)

FIG. 1 is an exploded perspective view of a washing machine according to the first embodiment. FIG. 2 is a longitudinal cross-sectional view of the washing machine
10 according to the first embodiment. FIG. 3A is a diagram illustrating a state in which lint has accumulated on a dry filter in a drying path of the washing machine according to the first embodiment. FIG. 3B is a diagram illustrating a state in which lint accumulating on the dry filter in the drying path of the washing machine according to the first embodiment has been washed away.

15 **[0013]** The washing machine according to the present embodiment will be described as a front-loading washing machine.

[0014] In FIG. 1 and FIG. 2, water tub unit 49 is provided inside washing machine casing 41. Water tub unit 49 includes water tub 42, rotating drum 43, and motor 45.

[0015] Water tub 42 is swingably disposed inside washing machine casing 41. Rotating drum 43 is rotatably disposed in water tub 42. Rotating drum 43 has a cylindrical shape with a bottom, and has an opening as clothes-inlet-and-outlet opening 53 on the front side.
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[0016] Rotation shaft (rotation center shaft) 44 horizontally extending is disposed at the rotation center of rotating drum 43. Rotation shaft 44 is coupled via belt 46 to motor 45 disposed in the vicinity of the back side of water tub 42. Rotating drum 43 is configured to
25 be rotated by motor 45 in normal or reverse direction.

[0017] In the inner wall of rotating drum 43, a few projecting plates 47 for stirring the laundry are provided. Furthermore, in the outer peripheral wall of rotating drum 43, many water vent holes 48 are provided through which water flows into or out of rotating drum 43.

[0018] Water tub 42 is supported so as to be vibration-isolated by a plurality of vibration
30 proof dampers 51 attached to a lower portion of washing machine casing 41, and is swingably supported so as to be vibration-isolated between an upper portion of washing machine casing 41 and water tub 42 by a plurality of springs (not illustrated).

[0019] In washing machine casing 41, casing opening 50 is formed to face clothes-inlet-and-outlet opening 53 of rotating drum 43. Cover 52 is disposed so as to openably and

closably cover casing opening 50. When cover 52 is opened, the laundry can be put in and taken out from rotating drum 43 via clothes-inlet-and-outlet opening 53.

[0020] Control device 81 is disposed in an upper portion inside washing machine casing 41. Control device 81 includes a microcomputer and other components. Control device 81 is configured to control, for example, motor 45, water supply valve 57 serving as a water supply unit, drainage pump 63, and circulating pump 67 in accordance with a mode setting or a control program, and thereby sequentially control a washing operation including a washing step, a rinsing step, and a dewatering step, and a drying step for drying clothes.

[0021] Inside washing machine casing 41, there are provided water supply path 54 for supplying washing water (for example, tap water) to water tub 42, drainage path 55 for discharging the washing water in water tub 42 to the outside of washing machine casing 41, and water circulation path 56 for circulate washing water in water tub 42.

[0022] Water supply path 54 includes water supply hose 60, detergent storage 61, and water filling hose 62.

[0023] Water supply valve 57 serving as a water supply device is connected to water supply hose 60.

[0024] Detergent storage 61 is configured to accommodate a drawer (not illustrated) for storing a detergent and a fabric softener so as to be drawable from outside. When water supply valve 57 is opened, washing water flows into water supply hose 60. Washing water having flown into water supply hose 60 passes through detergent storage 61 and water filling hose 62, and is supplied to water tub 42.

[0025] Drainage path 55 includes drainage pipe 64, filter frame 82 and drainage pump 63, and drainage hose 66.

[0026] Drainage pipe 64 is configured to connect drainage outlet 95 provided at the bottom of water tub 42 to inlet 82a disposed in filter frame 82. Filter 65 is accommodated inside filter frame 82. Details about filter 65 and the internal structure of filter frame 82 will be described later.

[0027] Drainage pump 63 is disposed between filter frame 82 and drainage hose 66. Drainage hose 66 is connected to outlet 82b provided in filter frame 82, and extends from the inside of washing machine casing 41 to the upper part of the outside of washing machine casing 41. When drainage pump 63 is driven, washing water in water tub 42 passes through drainage pipe 64, filter frame 82, drainage pump 63, and drainage hose 66 in this order, and is then drained outside.

[0028] Water circulation path 56 includes drainage pipe 64, filter frame 82, inflow-side

path 68, circulating pump 67, discharge-side path 69, and jet port 80.

[0029] Inflow-side path 68 is a path configured to connect filter frame 82 to circulating pump 67. Discharge-side path 69 is a path configured to connect circulating pump 67 to jet port 80. Jet port 80 is provided in a front portion of water tub 42 so that washing water
5 passing through discharge-side path 69 is discharged to rotating drum 43. When circulating pump 67 is driven, washing water in water tub 42 passes through drainage pipe 64, inlet 82a, filter frame 82, filter part 65a described later, inflow-side path 68, circulating pump 67, discharge-side path 69, and jet port 80 in this order, and is then discharged to rotating drum 43 as circulating water. Such circulation of washing water allows a
10 detergent to be quickly dissolved, whereby washing and rinsing performances of the front-loading washing machine are enhanced.

[0030] A plurality of jet ports 80 is provided to be aligned in the circumferential direction of rotating drum 43, and each of jet ports 80 ejects circulating water toward clothes in rotating drum 43.

[0031] In a side wall at the rear bottom of water tub 42, an air trap (not illustrated) is formed. The air trap is connected to air pipe 75. Air pipe 75 is connected to water level detector 76 disposed in an upper portion inside washing machine casing 41. Water level detector 76 includes, for example, a pressure sensor. Water level detector 76 is configured to detect a water level of washing water in water tub 42, based on a hydraulic pressure of
20 washing water inside water tub 42, that is, a pressure inside the corresponding air trap.

[0032] The front-loading washing machine illustrated in FIG. 1, which is the washing machine according to the present embodiment, is equipped with a drying function, so that air warmed by drying heater 70 is sent from water tub 42 to rotating drum 43 via duct 72 by air-blowing fan 71. Furthermore, while laterally rotating at low speed, rotating drum 43
25 sucks moisture-containing air from the backside of water tub 42 and removes the moisture of the air, and then the air is warmed again by the drying heater and circulated so as to be sent from water tub 42 to rotating drum 43 by the air-blowing fan. With this operation, clothes are dried.

[0033] As illustrated in FIG. 3A and FIG. 3B, dry filter 74 configured to capture lint 78 generated by drying and shower device 77 configured to wash away lint 78 having
30 accumulated on dry filter 74 are provided in warm air circulation path 73. As described later, shower device 77 is operated when water is supplied during the rinsing step, and washes away (FIG. 3B) lint (FIG. 3A) accumulating on the dry filter during the previous drying operation. Thus, the washing machine according to the present embodiment saves a

user from having to take care of the dry filter.

[0034] (Configuration around Filter)

FIG. 4A is a perspective view of a principal part around the filter of the washing machine according to the first embodiment. FIG. 4B is a perspective view of the principal part around the filter of the washing machine according to the first embodiment in a state in which the filter is removed. FIG. 5A is a schematic diagram illustrating a water flow during the circulation of water inside the filter of the washing machine according to the first embodiment. FIG. 5B is a schematic diagram illustrating a water flow during the drainage of water inside the filter of the washing machine according to the first embodiment. Note that a hose for connection is omitted in FIG. 4A, FIG. 4B, FIG. 5A, and FIG. 5B. Filter 65 mainly includes filter part 65a, collision part 65b, support part 65c, and holding part 65d. Filter 65 is configured to substantially prevent foreign matters from being sucked into drainage pump 63 and circulating pump 67.

[0035] Holding part 65d is disposed on the front side of the front-loading washing machine. Holding part 65d is provided in order that, while holding holding part 65d, a user attaches and removes filter 65 to and from filter frame 82.

[0036] Support part 65c extends from holding part 65d, and is configured to support filter part 65a and collision part 65b.

[0037] Filter part 65a is disposed to be closer to drainage pump 63 than inflow-side path 68 is, and formed in approximately disk-like shape so as to cover filter frame 82. Filter part 65a is formed in net shape and configured to capture lint 78 and the like contained in washing water circulating through water circulation path 56.

[0038] Collision part 65b is disposed to be closer to drainage pump 63 than filter part 65a is, and is formed in approximately disk-like shape. Collision part 65b is configured to substantially prevent foreign matters bigger than lint 78 from being sucked into drainage pump 63. Furthermore, collision part 65b also has a role in breaking down lint 78 flowing from filter part 65a, as described later.

[0039] The operation and functions of the front-loading washing machine configured as described above will be explained below.

[0040] (Washing Operation)

FIG. 6 is a flow chart of operation of the washing machine according to the first embodiment.

[0041] Hereinafter, a washing operation will be described as an example. A user opens cover 52, puts the laundry into rotating drum 43, and turns on a power switch (not

illustrated), and then operates a start switch (not illustrated) of an input setting unit (not illustrated) provided in operation display 79, so that washing operation is started.

[0042] When the washing operation is started, a washing step is started (Step S1). Subsequently, water supply valve 57 is opened to supply water to water tub 42 (Step S2).

5 [0043] At the time when water is supplied to water tub 42 to a predetermined water level, rotating drum 43 laterally rotates to perform stirring washing (Step S3). In the stirring washing, circulating pump 67 is driven, so that washing water circulates through water circulation path 56. The washing water flows as illustrated by arrow a in FIG. 5A, and filter part 65a filtrates the washing water flowing in from inlet 82a to capture lint 78
10 contained in the washing water. Captured lint 78 aggregates on the drainage pump 63 side of filter part 65a, and accumulates in the form of a mass. After the stirring washing of a predetermined time is completed, the operation proceeds to a rinsing step (Step S4).

[0044] At the rinsing step, drainage, intermediate dewatering, and stirring rinsing are performed. First, drainage pump 63 is driven, whereby washing water flows as illustrated
15 by arrow b in FIG. 5B, so that a drainage operation is performed (Step S5). Drainage pump 63 performs intermittent driving to repeat driving and stopping in a cycle of predetermined time at Step S5.

[0045] The intermittent driving causes the generation of a stream of water in a suction direction of drainage pump 63 and the reverse direction thereof along the longitudinal
20 direction inside filter frame 82, as illustrated by arrow c in FIG. 5B. This stream of water causes lint 78 having accumulated on filter part 65a to come off filter part 65a and float in the water. Lint 78 having come off filter part 65a is sucked toward drainage pump 63 by the driving of drainage pump 63, and collides with collision part 65b. Lint 78a having been finely broken down by the shock of the collision is discharged out of the washing
25 machine together with water at the timing of driving drainage pump 63.

[0046] The intermittent driving may be performed, for example, by a repetition of driving for approximately 2 seconds and stopping for approximately 1 second. Thus, by the time drainage is completed, collision is performed in a sufficient number of times for finely
30 breaking down the mass of lint. Furthermore, when the time for driving is set to be longer than the time for stopping, a decrease in drainage speed due to the intermittent driving can be substantially prevented.

[0047] If water level detector 76 detects that the water level has fallen to a reset water level (Yes at Step S6), drainage pump 63 stops the intermittent driving and performs continuous driving (Step S7). The reset water level is a water level at which clothes in

rotating drum 43 are not soaked in water, and the reset water level in the present embodiment is set to be below a lower end of rotating drum 43. Finely broken lint 78a remaining in filter frame 82 is collectively discharged during the continuous driving.

[0048] At Step S7, control device 81 performs saturation determination (not illustrated) to
5 determine whether or not drainage is completed. The saturation determination is such that, for example, a water level is detected by water level detector 76 every several seconds, and, when the degree of change in water level detected reaches a predetermined value or lower, it is determined that drainage has been completed. When the intermittent driving is performed during the saturation determination, there is a possibility that a water level
10 varies up and down with the intermittent driving. The continuous driving of drainage pump 63 allows accurate determination of whether or not the degree of change in water level reaches a predetermined value or lower, and thus erroneous detection in the saturation determination can be substantially prevented.

[0049] When it is determined that drainage has been completed, stirring for clothes
15 disentanglement is executed so as to smoothly start dewatering (Step S8).

[0050] In the stirring for clothes disentanglement, rotating drum 43 laterally rotates at approximately 50 r/min for a predetermined time so as not to cause the clothes to go far to one side in rotating drum 43. Drainage pump 63 is intermittently driven in the stirring for clothes disentanglement to substantially prevent air entrainment. Furthermore, in the
20 intermittent driving in the stirring for clothes disentanglement, a mass of lint having accumulated in filter part 65a is broken down, and the resultant is discharged out of washing machine casing 41.

[0051] When the stirring for clothes disentanglement of the predetermined time is completed, intermediate dewatering is started (Step S9). When the number of rotations for
25 dewatering reaches 100 r/min (Yes at Step S10), drainage pump 63 changes to perform continuous driving. When the number of rotations for dewatering exceeds 100 r/min, the amount of drainage rapidly increases, and thus, drainage can be efficiently performed by continuously driving drainage pump 63. Even after the number of rotations for dewatering exceeds 100 r/min, the intermediate dewatering is continuously performed while the
30 number of rotations for dewatering is increased (Step S11).

[0052] After the completion of the intermediate dewatering, water supply is started (Step S12). At this time, lint 78 and the like having accumulated on dry filter 74 in the previous drying operation are washed away by shower device 77 to water tub 42 or drainage path 55. Lint 78 and the like having washed away remain in water tub 42 or in drainage path 55

until the next driving of drainage pump 63 is started (Step S15).

[0053] When the water level reaches the predetermined water level, stirring rinsing is started (Step S13). In the stirring rinsing, while circulating pump 67 is driven, rotating drum 43 laterally rotates to stir the clothes. When the stirring rinsing of a predetermined
5 time is completed, the operation proceeds to the final dewatering step (Step S14).

[0054] At the final dewatering step, drainage pump 63 is driven to perform drainage (Step S15), in which drainage pump 63 performs the intermittent driving to repeat driving and stopping in a cycle of predetermined time. In the same manner as for the drainage operation at the rinsing step, a mass of lint accumulating on filter part 65a is broken down
10 by the intermittent driving, and discharged out of the washing machine. Similarly, lint 78 and the like washed away from dry filter 74 are also discharged out of washing machine casing 41.

[0055] When the drainage proceeds and the water level falls to a reset water level (Step S16), drainage pump 63 is switched from the intermittent driving to the continuous driving
15 (Step S17).

[0056] After completion of the drainage, stirring for clothes disentanglement is performed (Step S18). In the stirring for clothes disentanglement, drainage pump 63 is intermittently driven, so that air entrainment is substantially prevented. When the stirring for clothes disentanglement of a predetermined time is completed, dewatering is started
20 (Step S19). When the number of rotations for dewatering reaches approximately 100 r/min (Yes at Step S20), drainage pump 63 switches to the continuous driving. Even after the number of rotations for dewatering exceeds 100 r/min, the operation continues to be performed, with the number of rotations increasing (Step S21). When the dewatering of a predetermined time is completed, the washing operation is completed.

25 [0057] (Functions)

As described above, the washing machine according to the present embodiment includes: water tub 42 elastically supported inside washing machine casing 41; rotating drum 43 rotatably disposed inside water tub 42; water supply valve 57 serving as a water supply unit configured to supply water to rotating drum 43 or water tub 42; motor 45
30 configured to rotate rotating drum 43; and drainage path 55 configured to drain water in water tub 42. The washing machine further includes: drainage pump 63 disposed in drainage path 55 and configured to suck and drain water; filter 65 disposed in drainage path 55 and configured to capture foreign matters; and control device 81 configured to sequentially control the steps of washing, rinsing, dewatering, and the like. Control device

81 is further configured to intermittently drive drainage pump 63 when drainage pump 63 performs a drainage operation.

[0058] With this configuration, a mass of lint 78 and the like captured by filter 65 is finely pulverized by a stream of water generated with the intermittence driving of drainage pump 63, and is discharged through drainage path 55. This can substantially prevent a failure in drainage caused by the clogging of filter 65 and also can reduce the time and effort of a user for cleaning of filter 65.

[0059] Furthermore, as in the present embodiment, filter 65 may include: filter part 65a configured to capture foreign matters; and collision part 65b disposed to be closer to drainage pump 63 than filter part 65a.

[0060] With this configuration, a mass of lint 78 and the like captured by filter part 65a collides with collision part 65b and is finely pulverized due to a stream of water generated when drainage pump 63 is driven. This can substantially prevent a failure in drainage caused by the clogging of filter 65 and also can reduce the time and effort of a user for cleaning of filter 65.

[0061] Furthermore, as in the present embodiment, the washing machine may further include: water circulation path 56 communicating with drainage path 55 and configured to circulate water in water tub 42; and circulating pump 67 disposed in water circulation path 56 and configured to circulate water. Furthermore, filter 65 may be provided in filter frame 82 located at a position at which water circulation path 56 and drainage path 55 overlap.

[0062] This configuration allows filter 65 to capture lint 78 contained in circulating water passing through water circulation path 56. Thus, lint contained in washing water can be removed at the washing step and the rinsing step, so that the washing operation can be substantially prevented from being completed in a state in which lint 78 adheres to clothes.

[0063] Furthermore, as in the present embodiment, the washing machine may further include water level detector 76 configured to detect a water level in water tub 42, in which, in a drainage operation to be performed by drainage pump 63, control device 81 may continuously drive drainage pump 63 when the water level detected by water level detector 76 is a reset water level or lower, the reset water level being located below rotating drum 43.

[0064] With this configuration, when it is determined whether drainage from water tub 42 is completed, drainage pump 63 is continuously driven, whereby a water level can be substantially prevented from increasing and decreasing. Thus, when it is determined

whether drainage from water tub 42 is completed, erroneous detection can be substantially prevented.

[0065] Furthermore, as in the present embodiment, in the drainage operation by drainage pump 63, after continuous driving of drainage pump 63 at the reset water level or lower,

5 control device 81 may start to rotate rotating drum 43, and, if the number of rotations of rotating drum 43 is less than 100 r/min, control device 81 may intermittently drive drainage pump 63, meanwhile, if the number of rotations of rotating drum 43 is 100 r/min or more, control device 81 may continuously drive drainage pump 63.

[0066] With this configuration, when moisture contained in the laundry is removed with a centrifugal force, air entrainment can be prevented during rotation at low speed, and drainage can be efficiently performed in a rotation region in which the amount of drainage rapidly increases.

[0067] (Other Embodiments)

As described above, the first embodiment was illustrated as an example of techniques of the present disclosure. However, the techniques of the present disclosure are not limited by the first embodiment.

[0068] Therefore, another embodiment will be illustrated below.

[0069] In the first embodiment, the front-loading washing machine was described as an example of washing machine. The washing machine beneficially includes a drainage pump and a filter, and is not limited to a front-loading washing machine. The washing machine may be a top-loading washing machine or a twin-tub washing machine.

[0070] In the first embodiment, filter 65 including filter part 65a and collision part 65b each formed in approximately disk-like shape was described as an example of filter. The filter beneficially includes: the filter part configured to capture foreign matters; and the collision part disposed to be closer to drainage pump 63 than the filter part is. Therefore, the filter part and the collision part are not limited to be formed in approximately disk-like shape. Furthermore, filter 65 is not limited to have a structure in which filter part 65a and collision part 65b are supported by support part 65c, and may be formed in approximately box shape, for example. However, the structure in which filter part 65a and collision part 65b are supported by support part 65c can be easily cleaned because accumulated lint and the like can be easily removed.

[0071] Furthermore, in the first embodiment, the washing machine having a drying function was described as an example of washing machine. The washing machine may not include the drying function. However, the washing machine having the drying function

causes the generation of a large amount of lint during drying operation, and therefore the lint tends to remain in rotating drum 43. During the washing operation performed after the drying operation, the remaining lint is captured by the filter disposed at a position at which the circulation path and the drainage path overlap. Therefore, the present disclosure is suitably made use of for the washing machine having a drying function. Furthermore, a washing machine including a shower device is configured to wash away lint and the like captured by a dry filter to a drainage path, and accordingly, there is a possibility that a large amount of lint remains in the water tub or the drainage path. Therefore, the present disclosure is also suitably made use of for the washing machine having the shower device.

INDUSTRIAL APPLICABILITY

[0072] The present disclosure is applicable to a washing machine including a drainage pump and a filter. Specifically, the present disclosure is applicable to, for example, a top-loading washing machine, a front-loading washing machine, and a twin-tub washing machine.

REFERENCE MARKS IN THE DRAWINGS

[0073] 41...washing machine casing
42...water tub
43...rotating drum
44...rotation shaft
45...motor
46...belt
47...projecting plate
48...water vent hole
49...water tub unit
50...casing opening
51...vibration proof damper
52...cover
53 clothes-inlet-and-outlet opening
54...water supply path
55...drainage path
56...water circulation path
57...water supply valve (water supply device)

	60...water supply hose
	61...detergent storage
	62...water filling hose
	63...drainage pump
5	64...drainage pipe
	65...filter
	65a...filter part
	65b...collision part
	65c...support part
10	65d...holding part
	66...drainage hose
	67...circulating pump
	68...inflow-side path
	69...discharge-side path
15	70...drying heater
	71...air-blowing fan
	72...duct
	73...warm air circulation path
	74...dry filter
20	75...air pipe
	76...water level detector
	77...shower device
	78...lint
	78a...finely-broken-down lint
25	79...operation display
	80...jet port
	81...control device (controller)
	82...filter frame
	82a...inlet
30	82b...outlet

WHAT IS CLAIMED IS:

1. A washing machine, comprising:
 - a water tub elastically supported inside a main body;
 - 5 a rotating drum rotatably disposed inside the water tub;
 - a water supply device configured to supply water to the rotating drum or the water tub;
 - a motor configured to rotate the rotating drum;
 - a drainage path configured to drain the water from the water tub;
 - 10 a drainage pump disposed in the drainage path and configured to suck and drain the water;
 - a filter disposed in the drainage path and configured to capture foreign matters;
 - and
 - a controller configured to sequentially control a washing operation, the washing
 - 15 operation including a washing step, a rinsing step, and a dewatering step,
 - wherein, in a drainage operation to be performed by the drainage pump, the controller intermittently drives the drainage pump.
2. The washing machine according to claim 1,
 - 20 wherein the filter includes:
 - a filter part configured to capture foreign matters; and
 - a collision part disposed to be closer to the drainage pump than the filter part is.
3. The washing machine according to claim 1, further comprising:
 - 25 a circulation path communicating with the drainage path and configured to circulate the water in the water tub; and
 - a circulating pump disposed in the circulation path and configured to circulate the water,
 - 30 wherein the filter is disposed at a position at which the circulation path and the drainage path overlap.
4. The washing machine according to claim 2, further comprising:
 - a circulation path communicating with the drainage path and configured to

circulate the water in the water tub; and

a circulating pump disposed in the circulation path and configured to circulate the water,

wherein the filter is disposed at a position at which the circulation path and the
5 drainage path overlap.

5. The washing machine according to any one of claims 1 to 4, further comprising
a water level detector configured to detect a water level in the water tub,
wherein, in the drainage operation to be performed by the drainage pump, the
10 controller continuously drives the drainage pump when the water level detected by the
water level detector is a first predetermined water level or lower, the first predetermined
water level being located below the rotating drum.

6. The washing machine according to claim 5,
15 wherein, after the controller continuously drives the drainage pump, the controller
starts to rotate the rotating drum,
wherein, when the number of rotations of the rotating drum is less than 100 r/min,
the controller intermittently drives the drainage pump, and,
wherein, when the number of rotations of the rotating drum is 100 r/min or more,
20 the controller continuously drives the drainage pump.