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D06F 13/00 (2006.01)(73) Assignees: **Yoko Fujitsuka**, Hyogo (JP);
Masashi Fujitsuka, Hyogo (JP)(52) **U.S. Cl.** **68/134**(21) Appl. No.: **13/129,192**(57) **ABSTRACT**(22) PCT Filed: **Nov. 13, 2009**(86) PCT No.: **PCT/JP2009/006080**§ 371 (c)(1),
(2), (4) Date: **Jul. 26, 2011**

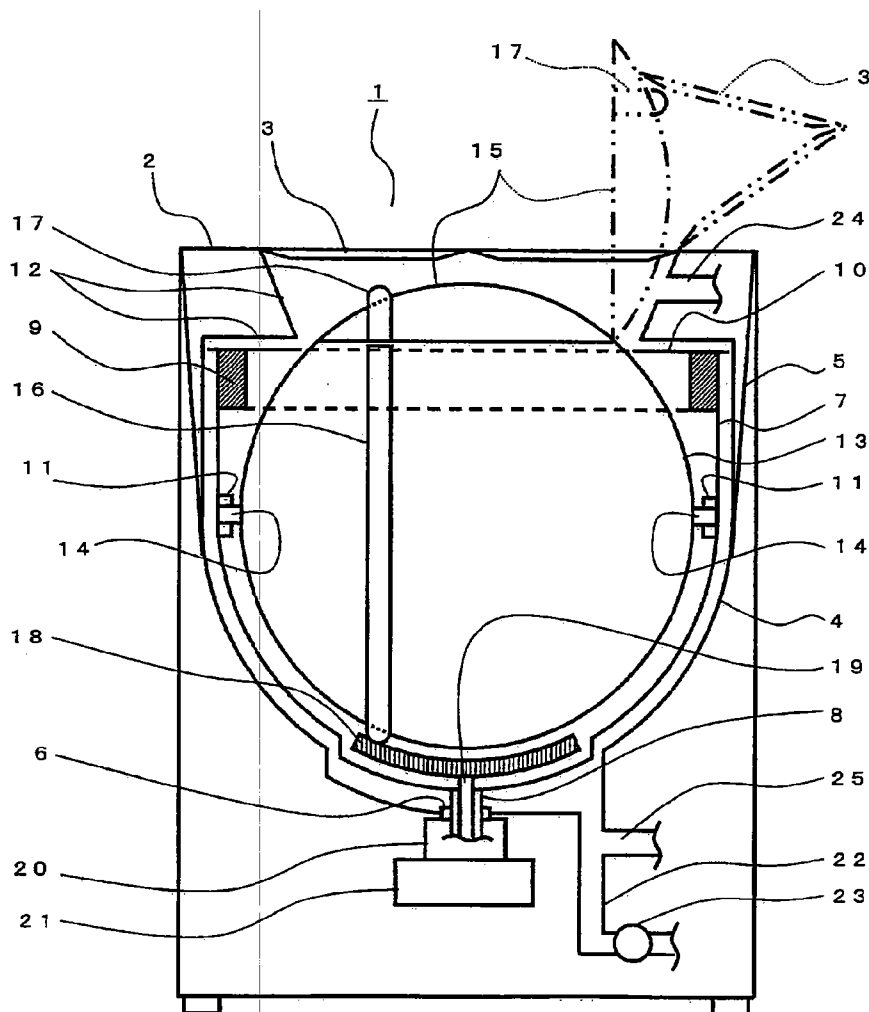
A novel and excellently configured washing machine wherein a washing-tub can be rotated by centering on either two rotating-shafts oriented in different directions.

A washing machine is provided with an outer-tub (4), a rotatable-support-body (7), an toroidal-rail-part (18) which is rotatable coaxial with a support-body-shaft (8) which is the rotating shaft for the support-body (7), and a washing-tub (13) which is mounted in the inside of the support-body (7) and is rotatably connected to the support-body (7) by washing-tub-shafts (14). Rolling-parts (16, 17) which rotate when the washing-tub (13) rotates using the washing-tub-shafts (14) as the rotating shafts are formed on the exterior surface of the washing-tub (13). The rolling-parts (16, 17) touches the toroidal-rail-part (18) so as to be able to transmit the rotating force. The support-body-shaft (8) is a shaft oriented in a different direction from the washing-tub-shafts (14).

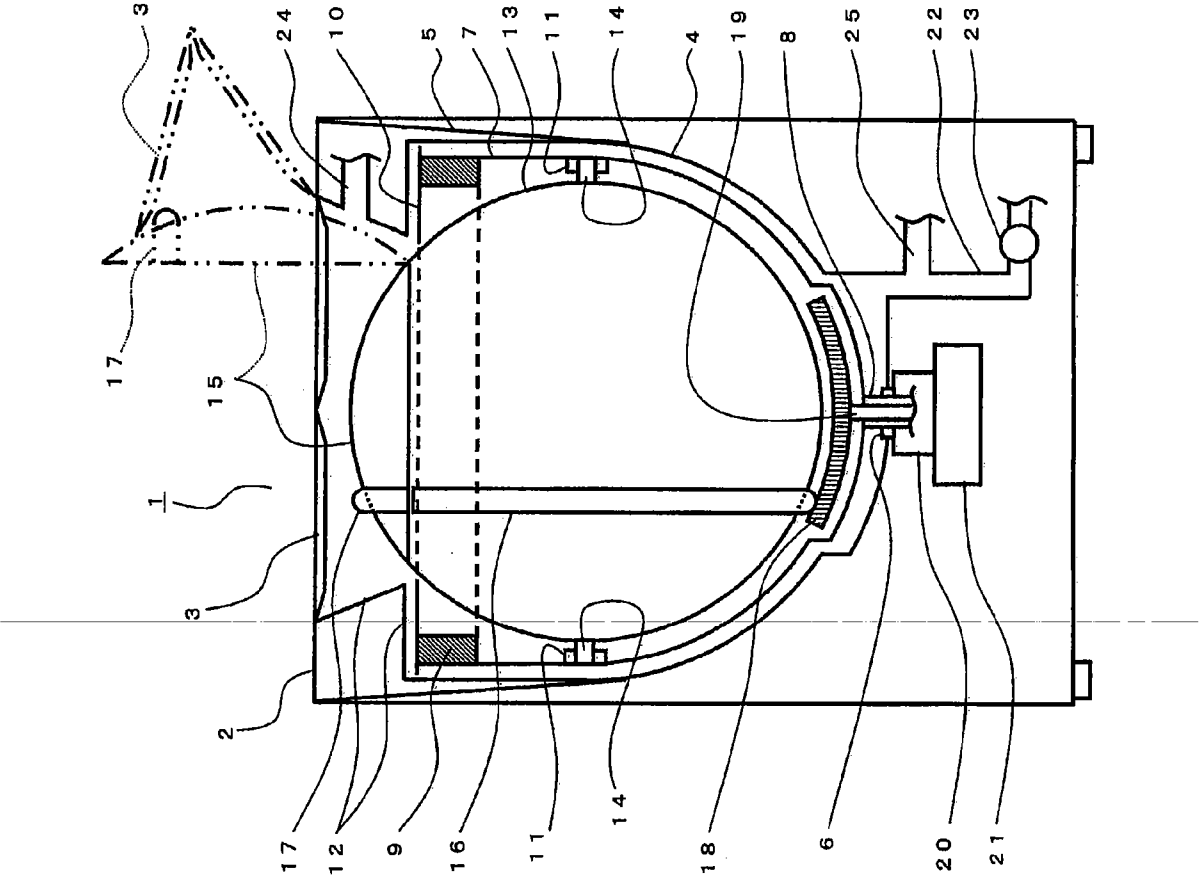
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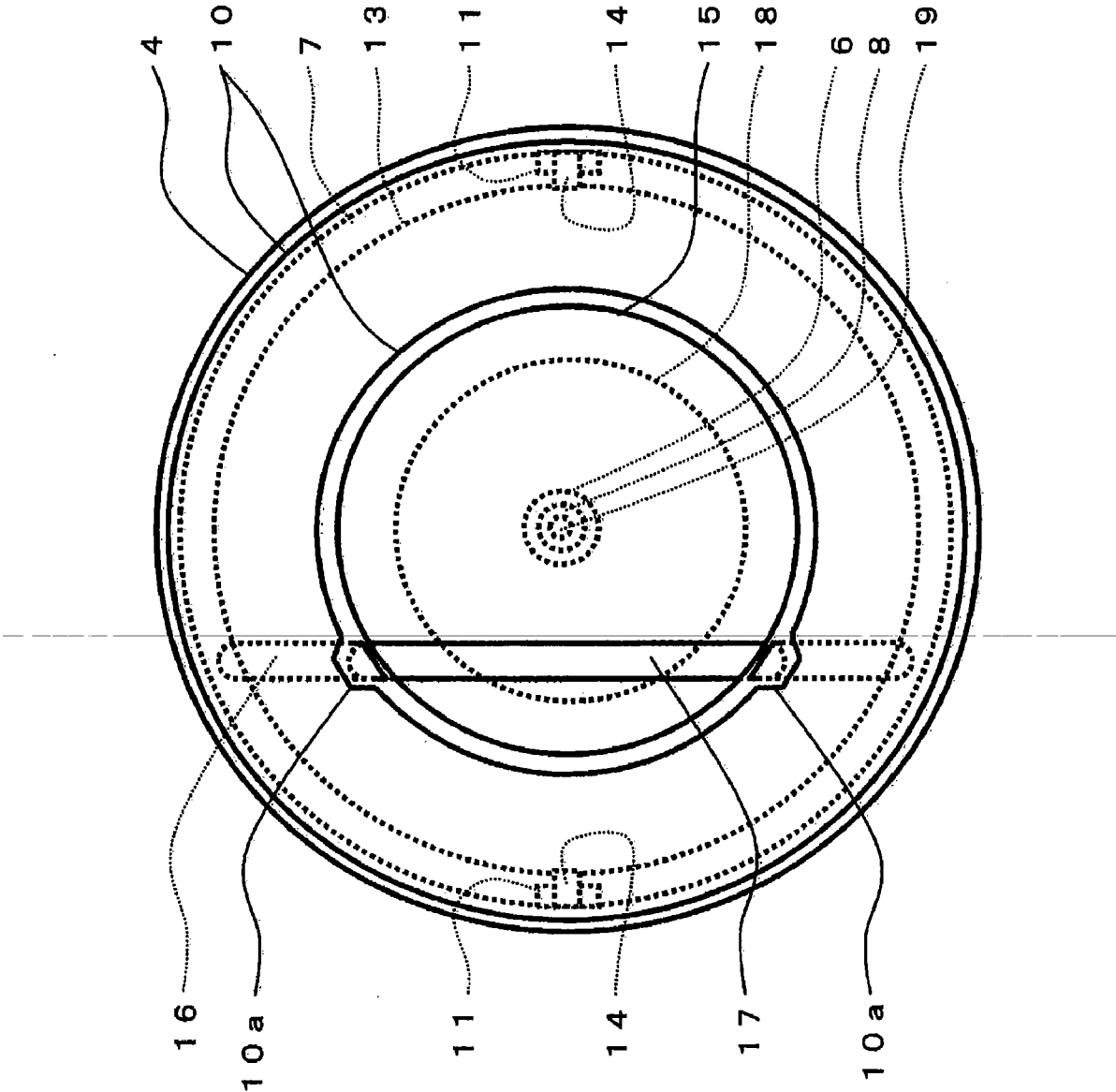
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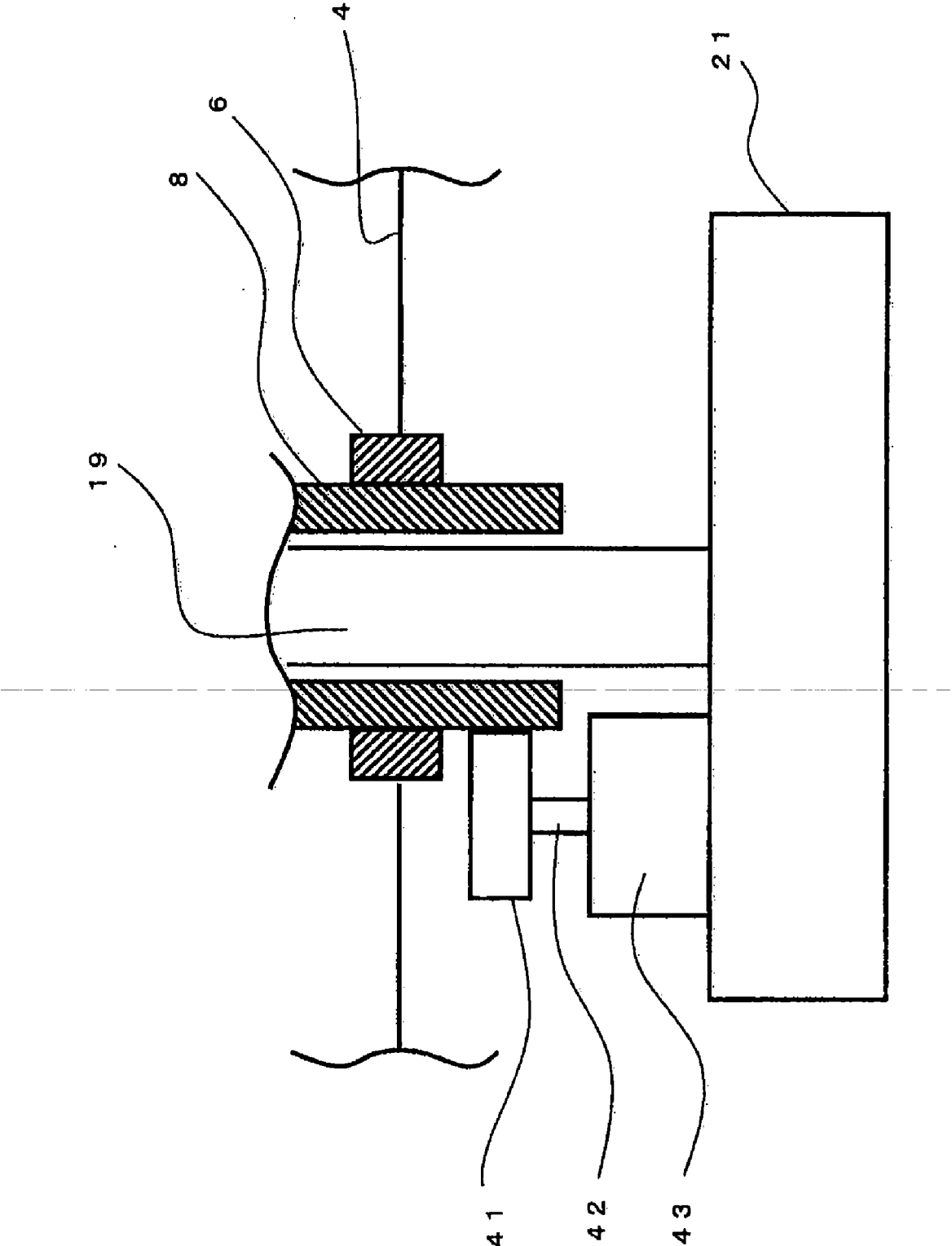
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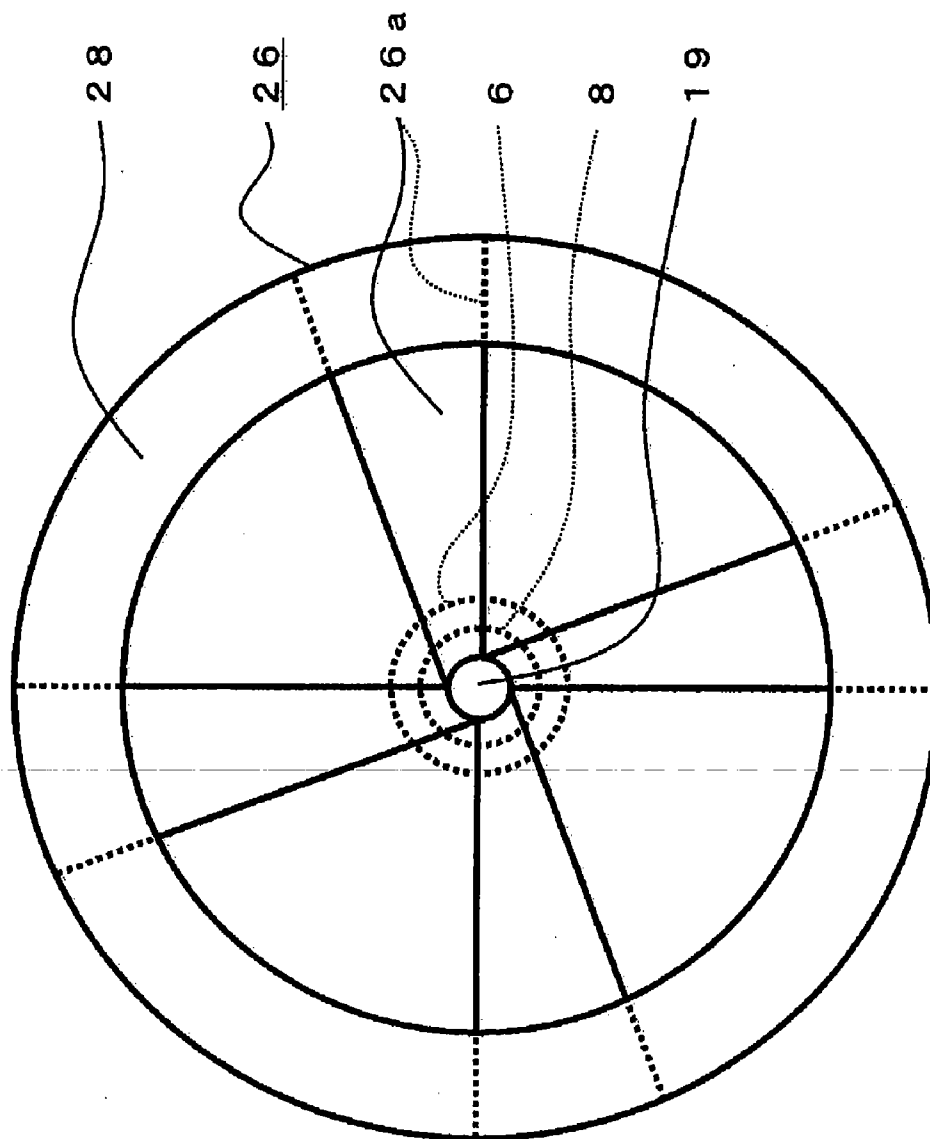
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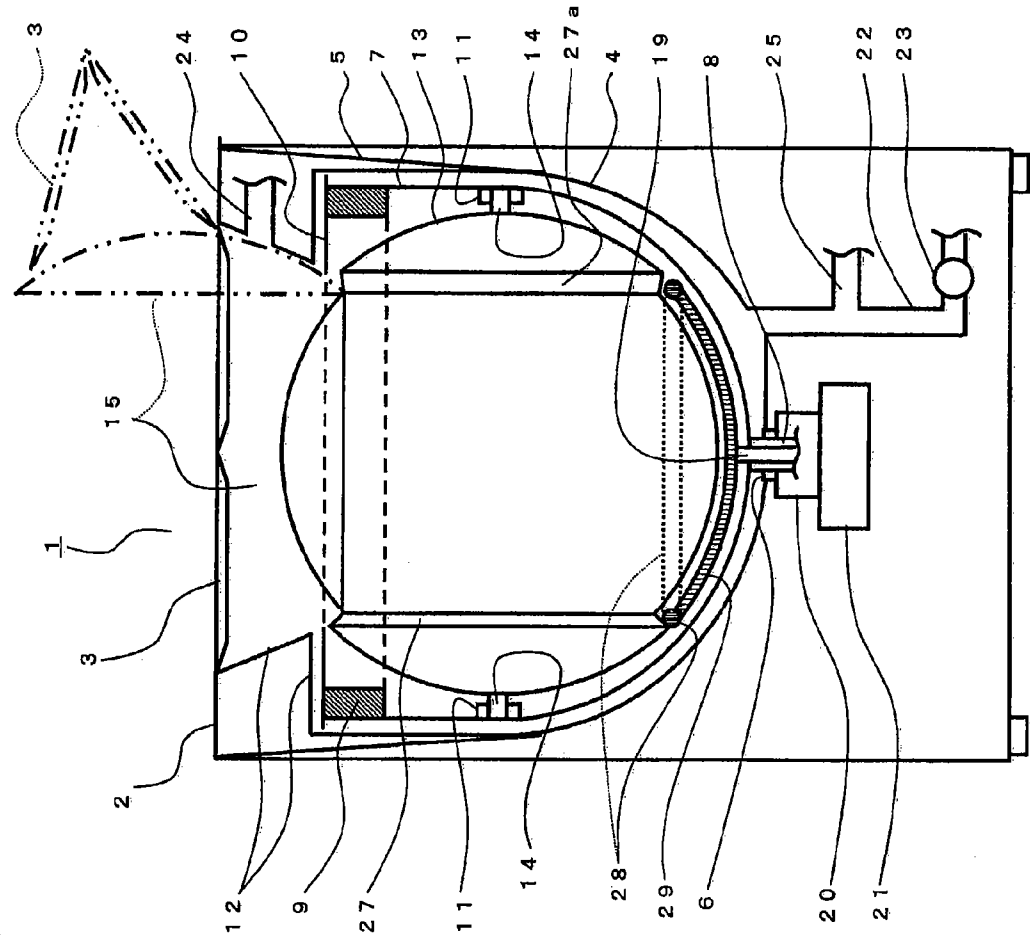
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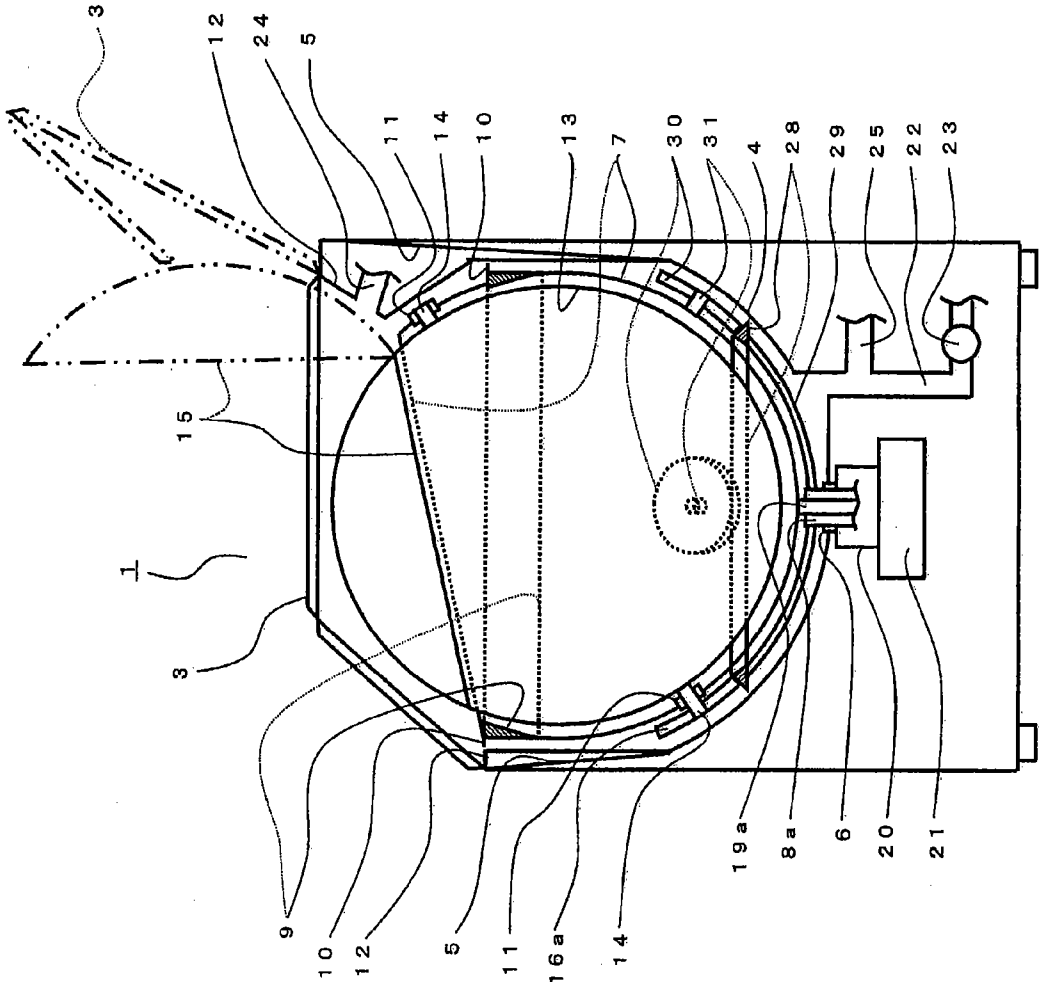
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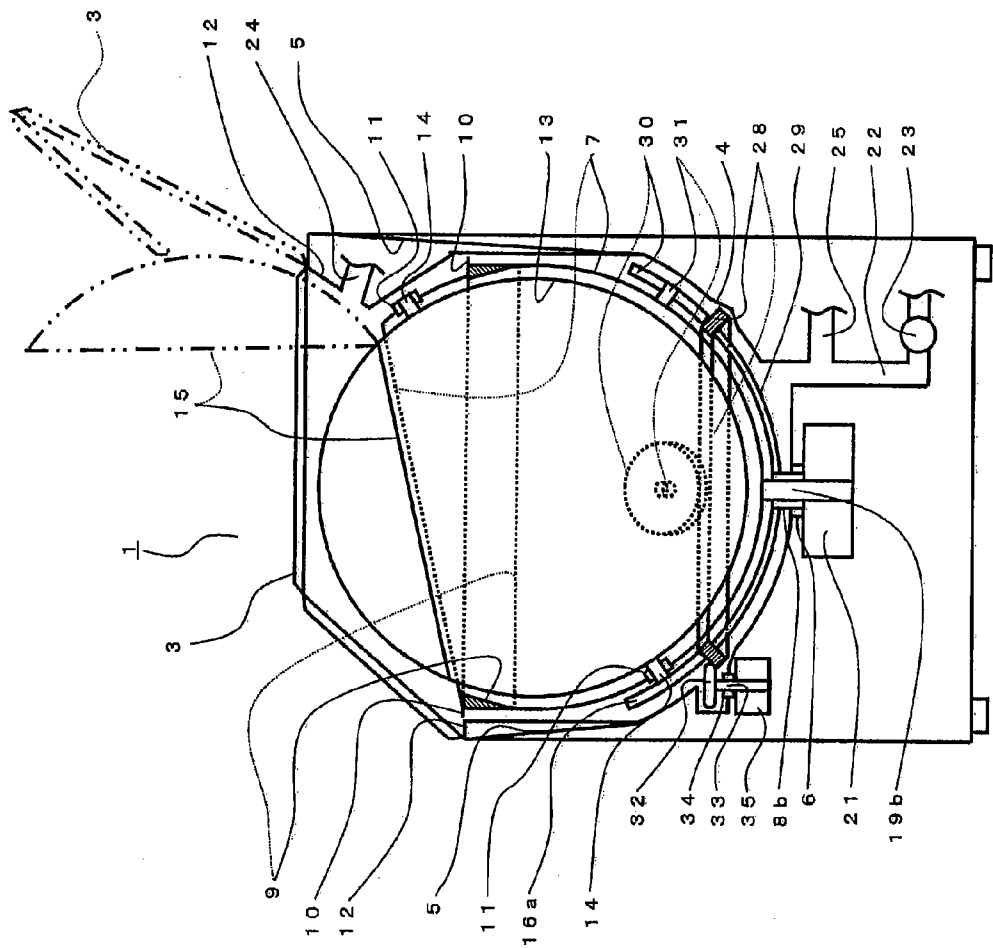
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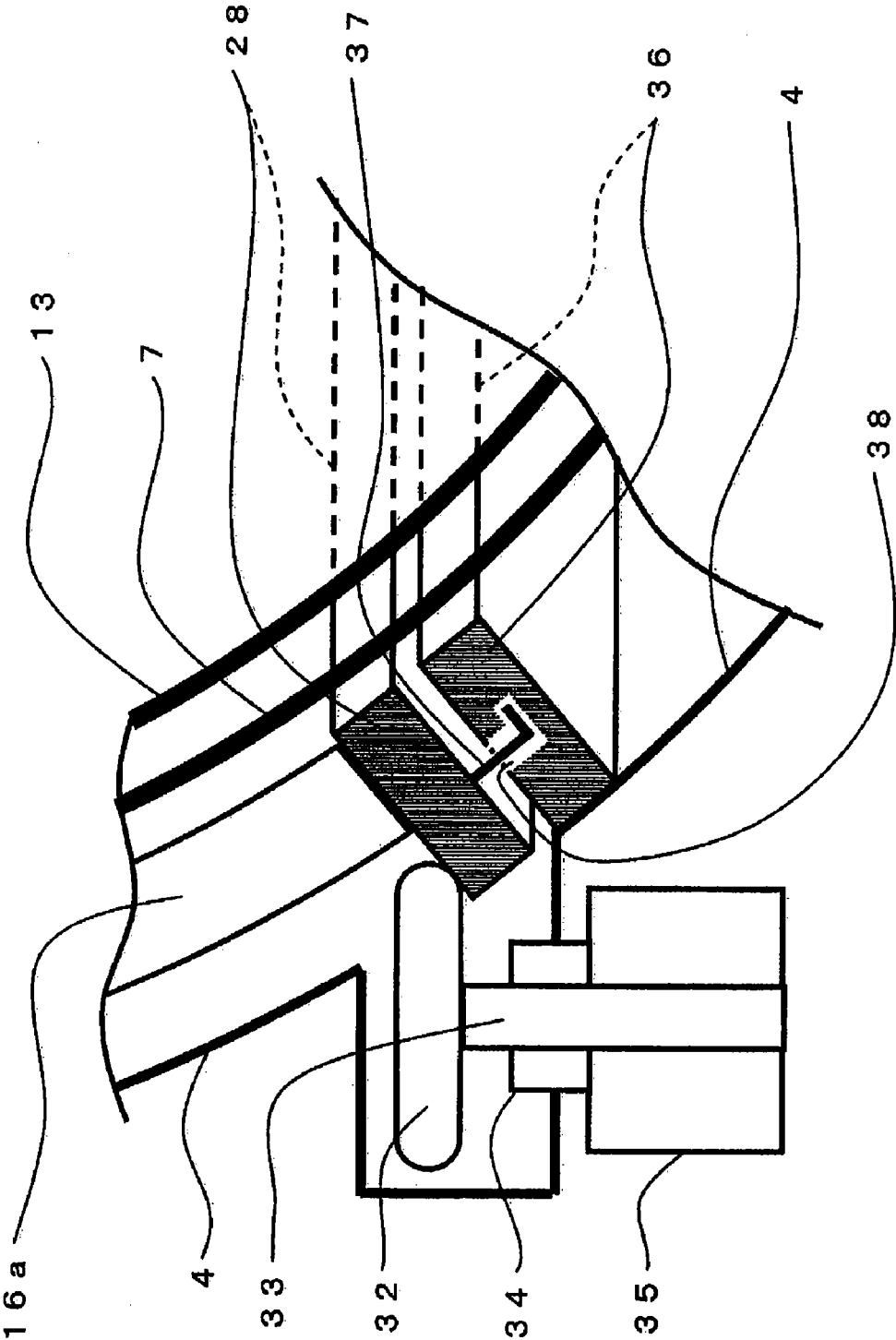
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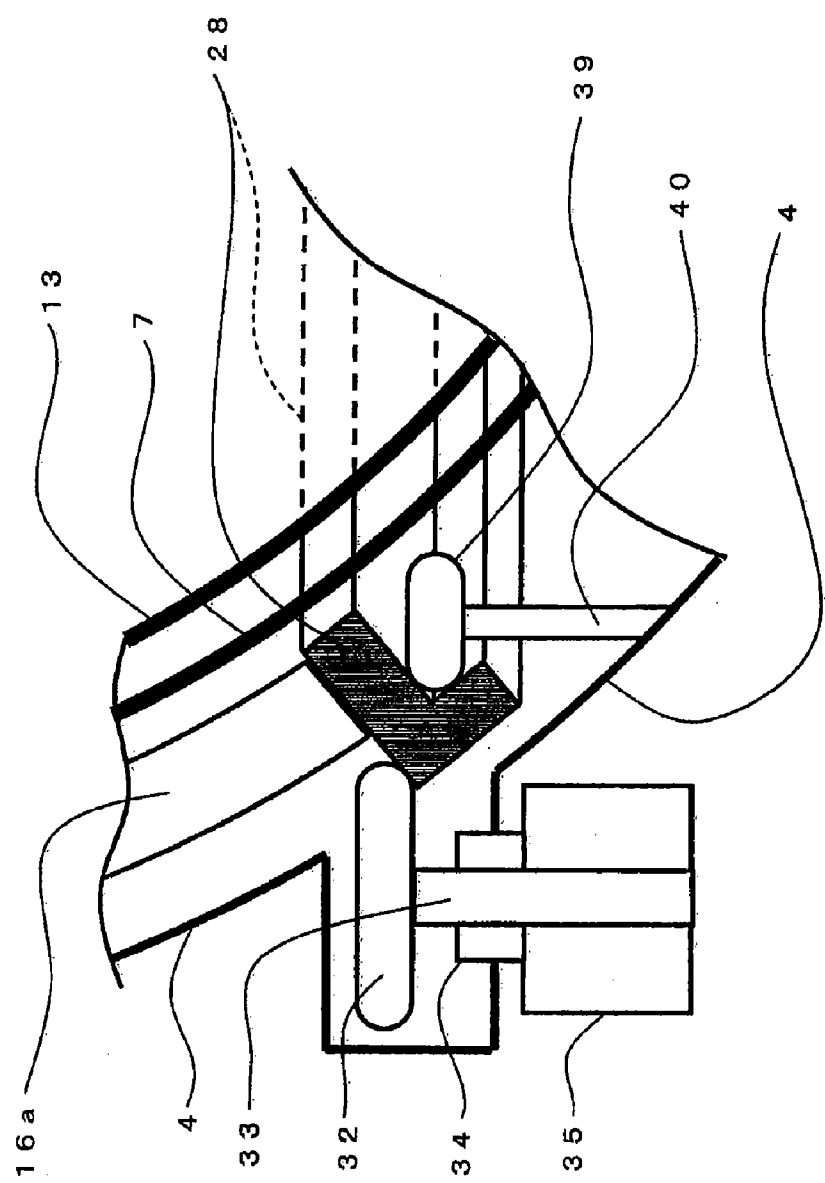
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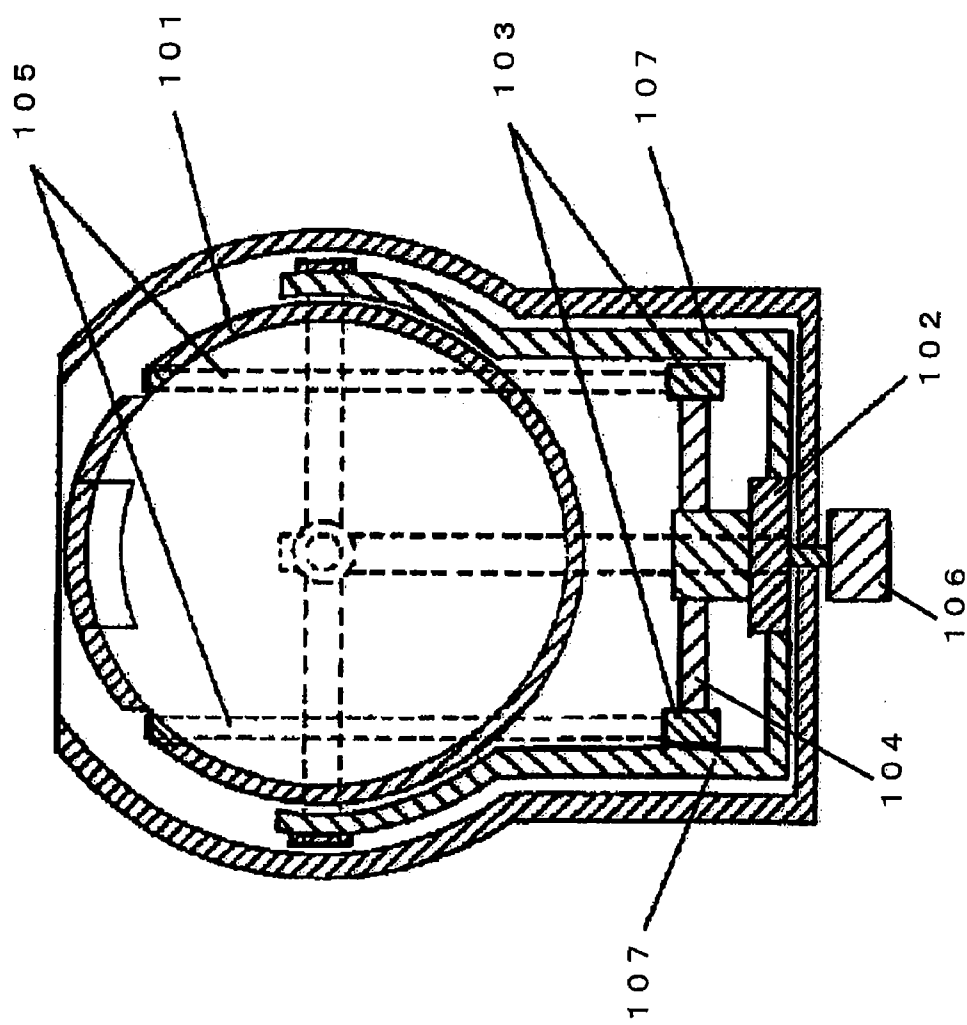
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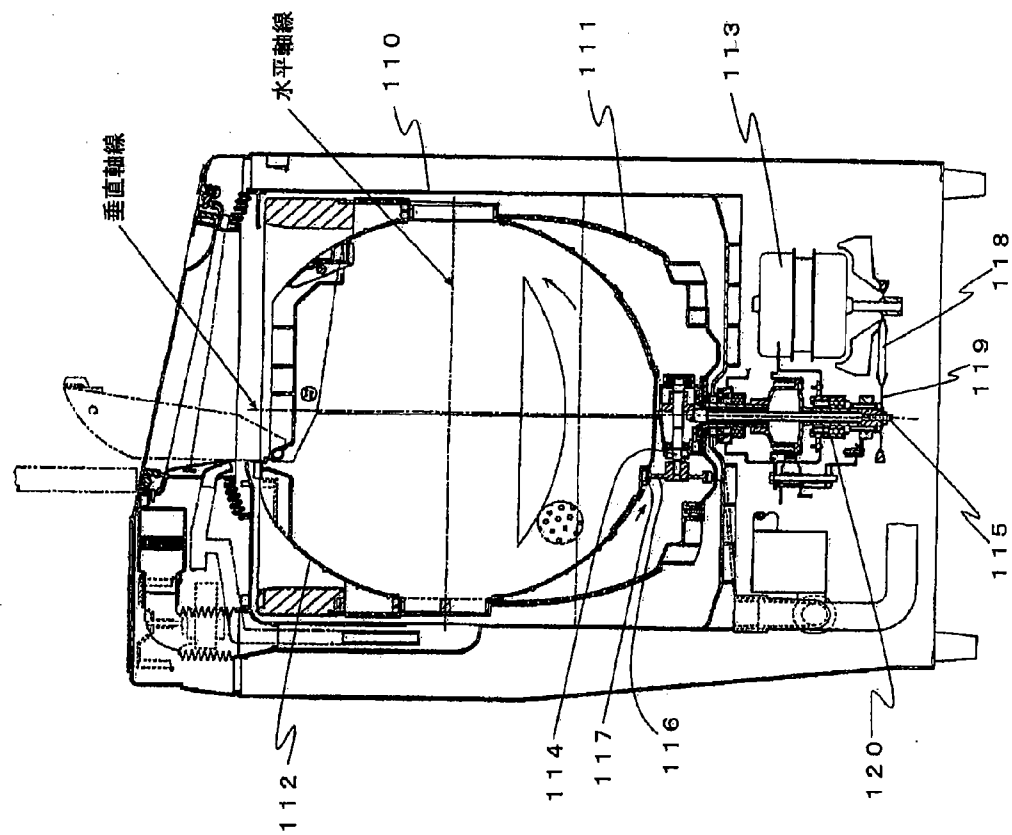
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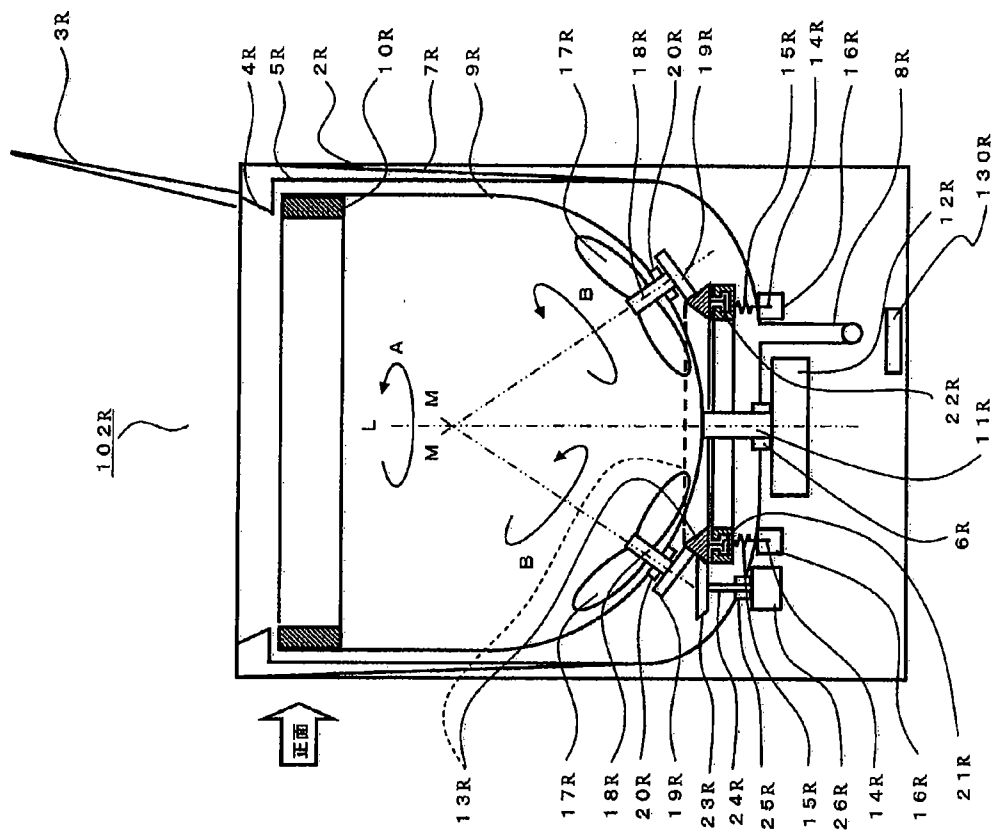
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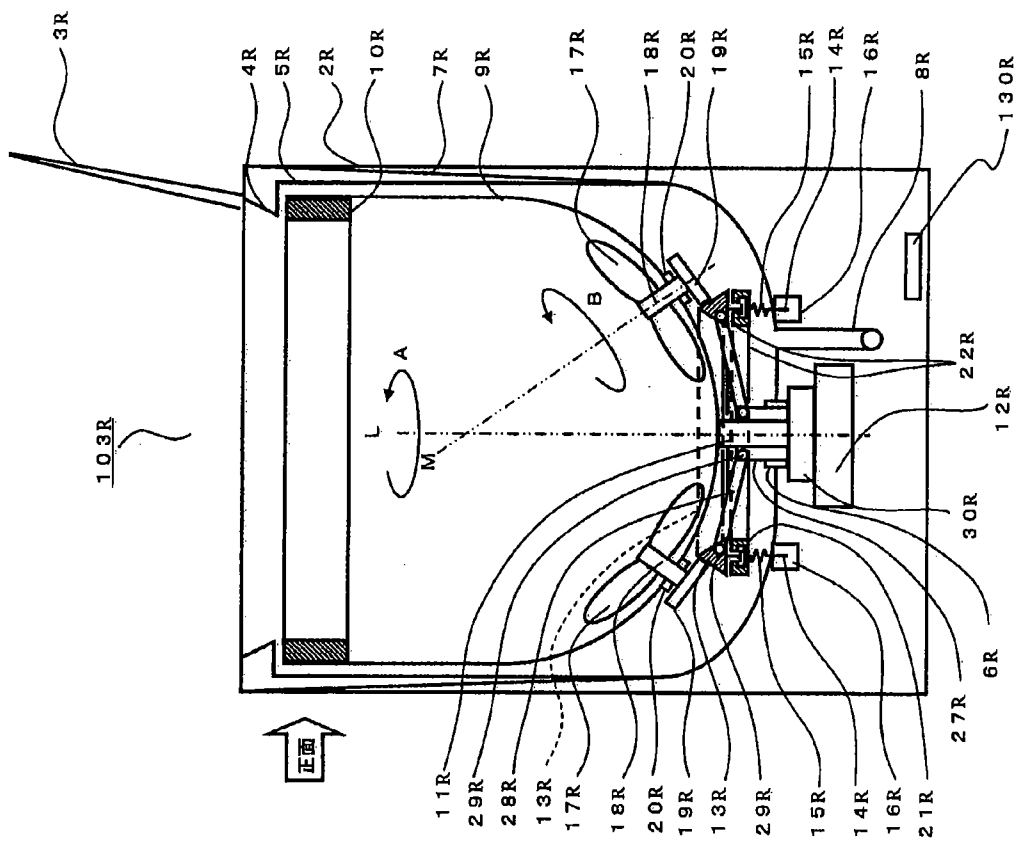
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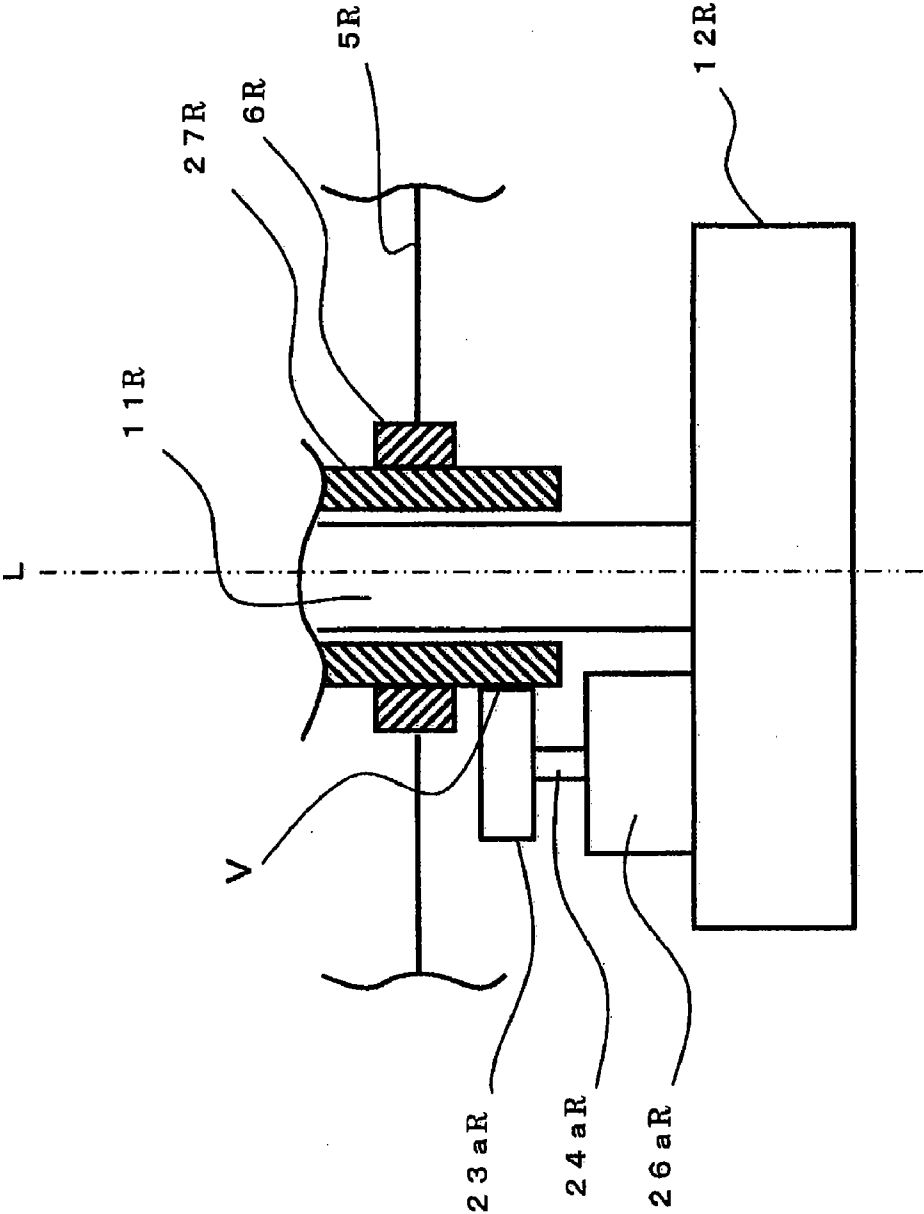
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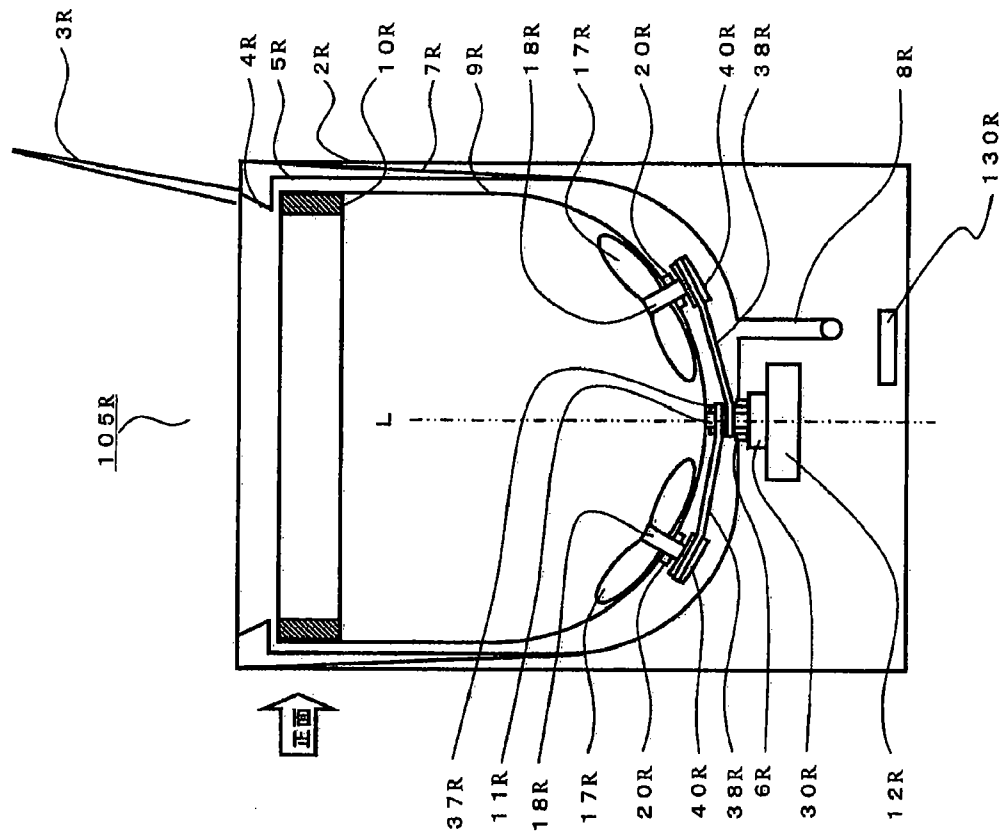
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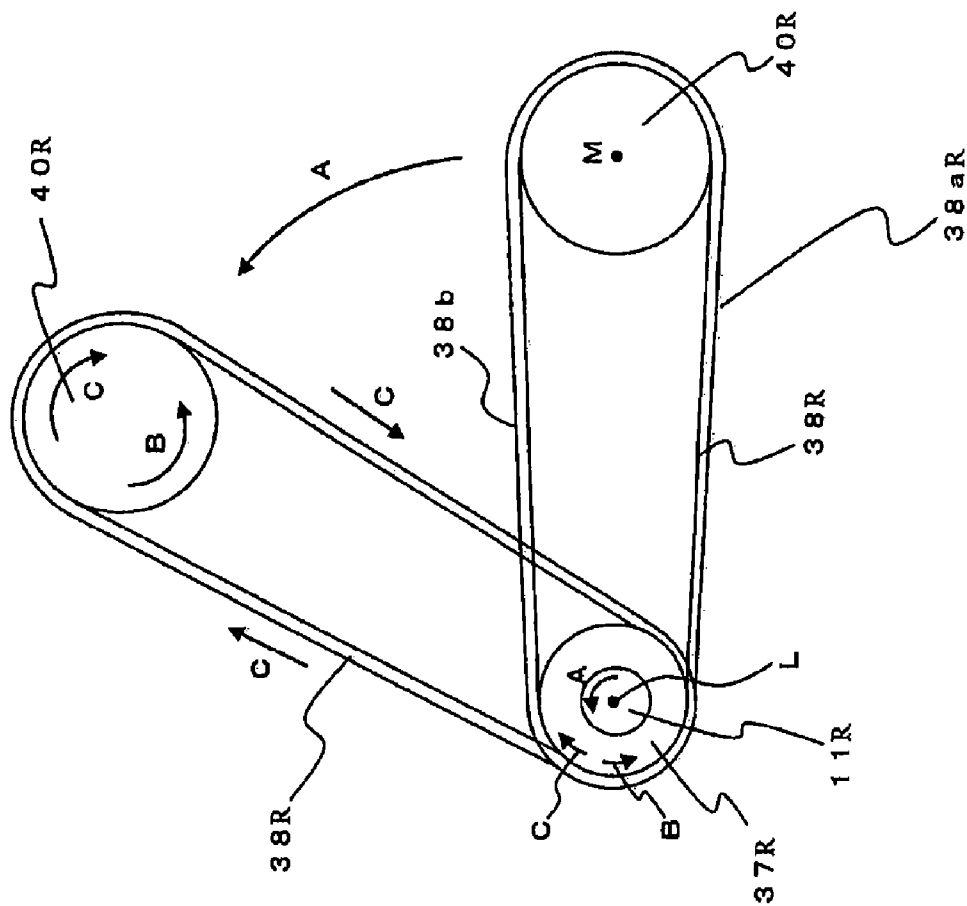
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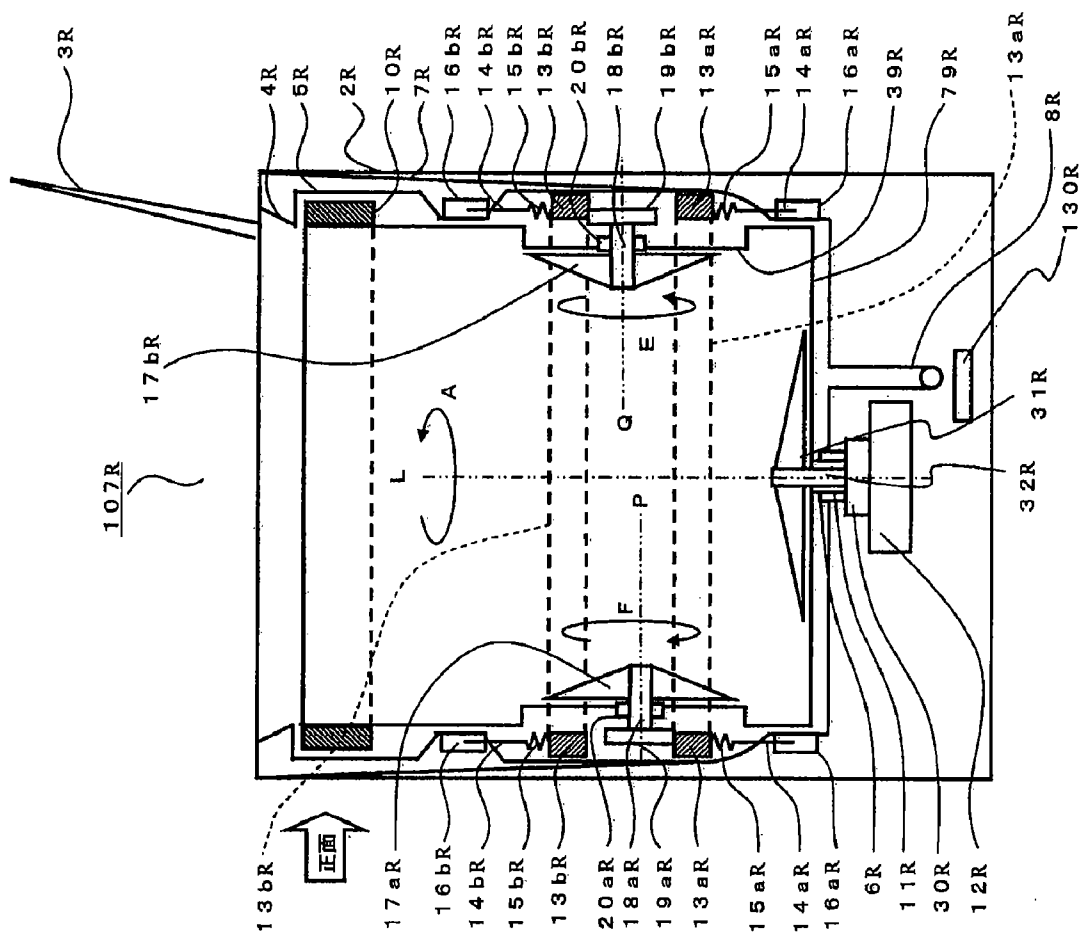
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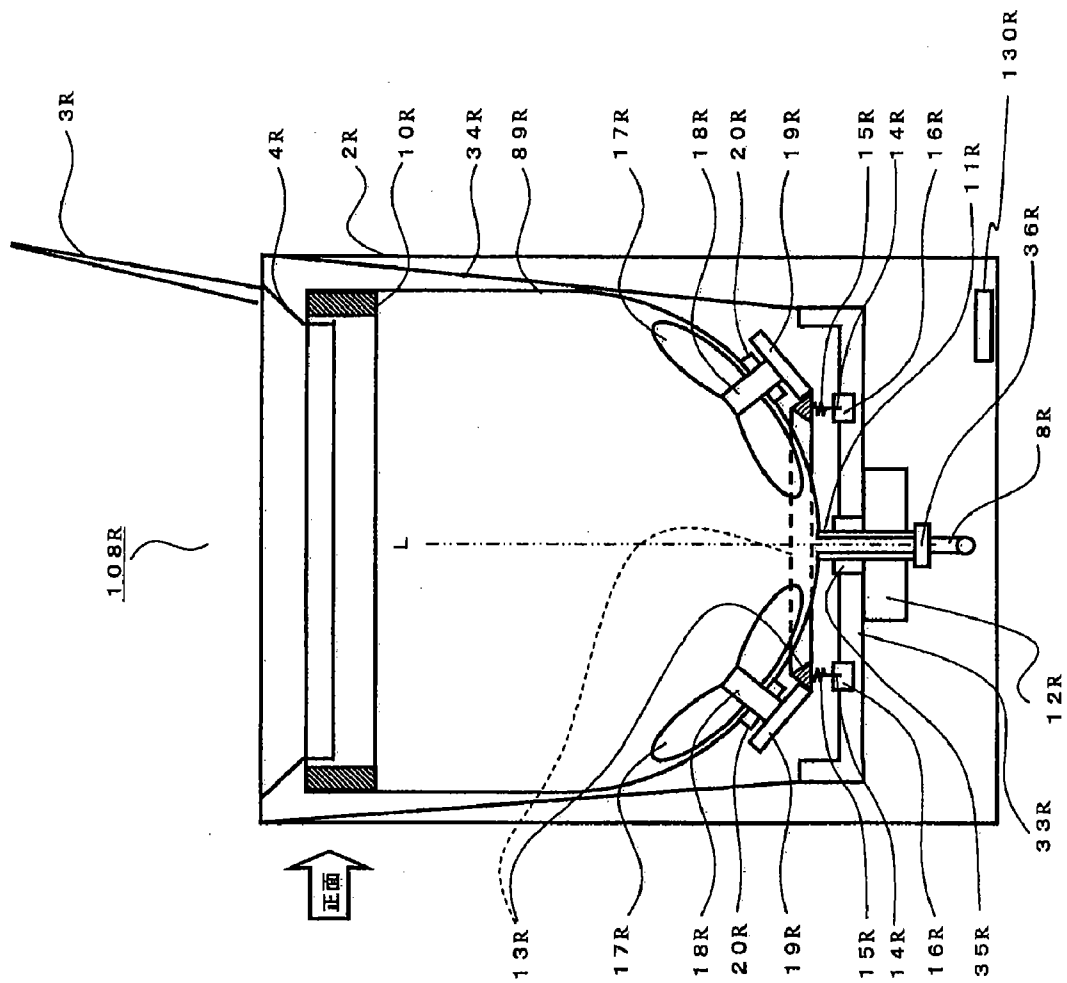
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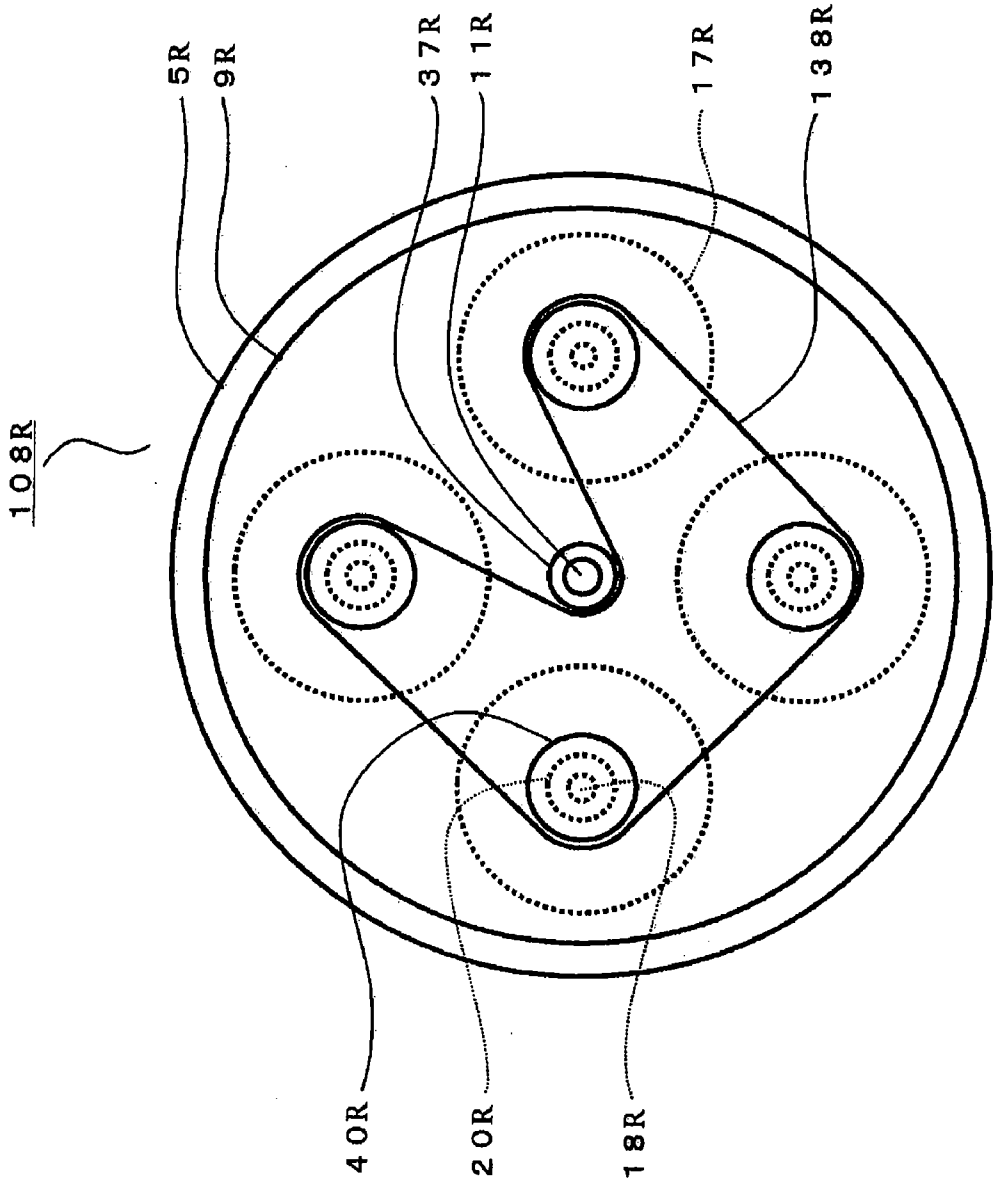
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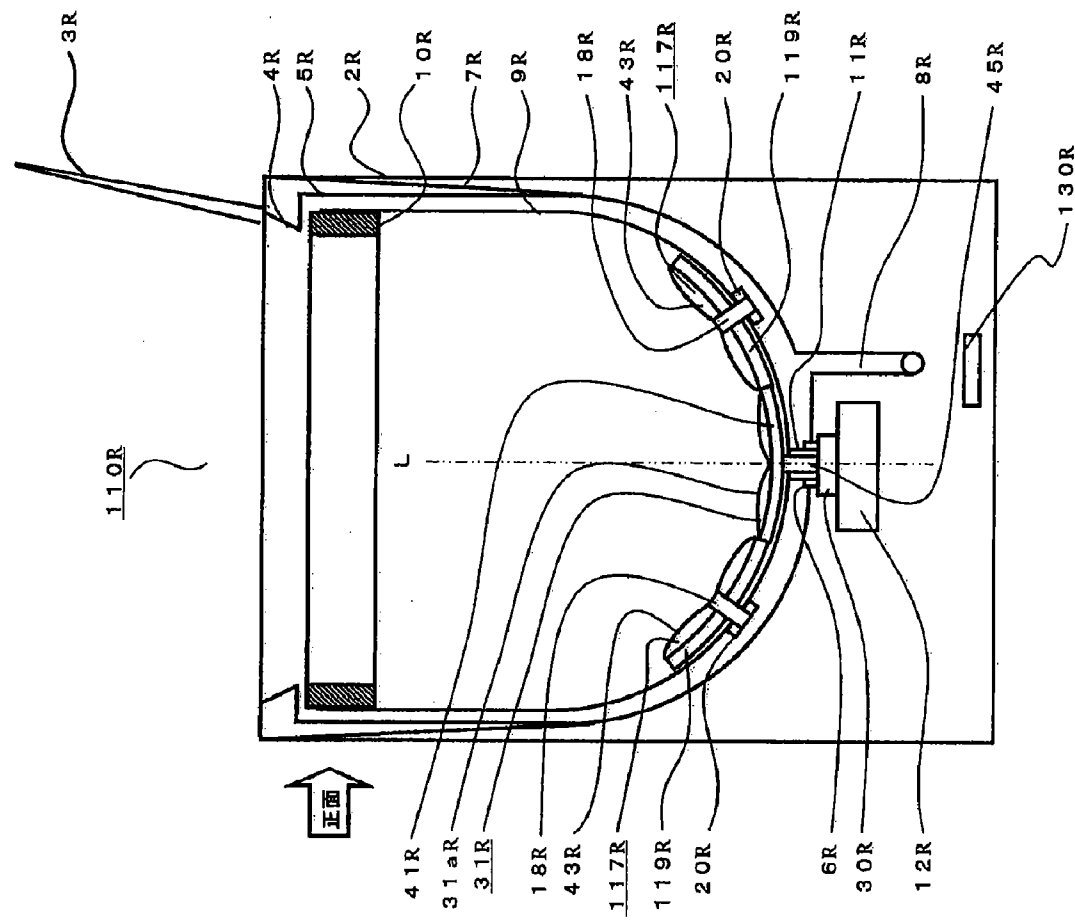
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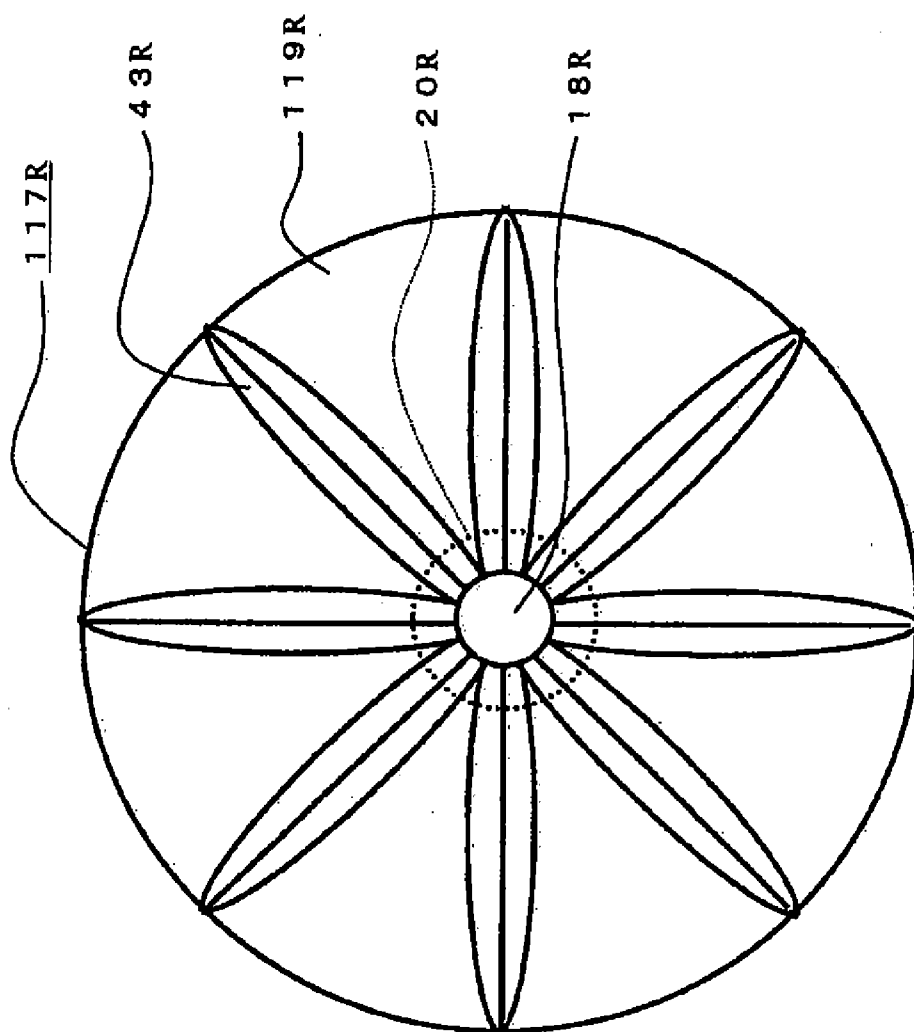
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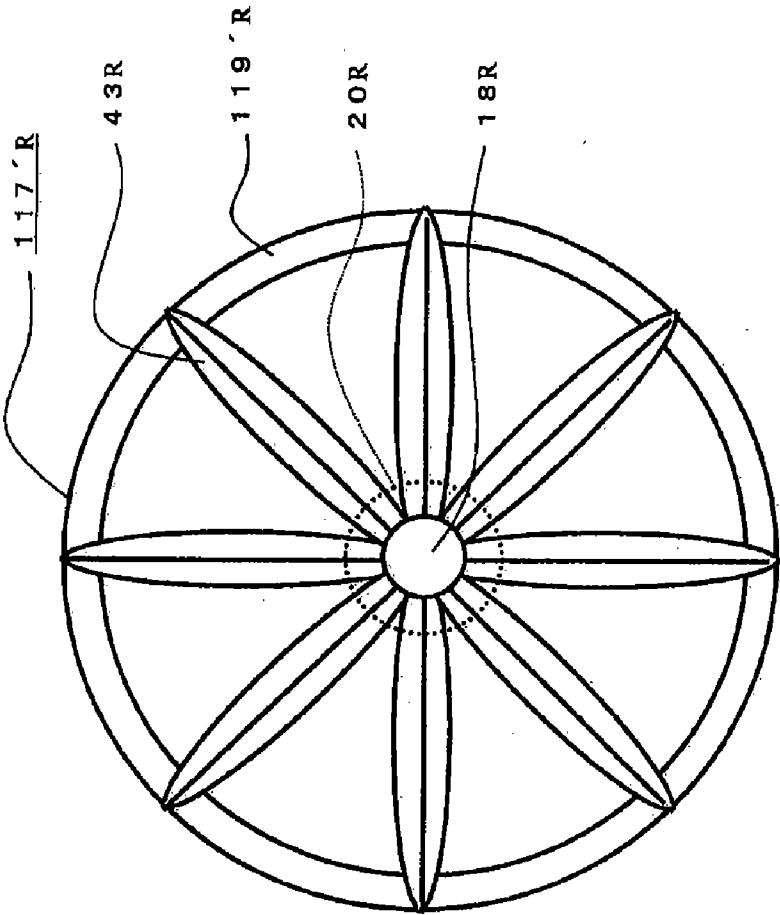
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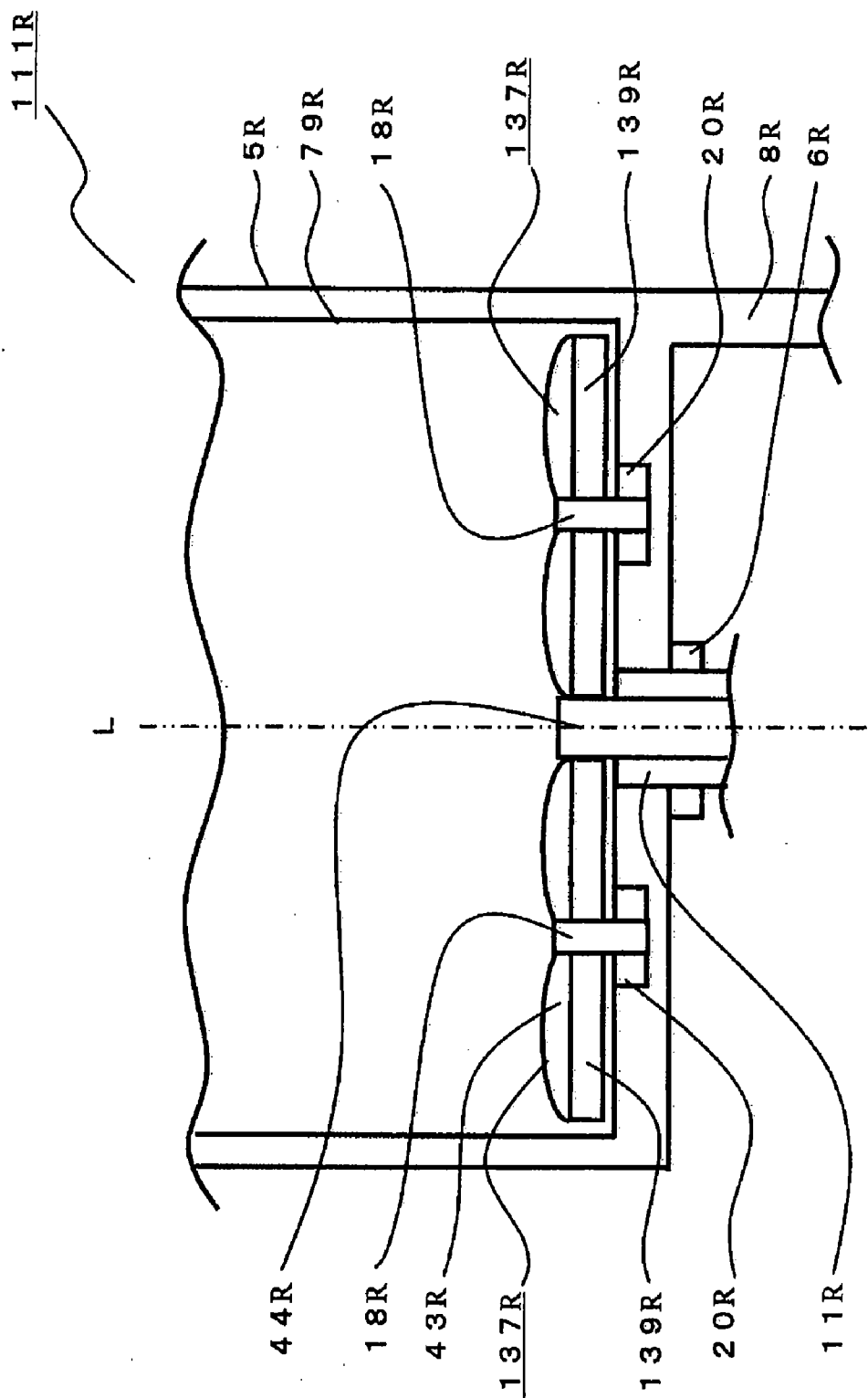
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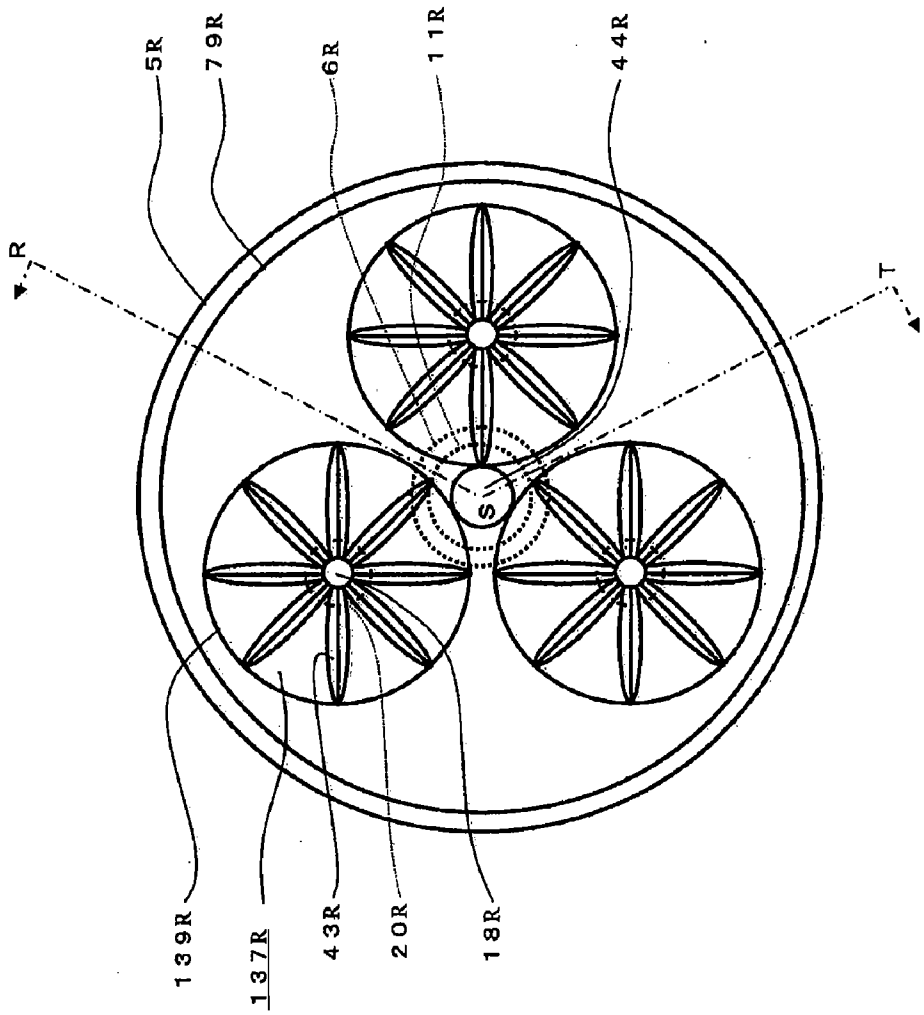
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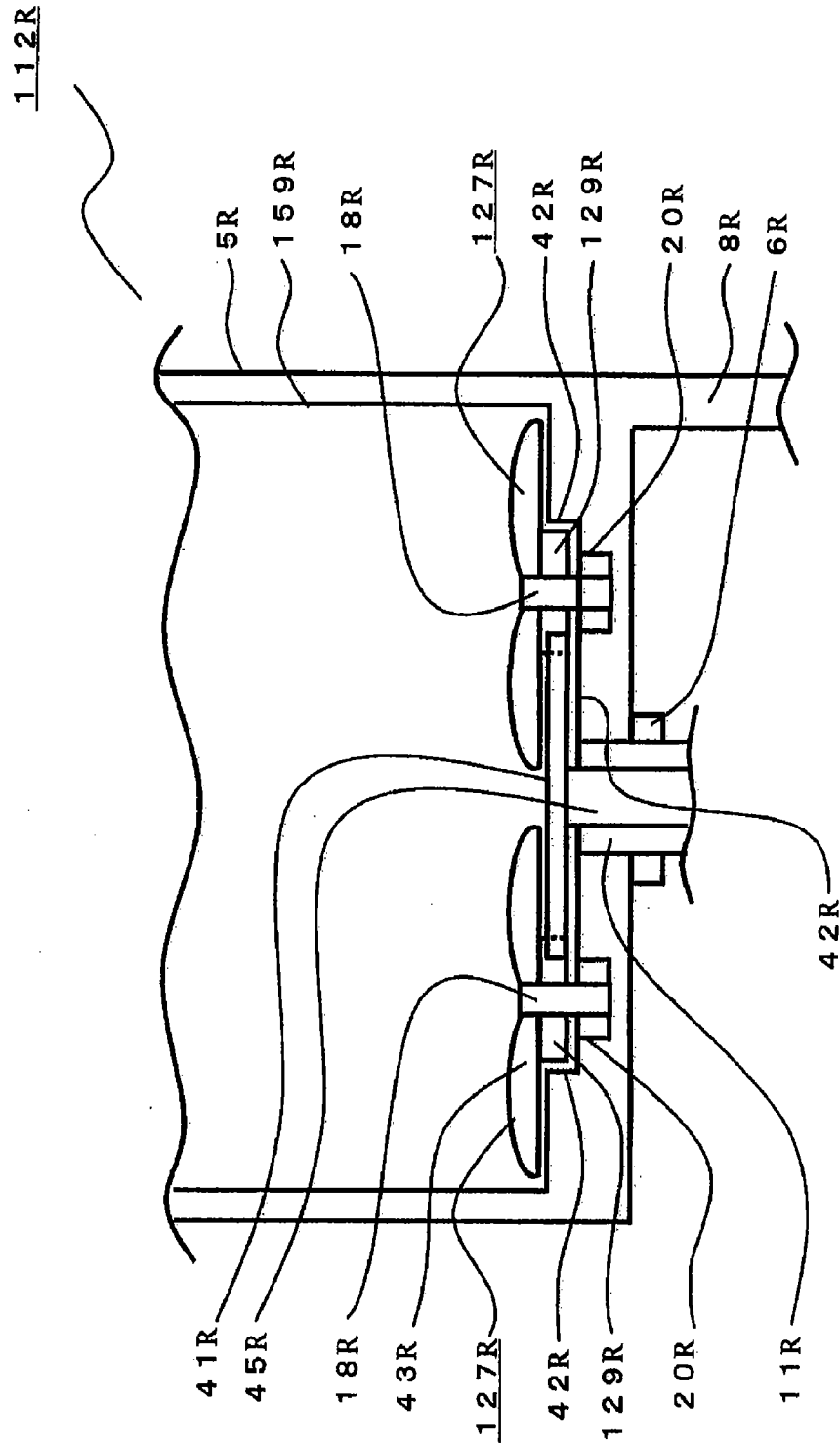
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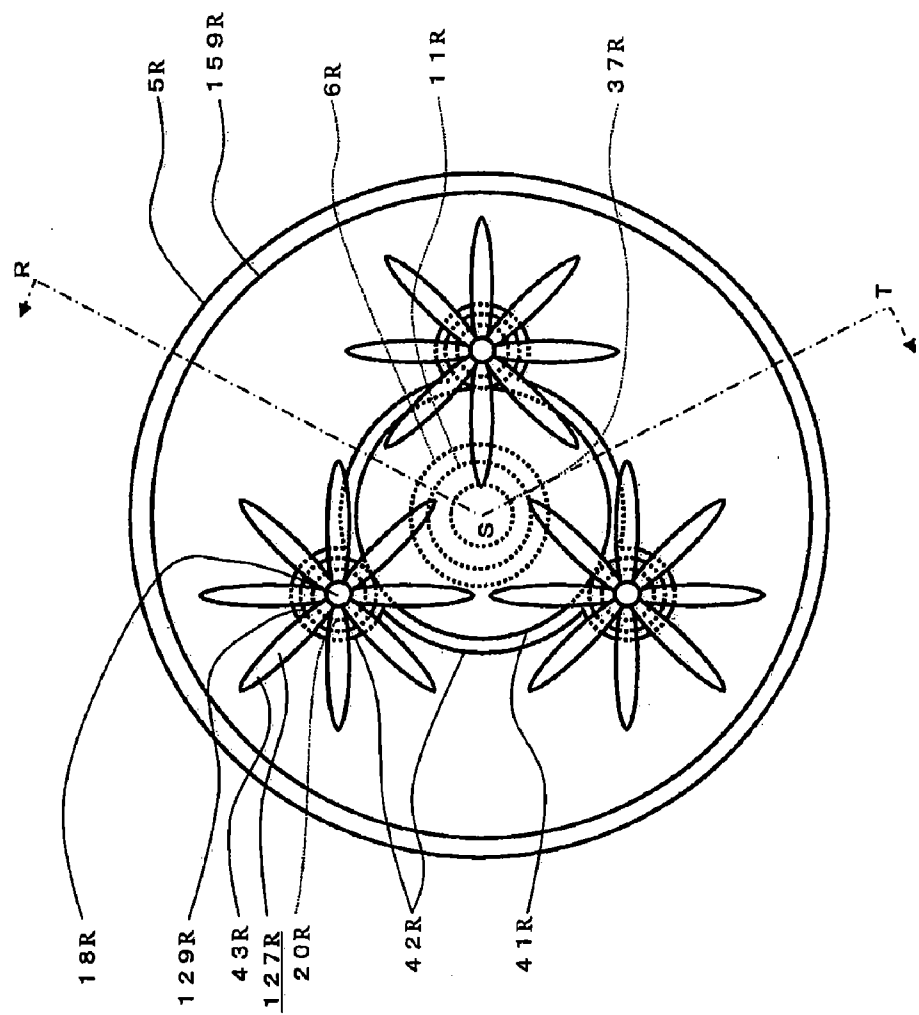
[圖26]



[圖27]



[圖28]



WASHING MACHINE

TECHNICAL FIELD

[0001] The present invention relates to a washing machine, wherein a washing-tub that stores washing-laundry inside and that rotates by centering on two rotating shafts of different directions is equipped in a case inside.

BACKGROUND ART

[0002] For the object of achieving the effect of the beating washing and the effect of saving the amount of the detergent and water compared with a conventional washing machine, the washing machine of the structure that a washing-tub that stores the washing-laundry inside is spherical, can be rotated around two different directions of the horizontal rotation and vertical rotation, is proposed (see, for example, patent document 1 and patent document 2).

[0003] FIG. 11 shows the tectonic profile to view from the front of the washing machine disclosed in patent document 1.

[0004] This washing machine is provided with: the support-body 107 that is mounted in the inside of the case, and calls the horizontal-rotating-arm who is rotatable (horizontal rotation) around the axis line of the rotating shaft of vertical direction; the washing-tub 101 that is mounted inside this support-body 107, and is supported to be rotatable (vertical rotation) around the axis line of the rotating shaft of horizontal direction.

[0005] Also it is provided with: the horizontal-rotating-shaft 104 that is equipped outside the washing-tub 101 in parallel to the rotating-shaft of horizontal direction of the washing-tub 101; driving the pulley 103 that is equipped at both ends of this horizontal-rotating-shaft 104; wherein the belt 105 called an endless driving-belt is hooked round around the surface of each outer circumference so as to cross between the washing-tub 101 and the driving-pulley 103. And equipped with the gear-box 102 that switches either one of whether the support-body 107 is rotated horizontally by a rotating power of a rotating-shaft of vertical direction driven so as to rotate by the motor 106, or whether the washing-tub 101 is further rotated vertically through the driving-pulley 103 and the belt 105 being converted once into the rotation of the horizontal-rotating-shaft 104 with the built-in gear.

[0006] This washing machine rotates vertically the washing-tub 101 at washing, rotates horizontally the support-body 107 (and the washing-tub 101 at the same time) at high speed at dewatering, and does alternately the vertical rotation of the washing-tub 101 and the horizontal rotation of the support-body 107 at drying.

[0007] Next, FIG. 12 shows the front view that breaks a part of the washing machine disclosed in patent document 2.

[0008] In this washing machine, the support-body 111 that calls middle-tub and that rotates around a vertical axis line is supported rotatably in the outer-tub 110 wherein water is stored, the washing-tub 112 that calls inner-tub and that rotates around the horizontal axis line (or the inclined axis line) is supported rotatably in the support-body 111.

[0009] a rotating power from the motor 113 is once transmitted to the horizontal rotating-shaft 114 that was extended to a lateral direction from the vertical rotating-driving-shaft 115 which is arranged properly on the way by way of the belt 118, the pulley 119, the clutch 120, the gear, etc. And, the driving-gear 116 that is equipped at one with the end of the horizontal rotating-shaft 114 rotates vertically, this driving-

gear 116 meshes always with the driven-gear 117 that was equipped on the outer circumference (the circumferential direction of the horizontal axis line) of the washing-tub 112, and the washing-tub 112 rotates around the horizontal axis line (or the inclined axis line). Also the washing-tub 112 can be rotated around the vertical axis line at one by rotating the support-body 111 around the vertical axis line, and at the rotation of high speed in dewatering the washing-tub 112 is rotated around the vertical axis line at one with the support-body 111, the washing-tub 112 shall be rotated around the horizontal axis line at washing or at drying.

[0010] According to such a structure disclosed by patent document 1 or patent document 2, a washing machine equipped with the washing-tub that is rotatable to different two directions of horizontal rotation and vertical rotation had was realized.

PRIOR ART DOCUMENTS

Patent Documents

[0011] Patent document 1: Japanese patent application laid-open No. hei8-19694

[0012] Patent document 2: Japanese patent application laid-open No. hei3-9790

[0013] Patent document 3: Japanese patent application laid-open No. sho58

[0014] Patent document 3: Japanese patent application laid-open No. sho60-24896

SUMMARY OF THE INVENTION

Problems to be Solved by the Invention

[0015] However, in the conventional structure like the above-mentioned, the structure for switching the rotational direction became complex, there was problems of constructional, of reliability.

[0016] That is, in any washing machine of patent document 1 and patent document 2 too, the horizontal-shaft 104 (or 114) to rotate the washing-tub vertically is equipped outside the washing-tub, the rotational power of the rotating-shaft of vertical direction must be once transmitted to this horizontal-rotating-shaft when the washing-tub is rotated vertically. The gear box or clutch etc. is equipped outside the motor for switching the rotational direction of the rotational power in the rotating-shaft of vertical direction, thereby the structure becomes complex, had problems in reliability.

[0017] The present invention, in consideration of a above-mentioned conventional problem, is intended to provide afresh and excellently a washing machine configured, wherein a washing-tub can rotate by centering on each two rotating-shafts in different directions.

[0018] Also, it explains about the conventional art of the washing machine according to the invention that relates to the present invention.

[0019] In the conventional washing machine wherein a washing-tub that can store a washing-laundry inside is rotated by centering on the rotating shaft, the mixing-impeller that is rotated by centering on the rotating-shaft on same straight line as the rotating-shaft of the washing-tub is equipped on the bottom of the washing-tub, the mixing-impeller is rotated when washing, the configuration to wash mixing the washing-laundry and water in the washing-tub is known (see, for example, patent document 3).

[0020] also, the configuration too wherein the mixing-impeller that is equipped on the bottom of the washing-tub is swung is proposed. (see, for example, patent document 4).

[0021] However, in patent document 3, the rotation of the mixing-impeller could only be rotated by centering on the axis line of the washing-tub. The washing-tub inside could only be mixed uniformly by centering on the single axis line. Therefore the effect of the washing and rinse of the washing-laundry could not help becoming limited.

[0022] Also, in patent document 4, the multiple mixing-impeller to swing is equipped. but because the range of the swinging angle has been limited, the mixing force can not become too strong much. thereby the effect too of the washing and rinse of the washing-laundry could not help becoming limited.

[0023] The related invention, in consideration of the above conventional problems of the washing machine, is intended to provide a washing machine that can improve the mixing force.

Means of Solving the Problems

[0024] To solve the problem mentioned above, the 1st invention is a washing machine comprising:

[0025] a outer-tub;

[0026] a support-body that is arranged in the inside of the said outer-tub and is rotatable;

[0027] a toroidal-rail-part that is arranged in the inside of the said outer-tub and is rotatable by the same axis as a support-body-shaft that shall be a rotating shaft of the said support-body;

[0028] a washing-tub that is arranged in the inside of the said support-body and was connected to the said support-body so as to be rotatable by a washing-tub-shaft;

[0029] a rolling-part that is arranged in the inside of the said outer-tub, that is formed with separately or at one the said washing-tub, and that is rotatable by gearing mutually with the rotation of the said washing-tub wherein the said washing-tub-shaft shall be a rotating shaft,

[0030] and wherein: the said rolling-part touches the said toroidal-rail-part so as to be able to transmit the rotation force;

[0031] the said support-body-shaft is non coaxial to the said washing-tub-shaft.

[0032] And furthermore, the summary of the related invention to the present invention is described as follows.

[0033] To achieve the object of the related invention to the present invention, the 1st invention is a washing machine comprising:

[0034] a washing-tub wherein the washing-laundry is stored inside, that is equipped self-rotatable;

[0035] a washing-tub-self-rotating-shaft that is equipped in the said washing-tub, that becomes a self rotating shaft of the said washing-tub;

[0036] a mixing-impeller that is equipped self-rotatable in the inside of the said washing-tub, that mixes the washing-laundry in the said washing-tub together with the water;

[0037] a mixing-impeller-self-rotating-shaft that is equipped in the said mixing-impeller, that becomes a self rotating shaft of the said mixing-impeller,

[0038] and wherein the said mixing-impeller-self-rotating-shaft is arranged on a different line from the said washing-tub-self-rotating-shaft.

[0039] Also, the 2nd invention is a washing machine according to the 1st invention, wherein the said mixing-impeller is self-rotated by using the rotating force wherein the said washing-tub self-rotates.

[0040] Also, the 3rd invention is a washing machine according to the 2nd invention, wherein the said mixing-impeller is self-rotated by using too other force except the rotating force wherein the said washing-tub self-rotates.

[0041] Also, the 4th invention is a washing machine according to the 1st invention, wherein the said mixing-impeller is self-rotated by using only other force except the rotating force wherein the said washing-tub self-rotates.

[0042] Also, the 5th invention is a washing machine according to the 2nd invention, comprising:

[0043] a rolling-part that was equipped to the said mixing-impeller-self-rotating-shaft;

[0044] a contact-material that was equipped by centering on the said washing-tub-self-rotating-shaft for the said rolling-part to touch, and wherein:

[0045] how the said mixing-impeller self-rotated by using the rotating force wherein the said washing-tub self-rotates is

[0046] with the self rotation of the said washing-tub, the said rolling-part revolves by centering on the said washing-tub-self-rotating-shaft while touching the said contact-material, thereby the said rolling-part is rolled by centering on the said mixing-impeller-self-rotating-shaft; the said mixing-impeller self-rotates together with the rolling of the said rolling-part.

[0047] Also, the 6th invention is a washing machine according to the 3rd invention, comprising:

[0048] a rolling-part that was equipped to the said mixing-impeller-self-rotating-shaft;

[0049] a contact-material that was equipped by centering on the said washing-tub-self-rotating-shaft for the said rolling-part to touch;

[0050] a driving-part that rotates the said contact-material by centering on the said washing-tub-self-rotating-shaft,

[0051] and wherein:

[0052] how the said mixing-impeller self-rotated by using the rotating force wherein the said washing-tub self-rotates is:

[0053] with the self rotation of the said washing-tub, the said rolling-part revolves by centering on the said washing-tub-self-rotating-shaft while touching the said contact-material, thereby the said rolling-part rolls by centering on the said mixing-impeller-self-rotating-shaft, the said mixing-impeller self-rotates together with the rolling of the said rolling-part;

[0054] how the said mixing-impeller self-rotated by using too other force except the rotating force wherein the said washing-tub self-rotates is

[0055] the said driving-part rotates the said contact-material, thereby the said rolling-part that touches the said contact-material rolls by centering on the said mixing-impeller-self-rotating-shaft, the said mixing-impeller self-rotates together with the rolling of the said rolling-part.

[0056] Also, the 7th invention is a washing machine according to either of the 5th or 6th invention, wherein:

[0057] the said contact-material has a 1st-rail-material that was equipped so as to round the outside of the said washing-tub;

[0058] the said rolling-part, in case of the said revolving, rolls on the surface of the said 1st-rail-material, thereby the said mixing-impeller rotates by centering on the said mixing-impeller-self-rotating-shaft.

[0059] Also, the 8th invention is a washing machine according to the 7th invention, wherein: a 1st-separated-part was equipped so as to be able to separate the said 1st-rail-material from the rolling-part.

[0060] Also, the 9th invention is a washing machine according to the 8th invention, wherein:

[0061] the said contact-material has a 2nd-rail-material that was equipped so as to touch the said rolling-part, and so as to round the outside of the said washing-tub by centering on the said washing-tub-self-rotating-shaft,

[0062] further comprising:

[0063] a 2nd-separated-part that can separate the said 2nd-rail-material from the said rolling-part;

[0064] a control-part that controls the said 1st-separated-part and 2nd-separated-part for either of the said 1st-rail-material or 2nd-rail-material to touch the said rolling-part when the said mixing-impeller self-rotated,

[0065] Also, the 10th invention is a washing machine according to the 6th invention, wherein the said driving-part is equipped with:

[0066] a driving-power-generating-part that generates a power to rotate the said contact-material;

[0067] a driving-shaft to take out the said power;

[0068] a transmitting-material that transmits the said power from the said driving-shaft to the said contact-material.

[0069] Also, the 11th invention is a washing machine according to the 10th invention, wherein:

[0070] the said driving-shaft is equipped outside the said washing-tub-self-rotating-shaft;

[0071] the said transmitting-material is a rod-like-material to connect the said contact-material to the said driving-shaft.

[0072] Also, the 12th invention is a washing machine according to the 6th invention, wherein the said driving-part has:

[0073] a driving-power-generating-part that generates a power to be rotated the said contact-material;

[0074] a driving-shaft that was equipped inside or outside the said washing-tub-self-rotating-shaft to take out the said power,

[0075] and wherein:

[0076] a contact-material is a disk-shaped material that was equipped in the said driving-shaft;

[0077] the outer circumferential part touches the said rolling-part.

[0078] Also, the 13th invention is a washing machine according to the 6th invention, wherein the said driving-part has:

[0079] a driving-power-generating-part that generates a power to rotate the said contact-material;

[0080] a driving-shaft that was equipped inside or outside the said washing-tub-self-rotating-shaft to take out the said power,

[0081] and wherein the said driving-shaft is doubled as the contact-material.

[0082] Also, the 14th invention is a washing machine according to the 3rd invention, comprising:

[0083] a rotating-part that was equipped in the said mixing-impeller-self-rotating-shaft;

[0084] a driving-part that is self-rotated the said rotating-part,

[0085] and wherein the said driving-part has:

[0086] a driving-shaft that was equipped outside the said washing-tub-self-rotating-shaft;

[0087] a driving-power-generating-part that generates a power to rotate the said driving-shaft;

[0088] a belt-like-material that was hooked on the said driving-shaft and the said rotating-part,

[0089] and wherein how the said mixing-impeller self-rotated by using the rotating force to self-rotate the said washing-tub is:

[0090] with the self rotation of the said washing-tub, the said rotating-part revolves by centering on the said washing-tub-self-rotating-shaft while osculating the said belt-like-material, thereby the said rotating-part self-rotates by centering on the said mixing-impeller-self-rotating-shaft, the said mixing-impeller self-rotates together with the self-rotating of the said rotating-part;

[0091] how the said mixing-impeller self-rotated by using other force too except the rotating force to self-rotate the said washing-tub is:

[0092] the said driving-shaft rotates; thereby the said rotating-part that touches the said belt-like-material self-rotates by centering on the said mixing-impeller-self-rotating-shaft; the said mixing-impeller self-rotates together with the self-rotating of the said rotating-part.

[0093] Also, the 15th invention is a washing machine according to either of the invention from the 10th invention to the 14th invention, wherein:

[0094] the said driving-power-generating-part is doubled as a washing-power-generating-part to rotate the said washing-tub;

[0095] a rotating-switching-part that the transmission of the power from the said driving-power-generating-part is switched was equipped so that either one or both the said washing-tub-self-rotating-shaft and the said driving-shaft is rotated.

[0096] Also, the 16th invention is a washing machine according to either of the invention from the 1th invention to the 15th invention, wherein two or more the said mixing-impeller is equipped in the said washing-tub.

[0097] According to these inventions, it becomes possible to provide a washing machine who can improve the mixing force.

Effects of the Invention

[0098] By the present invention, it becomes possible to provide a novel and excellently configured washing machine, wherein a washing-tub can rotate by each centering on two rotating shafts oriented in different directions.

BRIEF DESCRIPTION OF THE DRAWINGS

[0099] FIG. 1 is a configuration figure to view the washing machine pertained to the embodiment 1 in the present invention from the side.

[0100] FIG. 2 is a plane figure to view the main section of the washing machine pertained to the embodiment 1 in the present invention from the upper.

[0101] FIG. 3 is a configuration figure to view the modified example of the main section of the washing machine pertained to the embodiment 1 in the present invention from the side.

[0102] FIG. 4 is a configuration figure to view the washing machine pertained to the embodiment 2 in the present invention from the side.

[0103] FIG. 5 is a plane figure to view the main section of the washing machine pertained to the embodiment 2 in the present invention from the upper.

[0104] FIG. 6 is a configuration figure to view the washing machine pertained to the embodiment 3 in the present invention from the side.

[0105] FIG. 7 is a configuration figure to view the washing machine pertained to the embodiment 4 in the present invention from the side.

[0106] FIG. 8 is a configuration figure to view the washing machine pertained to the embodiment 5 in the present invention from the side.

[0107] FIG. 9 is a configuration figure of the main section to explain another manner to support the rail in the washing machine pertained to the embodiment 5 in the present invention.

[0108] FIG. 10 is a configuration figure of the main section to explain another manner to support the rail in the washing machine pertained to the embodiment 5 in the present invention.

[0109] FIG. 11 is a tectonic profile to view the conventional washing machine from the front.

[0110] FIG. 12 is a front elevation that ruptured a part of another conventional washing machine.

[0111] FIG. 13 is a configuration figure to view the washing machine 101R in the execution example 1 pertained to the related invention to the present invention from the side.

[0112] FIG. 14 is a configuration figure to view the washing machine 102R in the execution example 2 pertained to the related invention to the present invention from the side.

[0113] FIG. 15(a) is a configuration figure to view the washing machine 103R in the execution example 3 pertained to the related invention to the present invention from the side.

[0114] FIG. 15(b) is a side elevation to indicate the modified example of the main section in the washing machine 103R of the execution example 3 that is pertained to the invention that is related to the present invention.

[0115] FIG. 16 is a configuration figure to view the washing machine 104R in the execution example 4 pertained to the related invention to the present invention from the side.

[0116] FIG. 17(a) is a configuration figure to view the washing machine 105R in the execution example 5 pertained to the related invention to the present invention from the side.

[0117] FIG. 17(b) is a schematic figure to explain the rotating direction of the washing-tub-shaft 11R, the mixing-impeller-driving-shaft 37R, the transmitting-belt 38R and rotating-wheel 40R in the washing machine 105R in the execution example 5 that is pertained to the invention that is related to the present invention.

[0118] FIG. 18 is a configuration figure to view the washing machine 106R in the execution example 6 pertained to the related invention to the present invention from the side.

[0119] FIG. 19 is a configuration figure to view the washing machine 107R in the execution example 7 pertained to the related invention to the present invention from the side.

[0120] FIG. 20 is a configuration figure to view the washing machine 108R in the execution example 8 pertained to the related invention to the present invention from the side.

[0121] FIG. 21 is a plane figure to view the main section of the washing machine 109R in the execution example 9 that is pertained to the related invention to the present invention from the under.

[0122] FIG. 22 is a configuration figure to view the washing machine 110R in the execution example 10 that is pertained to the related invention to the present invention from the side.

[0123] FIG. 23 is a plane figure for the main section of the washing machine 110R in the execution example 10 that is pertained to the related invention to the present invention.

[0124] FIG. 24 is a plane figure to indicate the modified example of the main section in the washing machine 110R in the execution example 10 that is pertained to the invention that is related to the present invention.

[0125] FIG. 25 is a configuration figure to view the main section in the washing machine 111R in the execution example 11 that is pertained to the invention that is related to the present invention from the side.

[0126] FIG. 26 is a plane figure for the main section in the washing machine 111R in the execution example 11 that is pertained to the invention that is related to the present invention.

[0127] FIG. 27 is a configuration figure to view the main section in the washing machine 112R in the execution example 12 that is pertained to the invention that is related to the present invention from the side.

[0128] FIG. 28 is a plane figure of the main section in the washing machine 112R in the execution example 12 that is pertained to the invention that is related to the present invention.

EMBODIMENTS OF THE INVENTION

[0129] As follows, each embodiments of the present invention is explained according to the figure, but in each figure, the material and the part in the same or equality is explained assigning the same sign.

Embodiment 1

[0130] FIG. 1 is a block diagram to see from the side of the washing machine according to embodiment 1 of the present invention. FIG. 2 is a plan to see from upper side of the importance part of the washing machine according to embodiment 1 of the present invention.

[0131] A washing machine 1 according to this embodiment 1 is provided with: case 2; a outer-tub 4 that is mounted inside this case 2, that can store the water inside when the motion of washing; a support-body 7 that is mounted in the inside of the outer-tub 4, that is supported by the outer-tub 4; a washing-tub 13 that is supported by the support-body 7, that can store the washing-laundry inside, that is spherical.

[0132] The upper part of the outside-tub 4 and the support-body 7 is formed like a cylinder, the lower part is formed like roughly a hemisphere along a sphere in the lower half of the spheroidal washing-tub 13. Thereby compared with the case to form the outer-tub 4 to a hexahedron and a cylinder the volume of a water accumulated in the outer-tub 4 can be reduced.

[0133] the support-body 7 is fixed to the edge of the outer-shaft 8 extended downward of the vertical direction, this outer-shaft 8 is supported rotatably by a outer-tub-bearing 6 equipped in the outer-tub 4. Thereby, the support-body 7 becomes rotatable by centering on the axis line of the outer-shaft 8.

[0134] the Washing-tub 13 that has on the same straight line a pair of the washing-tub-shaft 14 extended to a horizontal direction is supported rotatably by these the washing-tub-shaft 14 on the support-body-bearing 11 equipped in support-body 7. By the way, if the washing-tub 13 dents the part connected to the washing-tub-shaft 14 or makes the form that cut a part of a spheroidal part by the flat surface, and is formed so as to house the support-body-bearing 11 and the support-body-shaft 14 in the occurred space as the result, the clearance between the washing-tub 13 and the support-body 7 can be minimum and the capacity of the washing-tub can ensure the maximum.

[0135] And on the outer circumferential surface of the washing-tub 13, in the position that was separated a certain distance from the axis line of the outer-shaft 8, the rolling-wheel 16 that was formed to the toroidal of the circumferential direction by centering on the axis line of the washing-tub-shaft 14 is fixed.

[0136] By the way, the rolling-wheel 16 corresponds in the present invention to one example of the rolling-part that is the convexity part formed so as to round the external surface of the washing-tub at one with the washing-tub.

[0137] Under the washing-tub 13 between the washing-tub 13 and the support-body 7, the disk 18 is equipped for the rolling-wheel 16 to touch always. Disk 18 is not a flat board, and is the form of the curved surface to dent a center of the lower side along the outer circumferential surface of washing-tub 13. By the way, if the width of the rolling-wheel 16 that protrudes from the outer circumferential surface of the washing-tub 13 is made large or the rotating circumferential side surface of the washing-tub is dented at the position along the form of the disk 18 and makes like a cylinder, the upper surface of the disk 8 can be formed to the flat surface too. The disk 18 becomes manufacturable easily, but is made to the form of a curved surface as shown in FIG. 1 in this embodiment 1, so as to be as much as possible small for a distance between the support-body 7 and the washing-tub 13 and so as to ensure as much as possible large for capacity in the washing-tub 13. However, except the part of a circumference of the disk 18 wherein basically the rolling-wheel 16 touches at a point, the rolling-wheel 16 keeps for the disk 18 not to touch.

[0138] By the way, the disk 18 of the form of the curved surface as shown in FIG. 1 corresponds to one example of the curved disk according to the present invention. And disk 18 in the case to form like flat surface corresponds to one example of the not-curved disk according to the present invention.

[0139] The rolling-wheel 16 is formed with the material that has the elasticity such as a synthetic rubbers; the rolling-wheel 16 under the elastic deformation always touches the disk 18. Thereby rolling-wheel 16 can touch surely with disk 18. the Rolling-wheel 16 can be configured so as to be get the elasticity by forming like a hollow tire that enclosed the gas and the liquid in. Also rolling-wheel 16 can touch the disk 18 that deforms with elasticity.

[0140] The disk 18 is fixed to the inner-shaft 19 that was extended to the under of a vertical direction. The inner-shaft 19 and the outer-shaft 8 becomes the double rotating shafts structure that can be rotated around the same axis line, the inner side becomes the inner-shaft 19, the hollow outer side is the outer-shaft 8.

[0141] Both of the inner-shaft 19 and the outer-shaft 8 pass through the outer-tub 4, and are connected to a rotating-switching-part 20 that equipped outside the outer-tub 4, and further can be driven rotatably by the motor 21. The rotating-

switching-part 20 includes the gear and the clutch and the brake, and switches which rotating shaft of either or both of the inner-shaft 19 or the outer-shaft 8 to be rotate by the rotating driving power of the motor 21. By the way, a water-tight structure to seal so that water in the inside of the outer-tub 4 should not leak outside when the outer-shaft 8 or the inner-shaft 18 is rotating is provided between the outer-tub-bearing 6 and the outer-shaft 8, and between the outer-shaft 8 and the inner-shaft 19.

[0142] In generally a vertical washing machine: that is equipped in a outer-tub with a washing-tub that rotates around the axis line of a washing-tub-shaft, that is made like a cylinder with a bottom and a mixing-impeller that rotates around same axis line as the washing-tub-shaft in the bottom of the washing-tub; the rotating-switching-part 20 is not special, can be switched so as to rotate only the mixing-impeller at washing or so as to at dewatering rotate to be synchronous between the washing-tub and the mixing-impeller.

[0143] As the rotating-switching-part 20, the general type like the above is used, and the motor 21 is driven, and when the outer-shaft 8 is not rotated and when the inner-shaft 19 only is rotated by the rotating-switching-part 20, the rolling-wheel 16 is rotated around the axis line of the washing-tub-shaft 14 while touching with the circumferential direction by centering on the axis line of the outer-shaft 8 on the disk 18, and the support-body 7 is not rotated and the washing-tub 13 is rotated around the axis line of the washing-tub-shaft 14. Also, when the outer-shaft 8 rotates at one with the inner-shaft 19, the washing-tub 13 do not rotate around the axis of the washing-tub-shaft 14, and the support-body 7 rotates around the axis of the outer-shaft 8 at one with the washing-tub 13.

[0144] By the way; the touched region between the rolling-wheel 16 and the disk 18 is equipped with the structure that engages the gears etc on both, or is touched on the mutual surfaces that used the material with large friction of rubber etc; thereby, when the rolling-wheel 16 is rolled on the disk 18, the rotating etc without touching is difficult to occur, the transmission of the rotating force becomes more sure.

[0145] By the way; when rolling-wheel 16 is rolled, the ring-shaped part wherein the rolling-wheel 16 touches on disk 18 corresponds to one example of the toroidal-rail-part in the present invention. If this rolling-wheel 16 includes the ring-shaped part to be touched, the external form must not be a circle form like disk 18. Example, instead of disk 18 the curved plate of a polygon etc can be used as a external form. However, when rotating at slow speed, the circular form is desirable to rotate with stability. Also the structure wherein toroidal-rail-part is equipped near the outer circumference of the circular form is desirable to become light.

[0146] Also, the coaxial center axis of the inner-shaft 19 and the outer-shaft 8 corresponds to one example of the support-body-shaft in the present invention, the center axis of the washing-tub-shaft 14 corresponds to one example of the washing-tub-shaft in the present invention.

[0147] The open part wherein the washing-laundry can be taking in and out is formed each for the upper part of the case 2, of the outer-tub 4, of the washing-tub 13.

[0148] The case 2 has a case-lid 3 to open and shut the open part of the case 2, the washing-tub 13 has a washing-tub-lid 15 to open and shut the open part of the washing-tub 13.

[0149] By the way, in FIG. 1, for the case-lid 3, the washing-tub-lid 15, a rolling-wheel-on-lid 17; the condition when shutting each the open part is indicated by continuous line; the

condition when opening the open part is indicated by the two-dot chain line. It is similar in other figures too.

[0150] The case-lid 3, so as to ensure the thermal insulation between inside and outside case 2 when drying operates, is equipped with a double-layered structure that keeps space and that becomes opposite among two flat board, the hinge (not indicated in the figure) that is equipped in the middle part and the base part becomes as a fulcrum, the case-lid 3 is folded or opened, the open part of the case 2 is opened and shut.

[0151] The washing-tub-lid 15 is formed to the form of the cut part wherein a part of a spheroidal part was cut by the flat surface, the hinge (not indicated in the figure) that was mounted between the washing-tub 13 and the washing-tub-lid 15 becomes as a fulcrum, the open part of the washing-tub 13 is opened and shut.

[0152] The part pertaining to the washing-tub-lib 15 becomes the rolling-wheel-on-lid 17, the rolling-wheel 16 is separated so that the distance of the rolling-wheel 16 on the body of the washing-tub 13 does not become open big.

[0153] In the upper part of the case 2, the upper-cover 12: once extends toward the outer circumferential direction of the washing-tub-lib 15 in the washing-tub 13 from the external circumference of the open part; next was bended horizontally and was connected to the upper end of the outer-tub 4; was made like a cylinder, is equipped with. This upper-cover 12, when the washing-laundry is taking in and out for the washing-tub 13, restrains to put the washing-laundry in between the case 2 and the outer-tub 4 and between the outer-tub 4 and the washing-tub 13.

[0154] Also, in the upper end of the support-body 7, the support-body-cover 10 that was extended toward the washing-tub 13 and toward the outer-tub 4 is equipped. The support-body-cover 10: as shown in FIG. 2; as the extent to touch the end of the inner circumference to the washing-tub 13 and the end of the outer circumference to the outer-tub 4; and so that the notch 10a is equipped in the end of the inner circumference in a part of the rolling-wheel 16; is mounted adjacent to the washing-tub 13 and the outer-tub 4 over all circumferences; is become not to obstruct the rotation of the washing-tub 13 and the support-body 7.

[0155] By the way, the side wherein the upper-cover 12 is at least adjacent to the washing-tub 13, and the side where the support-body-cover 10 is at least adjacent to the washing-tub 13 and the outer-tub 4, is preferred to use the elastic material such as the synthetic rubbers as a material. Thus when the washing-tub 13 with rotation shake collides to the upper-cover 12 and the support-body-cover 10, the upper-cover 12 and the support-body-cover 10 absorbs the impact by the collision, the washing-tub 13 and the outer-tub 4 can be prevented being damaged.

[0156] In the wall of the washing-tub 13 and in the washing-tub-lid 15, so as to pass through outside and inside, many water-bore (not indicated in the figure) wherein the water can pass is formed over all surfaces.

[0157] By this water-bore, the water and the washing-laundry can be mixed in the inside of the washing-tub 13 when washing operates, the water in the inside of the washing-tub 13 can be discharged outward when dewatering operates and when drain operates.

[0158] Also, in the wall of the support-body 7 too, so as to pass through outside and inside, many water-bore (not indicated in the figure) that water can pass is formed over all surfaces.

[0159] Further, the support-body 7, is not form so as to cover the washing-tub 13 from the under as shown in FIG. 1, can be formed with only the frame in a properly necessary part that is not the whole, the water can pass freely inside and outside the support-body 7. In this case, in the support-body 7 the strength of the extent that can rotate by centering on the outer-shaft 8 and can support the washing-tub 13 rotatable is necessary.

[0160] Also, at least a part of the wall surface in the washing-tub 13 and of the wall surface in the support-body 7 is formed to the form like the so called net extremely, the opening space of the water-bore makes to become larger than the non-opening space. Thereby, the water becomes easy to pass through the inside of the washing-tub 13 when washing operates, becomes easy to discharge outside the washing-tub 13 when washing operates and when drain operates, and further, when drying operates, the air becomes easy to pass, the drying effect increases.

[0161] In the lowermost of the outer-tub 4, the drain path 22 is connected so as to discharge the stored water in the inside of the outer-tub 4 to outside, the drain-valve 23 is equipped on the way of this drain-path 22. By this drain-valve 23 the water can be stored in the outer-tub 4, the stored water in the inside of the outer-tub 4 can be discharged.

[0162] By the way; the plural mixing-impeller-inside-tub, but especially not shown in figure, that was fixed on the tub, that was the shape like the flat board that projected toward inside, is mounted over all surface of inner circumferential surface of the washing-tub 13. When the washing-tub 13 is rotated when washing operates; the water and the washing-laundry stored in the inside of the washing-tub 13 can be mixed efficiently by these mixing-impeller-inside-tub. Further, these mixing-impeller-inside-tub can be mounted in the inner circumference surface too of the washing-tub lid 15. Also, the mixing-impeller-inside-tub can be too formed in the inner circumferential surface of the washing-tub 13 at one with the washing-tub 13. And the mixing-impeller-inside-tub is equipped in the inner circumferential surface of the washing-tub 13, then is mounted in different angle from both axis line of the outer-shaft 8 and the washing-tub-shaft 14, thereby can be used together with the mixing-impeller to rotate around the axis line of the outer-shaft 8 and the washing-tub-shaft 14.

[0163] In the inner circumferential surface of the upper end of the support-body 7, the ring-shaped balancer 9 by centering on the axis line of the outer-shaft 8 is equipped. This balancer shuts the liquid inside, restrains the rotation shake with rotating by centering on the outer-shaft 8 of the support-body 7 at high speed when dewatering operates.

[0164] The outer-tub 4 is supported by the outer-tub-support-material 5 so as to be hanged from the four upper parts of the case 2. On the way or the end of the outer-tub-support-material 5, the elastic body wherein the spring not shown in the figure and the gas pressure were enclosed is equipped, both ends of the outer-tub-support-material 5 expands and contracts, it is restrained that the vibration generated by the rotation of the support-body 7 and the washing-tub 13 transmits to the case 2. By the way, the outer-tub 4 does not be supported so as to be hanged down from the upper of the case 2, the outer-tub 4 can be supported so as to push up the outer-tub-support-material 5 from the lower of the case 2. Also, the upper-cover 12 can be doubled as the outer-tub-

support-material that supports the outer-tub 4. Also, the outer-tub-support-material doesn't limit to 4 pieces, and can be any number.

[0165] The washing-tub 13 is rotated around the axis line of the washing-tub-shaft 14, then in the washing machine 1 the position-stop-means (not indicated in figure) to stop the washing-tub 13 at the designated position is equipped, so that the position of the open part of the washing-tub 13 matches the position of the open part of the case 2, the support-body 7.

[0166] This position-stop-means is including: a rotating-position-detect-means (not indicated in figure) that detects the rotating position of the washing-tub 13, the support-body 7; a control-part (not indicated in figure), that is connected electrically with this rotating-position-detect-means, that stops the washing-tub 13, support-body 7 so that the position of the open part of the washing-tub 13 matches the position of the open part of the case 2, on based on a signal of the rotating position of the washing-tub 13 to input from the rotating-position-detect-means. This control-part controls a rotating-stop-position of the inner-shaft 19 so that the open part of the washing-tub 13 becomes to the upper, and controls the rotating-stop-position of rotating so that the position of the hinge on washing-tub-lid 15 becomes to the rear.

[0167] Also, the rotating-position-detect-means is including: the reflective plates that were mounted with the washing-tub 13 and the support-body 7; a irradiation device that irradiates the infra-red rays toward these reflective plates; a sensor that detects the reflected infra-red rays, detects a rotating phase of the washing-tub 13 and the support-body 7. By the way, the irradiation device may irradiate the other electromagnetic waves not limited to the infra-red rays, the sensor too may detect the other electromagnetic waves not limited to the infra-red rays. Also, a sensor like wire touches with a part of the washing-tub 13 and the support-body 7, the rotating-position-detect-means may detect the electrification change when it came to a designated position in which the electrification part or the insulation part was installed.

[0168] Also, of course the position-stop-means like above-mentioned should not be had, because the open part can be matched to the position for taking in and out so as to rotate the washing-tub 13 and the support-body 7 by user manually at shutdown etc, complicatedly too. Further a handrail etc is equipped outside the outer surface of the washing-tub 13, the manual positioning is easier than.

[0169] The washing machine 1 is equipped with: a heater (not indicated in figure) that generates warm air; a heat-exchanger (not indicated in figure) that cools warm air by water or air to condense moisture in warm air, and it is the washing and drying all-in-one design that had the function of washing operation and drying operation. A ventilation duct is formed in the circumference side surface of the upper-cover 12, a upper-air-conduit 24 is connected, a lower-air-conduit 25 is connected to branch on the way of the drain path 22, the warm air can circulate through, not indicated in figure, a heat exchanger and a heater between the upper-air-conduit 24 and the lower-air-conduit 25 and also through the outer-tub 4. Thus, the circulated warm air becomes difficult to pass through the gap between the outer-tub 4, the support-body 7, and the washing-tub 13 by equipping the support-cover 10, becomes easy to pass through in the washing-tub 13, thereby the washing laundry in the washing-tub 13 is easy to touch on the warm air, can be dried efficiently.

[0170] Also, the water content to which the circulating warm air with the moisture was cooled and condensed by the

heat exchanger hangs down from the outer-tub 4 and the lower-air-conduit 25 to the drain-path 22 and is drained off to outside the case 2.

[0171] By the way, the configuration so as to generate the warm air and so as to generate the cold heat used so as to condense the moisture can be equipped with a heat pump that uses the condensation, the evaporation, the expansion, the compression as to the refrigerant; a heat exchanger that exchanges the heat between the refrigerant and the circulating warm air. Thus the hot heat for drying and cold heat for condensation can be generated most efficiently and becomes the energy saving.

[0172] Next explains about the movement of the washing machine 1 pertaining to the this embodiment 1.

[0173] Anyway, a user of the washing machine 1 opens the case-lid 3 and washing-tub-lid 15 and stores the washing laundry in the inside of the washing-tub 13.

[0174] The user pushes a switch (not indicated in the figure) after the washing-tub-lid 15 and the case-lid 3 was shut, then the weight of the washing laundry is calculated by detecting the whole weight change in the outer-tub 4 for example by a weight sensor that was mounted on the outer-tub-support-material 5. By the way, the weight of the washing laundry allows being detected in any means if possible, and for example, rotating around the support-body 7 and the outer-shaft 8 at slow speed, allows to be calculated by detecting the torque change of motor 21, the change in input currents, the acceleration change of the axis, and the change of follow up time of phase change etc.

[0175] After the drain-valve 23 on the drain-path 22 was closed, the inside of the outer-tub 4 is supplied with water from a water pipe (not indicated in figure) that was mounted for the side surface of the outer-tub 4 or for the side surface of the upper-cover 12 etc according to the weight of the washing laundry. By the way, regardless of the existence of the weight sensor, user opens or shuts the water pipe by hand operation and switch operation, may store the water in the outer-tub 4.

[0176] Next the detergent is put in the inside of the washing-tub 13 by user, the washing operation is started. By the way, the detergent can be automatically put in the inside of the washing-tub 13, and further can be put in by mixing to the water supply, and can be put in by user's hand operation. Also though it is desirable that a timing in which the detergent is put in the washing-tub 13 is before the washing-tub 13 rotates, it may be other timing.

[0177] Next the motor 21 is driven, by the rotating-switching-part 20 the outer-shaft 8 is fixed and the inner-shaft 19 is rotated, thus the disk 18 rotates around the axis line (same axis line as the axis line of outer-shaft 8) of the inner-shaft 19, the rolling-wheel 16 that touched the rotating disk 18 is rolled, it rotates around the axis line of the washing-tub-shaft 14, and at the same time the washing-tub 13 rotates.

[0178] By the way, the rotating direction of the inner-shaft 19 can be switched at regular intervals by controlling the drive of the motor 21. thereby the rotating direction of the washing-tub-shaft 13 too can be switched at regular intervals.

[0179] The washing laundry in the inside of the washing-tub 13 is moved up and down because the washing-tub 13 rotates around the axis line of the washing-tub-shaft 14, also the water and the washing laundry in the washing-tub 13 are mixed further more efficiently because the above mentioned mixing-impeller-inside-tub is equipped with.

[0180] After a designated time passes, the washing operation ends, the drain-valve 23 opens, the water in the outer-tub 4 is drained off through the drain-path 22 to outside.

[0181] After the water in the inside of the outer-tub 4 was drained off, the drain-valve 23 shuts again, the water is supplied in the inside of the outer-tub 4, the rinse operation is started.

[0182] The rinse operation is started, after a designated time passes, the drain-valve 23 opens again, the water in the outer-tub 4 is drained off to outside.

[0183] This rinse operation is repeated at the designated numbers, After the water in the outer-tub 4 is drained off, the outer-shaft 8 and the inner-shaft 19, is unified by the rotating-switching-part 20, The dewatering operation wherein the support-body 7 and washing-tub 13 rotates around the axis line of the outer-shaft 8 is started, at the faster rotating numbers than when washing operates or rinse operates.

[0184] By the centrifugal force at the high-velocity rotation around the axis line of the outer-shaft 8 of the washing-tub 13 that became at one with the support-body 7, the water in the inside of the washing-tub 13 is drained off to the outside of the washing-tub 13 and support-body 7 through the water-bore of the washing-tub, the water-bore and open part of support-body 7, the washing-laundry is dewatered.

[0185] By the way, the rotation at high-velocity of the support-body 7 and the washing-tub 13 has only to be executed by changing the gear by the rotating-switching-part 20 or by changing the frequency of the electric current or electric voltage that is supplied to the motor 21 by inverter etc.

[0186] The water that was drained off to the outside of the washing-tub 13 and the outer-tub 4 through the water-bore of washing-tub 13 and through the water-bore of the support-body 7 flows through the side-surface and through the under-side-surface of the outer-tub 4, and is drained off through the drain-path 22.

[0187] When the washing laundry has been biased in the inside of the washing-tub 13 while dewatering operates, the rotation shake around the axis of the outer-shaft 8 is restrained by the balancer 9.

[0188] When the washing laundry has been biased to a level beyond restraint by the balancer 9, it is detected by the torque change and the acceleration change etc of the motor 21, the rotation of the support-body 7 is stopped. And as well as when the washing and the rinse operates, the bias of the washing laundry is improved by supplying the water again, or the improvement of the bias is suggested by notifying with the buzzer etc for the user.

[0189] By the way, when the washing laundry has been biased, the washing-tub 13 is rotated around the axis line of the washing-tub-shaft 14 by rotating only the inner-shaft 9 as well as when the washing and the rinse operates, the washing laundry adhered to the inner circumference surface of the washing-tub 13 may move. Thereby the bias of the washing laundry are canceled without adding the water in the washing-tub 13, the decentering of the washing-tub 13 can be improved, it becomes the water saving.

[0190] After the support-body 7 and the washing-tub 13 was rotated at the high velocity around the axis line of the outer-shaft 8 while the designated time, the dewatering operation is ended, the support-body 7 and the washing-tub 13 is stopped.

[0191] The user opens the case-lid 3 and the washing-tub-lid 15, the washing laundry is taken out to the outside of the case 2, the operation of the washing machine 1 is ended.

[0192] By the way following, when the washing laundry is dried, the warm air is circulated in the inside of the outer-tub 4 at the designated time through the upper-conduit 24 and the lower-conduit 25, the washing laundry in the inside of the washing-tub 13 is dried. When this drying operates, the outer-shaft rotates rotating of course the washing-tub around the axis line of the washing-tub-shaft as well as when washing operates or rinse operates. In such dry operation the washing laundry is difficult to bias partially in the inside of the washing-tub 13, together with being difficult to wrinkle the washing laundry etc after dry, the washing laundry is easy to move up and down in the inside of the washing-tub 13 by the rotating around the washing-tub-shaft 14, drying the washing laundry at short time with few mottles becomes easy. When the drying of the washing laundry ends, the user opens the case-lid 3 and the washing-tub-lid 15, the washing laundry is taken out to the outside from the case 2, the operation of the washing machine 1 is ended.

[0193] As explained above, according to the washing machine 1 pertaining to the this embodiment 1, it takes the double rotating shafts structure wherein the motor 21 drives to rotate and the outer-shaft 8 that rotates the support-body 7 is hollow and in the inside of the inner-shaft 19 that rotates the disk 18 is had, the washing-tub 13 together with the rolling-wheel 16 that touched can rotate around the axis line of the washing-tub-shaft 14 when the disk 18 rotates around the axis line of the outer-shaft 8, so that the mixing-impeller in generally a vertical washing machine wherein the mixing-impeller in the inside of the washing-tub rotates around same axis line as the washing-tub is rotated. Also, when rotating at one with the support-body 7 and the disk 18 around the axis line of the outer-shaft 8 so as to rotate at one with the washing-tub and the mixing-impeller in generally a vertical washing machine, the washing-tub 13 can rotate at one with the support-body 7 around the axis line of the outer-shaft 8, without switching the rotating direction to plural directions so as to transmit the rotation power from the motor 21 to the washing-tub 13, and without wasting space, in an easy configuration, The washing-tub 13 can be rotated around each axis line of the washing-tub-shaft 14 and the outer-shaft 8 wherein the direction of the axis line is different.

[0194] Also the outer-tub 4 that can store the water in the inside is equipped between the case 2 and support-body 7, so, rotating around the axis line of the outer-shaft 8 and the washing-tub-shaft 14, the washing-tub 13 can supply the water to the inside of the washing-tub 13 or can drain the water to the outside.

[0195] Also the water-tub 13 is rotated and driven by directly touching the disk 18 along a part of the outer circumference surface of the washing-tub 13, so it is not necessary to keep greatly between the washing-tub 13 and the support-body 7, uselessness of space is decreased, the amount of storing water in the outer-tub 4 can keep to a minimum and is saved.

[0196] Also because the rolling-wheel 16 was directly fixed on the outer circumference surface of the washing-tub 13, uselessness of space becomes more decreased; and the structure stiffness of the washing-tub 13 can be used, it becomes easy to keep the form of the rolling-wheel 16; or the structure stiffness of the washing-tub 13 can be strengthened oppositely.

[0197] Also because the ring-shaped balancer 9 by centering on the axis line of the outer-shaft 8 is equipped in the support-body 7, the rotation shake at when the washing-tub

13 rotated around the axis line of the outer-shaft 8 together with the support-body 7 can be restrained.

[0198] Also because the rotating position of the washing-tub 13 can be detected by the rotating-position-detect-means, the washing-tub 13 can be stopped by using the control-part that controls the motor 21 so that the open-part of the washing-tub 13 accords the open-part of the case 2.

[0199] Also because the support-body-cover 10 is equipped, that the washing-laundry falls out to outside of the washing-tub 13 when taking in and out can be restrained; and the warm air that circulates in inside of the outer-tub 4 between the upper-conduit 24 and lower-conduit 25 when drying operates is easy to pass to inside of the washing-tub 13, the drying effect is high, drying time can be shortened.

[0200] Next, the variable embodiment of the this embodiment 1 except the above-mentioned describing is explained as follows.

[0201] In the above-mentioned configuration of the this embodiment 1, the washing-tub 13 rotates around the axis line of the washing-tub-shaft 8 without rotating the support-body 7 when washing operates and when drying operates, the washing-tub 13 rotates together with the support-body 7 around the axis line of the outer-shaft 8 but is not rotated around the axis line of the washing-tub-shaft 14 when dewatering operates.

[0202] As the other embodiment of the this embodiment 1, in the rotating-switching-part 20, the inner-shaft 19 is rotated by the motor 21 so as not to directly transmit the rotating driving power to the outer-shaft 8 only by adding an easy structure of equipping a connected gear that rotates around the axis line fastened for the outer-tub 4 between the inner-shaft 19 and the outer-shaft 8, and the connected gear is rotated, thereby the outer-shaft 8 is able to rotate at any time to the opposite direction in the inner-shaft 19. Thus, the rotation of the support-body 7 in the opposite direction is added compared with the case to rotate only the disk 18, so the washing-tub 13 becomes able to rotate around the axis line of the outer-shaft 8 too by rotating the support-body 7 together with rotating the washing-tub 13 around the axis line of the washing-tub-shaft 14 at higher speed.

[0203] Further, if the connected gear makes able to cancel the fixation of axis line of the outer-shaft 4 by clutch etc, at one with the inner-shaft 19 and the outer-shaft 8 becomes able to rotate by the motor 21; the washing-tub 13 is able to rotate around the axis line only of the outer-shaft 8.

[0204] Also, if the engaging of the inner-shaft 19, the outer-shaft 8 and the connected gear makes able to release, the inner-shaft 19 only is able to rotate by the motor 21; the washing-tub 13 is able to rotate only around the axis line of the washing-tub-shaft 14.

[0205] And further, even if the connected-gear etc is not to exist between the inner-shaft 19 and the outer-shaft 8 as stated above, when the outer-shaft 8 only is rotated without rotating the inner-shaft 19 by the rotating-switching-part 20, the washing-tub 13 rotates around the axis line of the outer-shaft 8 together with the support-body 7; the rolling-wheel 16 rolls touching on the disk 18 that does not rotate, the washing-tub 13 becomes able to rotate around the axis line of the washing-tub-shaft 14. For example most easily, if the inner-shaft 19 pass through the motor 21 and is fixed in the underside (anti washing-tub 13 side) of the motor 21, the inner-shaft 19 only is able not to rotate surely. Of course, this fixing is canceled when the inner-shaft 19 rotates. By the way, because the inner-shaft 19 is difficult to rotate by friction with each part,

similar motion gets even if there is not necessarily sure fixation like the above mentioned of the inner-shaft 19.

[0206] In the washing machine of the conventional structure so as to be disclosed in patent document 1 and in patent document 2, the washing-tub is rotated by centering on the horizontal axis line, was unable to be rotated by centering on the vertical axis line at the same time, it becomes possible easily too that the washing-tub 13 rotates around the either or both at the same time axis line of the washing-tub-shaft 14 and of the outer-shaft 8 by making like the above mentioned other embodiment of the this embodiment 1. The washing laundry and the water in the inside of the washing-tub 13 can be mixed more efficiency when the washing-tub 13 makes able to be rotated at same time around the axis of the outer-shaft 8 and the washing-tub-shaft 14. Thereby the washing effect improves, the washing time is shortened, and bias of the washing laundry in washing-tub 13 can be restrained.

[0207] Also, the said this embodiment 1 was shown in the method, that is the direct motor drive, to rotate the support-body 7 and the washing-tub 13 by the motor 21 that was mounted on the extended axis line of the inner-shaft 19 and the outer-shaft 8, but Of course, even if transmitting through the belt etc from the driven motor to rotate on the different axis line of the inner-shaft 19 or the outer-shaft 8 is the driven method to rotate the inner-shaft 19 and the outer-shaft 8, the realization of similar operation is possible.

[0208] Also, in this said embodiment 1 the rotating-switching-part 20 was equipped, but the configuration may be that a motor that rotates the outer-shaft 8 is equipped besides the motor 21 that rotates the inner-shaft 19.

[0209] A block diagram to see from side surface a part of the motor 21, as the modified example of the washing machine pertaining to this embodiment 1, is shown in FIG. 3

[0210] As shown in FIG. 3, the inner-shaft becomes possible to be rotated by the motor 21 that was connected directly, and a outer-shaft-driving-wheel 41 is equipped to engage with the outer surface of the outer-shaft 8 by equipping the gear structure in the contact part, the outer-shaft may make possible to be rotated by rotating the outer-shaft-driving-wheel through a outer-driving-shaft by a outer-shaft-motor.

[0211] By the way, in FIG. 3, the motor 21 and the outer-shaft-motor 43 is fixed on the outer-tub 4 and the case 2. By doing like this, the inner-shaft 19 and outer-shaft 8 can be rotated freely independently respectively in an individual rotational speed and rotational direction, the rotational speed and rotational direction of the disk 18 and support-body 7 becomes able to be controlled respectively freely, the washing-tub 13 can be rotated in free rotational speed and rotational direction around the axis line of the washing-tub-shaft 14, the support-body 7 can be rotated in free rotational speed and rotational direction around the axis line of the outer-shaft 8, that is, the washing-tub 13 becomes able to be rotated around two axis lines of the washing-tub-shaft 14 and the outer-shaft 8 individually independently respectively in a free rotational speed and rotational direction. For example, when the rotational direction of the inner-shaft 19 is changed rotating the support-body 7 to one direction around the axis line the outer-shaft 8, the rotational direction of the washing-tub 13 around the axis line of the washing-tub-shaft 14 becomes possible to be changed too. As a result, the effect in this embodiment 1 can be improved further more.

[0212] By the way, in FIG. 3, the motor 21 and outer-shaft-motor 43 corresponds respectively to one example of the first-motor and second-motor in the present invention.

[0213] By the way, the configuration may be that the outer-shaft-motor 43 was equipped in the inside of the rotating-switching-part 20.

[0214] Also FIG. 3 is the configuration wherein the outer-shaft 8 is rotated engaging the outer-shaft-driving-wheel 41 with the gear structure, but the configuration may be that the transmitting-belt transmitted the rotation without touching the outer-shaft-driving-wheel with the outer-shaft 8. Thus, the degree of freedom at the position where outer-shaft-motor 43 is equipped is high.

[0215] Also, in this embodiment 1, it was explained about the washing machine 1 that was equipped with: the support-body 7 that was fixed by the edge part of the outer-shaft 8 in the vertical direction; the washing-tub 13 that has a pair of the washing-tub-shaft 14 in the horizontal direction, but of course this configuration is not limited, there may be the washing machine 1 wherein the outer-shaft 8 and washing-tub-shaft 14 is equipped toward the different direction from vertical direction and horizontal direction. Further, there may be the washing machine 1 wherein the axis line of the outer-shaft 8 and the axis line of the washing-tub-shaft 14 are not mutually orthogonal and further are not intersected.

[0216] Also, in this embodiment 1, there was the washing machine 1 wherein the open part of the case 2 and washing-tub 13 to put the washing laundry in and out was arranged right above, but the open part may be arranged forward diagonally. Thus putting the washing laundry in and out becomes easy.

[0217] Also, in this embodiment 1, the rolling-wheel 16 was equipped so as to separate the rolling-wheel-on-lid 17 pertaining to the washing-tub-lid 15, but for example, the open part of case 2 and washing-tub 13 is arranged forward diagonally, or the washing-tub-shaft 14 is arranged diagonally not horizontally and the open part is equipped to the side surface of the rotating washing-tub 13; then the rolling-wheel 16 makes not to cover the washing-tub-lid 15, it is easy not to separate to the rolling-wheel-on-lid 17 and to make too the rolling-wheel 16 at one body.

[0218] Also, in this embodiment 1, it was explained about the washing machine 1 wherein the mixing-impeller-inside-tub that is the shape of the flat board was mounted in the inner circumference surface of the washing-tub 13, but of course this configuration is not limited, the washing machine 1 may be too the one wherein the mixing-impeller-inside-tub that is the shape of the ruggedness was mounted in the inner circumference surface of the washing-tub 13. Further, there may be too the washing machine 1 wherein forming the inner circumference surface in the washing-tub 13 into the shape of the polyhedron the mixing was made able.

[0219] Also, in this embodiment 1, the disk 8 was used as including the toroidal-rail-part in the present invention, but may use the one wherein forming a part that is touched by the rolling-wheel 16 into the ring-shaped rail the ring-shaped rail was fixed to the inner-shaft 19 by the plural radial spoke that was extended toward the inside from this ring-shaped rail.

[0220] Also, in this embodiment 1, the support-body wherein the upper-part was a cylinder state and the lower-part was a hemisphere state was explained about, but of course this is not limited, may be any shape to be able to support the washing-tub-shaft 14. for example, the support-body may be a vertical toroidal. In this case, it is desirable that the open-part of the washing-tub 13 and of the case 2 and of the outer-tub 4 is equipped diagonally to become the front of the

case 2 so as not to overlap to the ring-shaped support-body 7, putting the washing laundry in and out becomes easy.

[0221] Also, in this embodiment 1, the balancer 9 was equipped in the support-body 7, but when the washing-tub 13 is not rotated around the axis line of the washing-tub-shaft 14, the balancer may be equipped at the washing-tub 13 so as to locate in the circumferential direction by centering on the axis line of the outer-shaft 8 (the embodiment 2 to describe later is a sample wherein the balancer was equipped at the washing-tub). Thus, the effect too of reinforcement to maintain the shape of the washing-tub 13 by the balancer is achieved. However, in the case that the balancer was equipped at the washing-tub 13, there is a case that the balancer becomes the position not of the circumferential direction by centering on the axis line of the outer-shaft 8 when the washing-tub 13 is rotated around the axis line of the washing-tub-shaft 14. Thereby in the case that the balancer is equipped at the washing-tub 13, when the washing-tub is rotated at high speed at last etc of when the washing and rinse operates, it is desirable that a stop of the washing-tub 13 is controlled, so that the balancer becomes the position of the circumferential direction by centering on the axis line of the outer-shaft 8.

[0222] Also, in this embodiment 1, to rotate the support-body 7 and washing-tub 13 around the axis line of the outer-shaft 8 at high speed shall is to dewater, but to rotate the washing-tub 13 around the both axis line of the outer-shaft 8 and washing-tub-shaft 14 at high speed may be to dewater. Then the balancer may be equipped at the circumferential direction by centering on the axis line of the washing-tub-shaft 14 in the washing-tub 13. And then the rolling-wheel 16 may be used as the balancer.

[0223] Also, in this embodiment 1, the support-body-cover 10 was equipped in the upper end of the support-body 7, but the upper end is not limited, may be equipped at any position between the upper-conduit 24 and the lower-conduit 25. There may be a case that the effect of the fall prevention of the washing laundry is not achieved by the position that the support-cover 10 was equipped. But even for that case the warm air that circulates in the outer-tub 4 becomes easy to pass through the inside of the washing-tub 13, and the drying effect is high, the effect that the drying time can be shortened is achieved.

[0224] Also, in this embodiment 1, the lower-conduit 25 is connected on the way of the drain-path 22, but may be connected on the outer-tub 4 under the support-body 10. Also the upper-conduit 24 is connected on the upper-cover 12, but may be connected on the outer-tub 4 above the support-body 10.

[0225] Also, in this embodiment 1, the warm air when drying operates was supplied from the upper-conduit 24 to the outer-tub 4, was discharged from the lower-conduit 25, but may be supplied from the lower-conduit 25, may be discharged from the upper-conduit 24. Thus, striking from the lower side gets the effect that the washing laundry is lifted by the wind pressure, the chance that the washing laundry comes in contact with the warm air increases, and the drying effect increases.

[0226] By the way, of course the variable embodiments at the this embodiment 1 was may be applied to other embodiment as much as possible.

Embodiment 2

[0227] FIG. 4 is a block diagram to see from the side of the washing machine according to embodiment 2 of the present invention. FIG. 5 is a plan to see from upper side of the

importance part of the washing machine according to embodiment 2 of the present invention.

[0228] The following is explained about the washing machine of the embodiment 2 around a point different from the embodiment 1.

[0229] The open part of the case 2 in the embodiment 2 is equipped to incline to the front side of the washing machine 1, and the open part too of the washing-tub 13 is equipped so as to incline shifting to the front side of the axis line of the outer-shaft 8. And in the method similar to embodiment 1, so as to detect the rotational direction of the washing-tub 13 rotated around the axis line of the washing-tub-shaft 14 and of the support-body 7 rotated around the axis line of the outer-shaft 8, the rotation becomes stop at the position that the open part of the washing-tub 13 confronts to the open part of the case 2. Thus, putting the washing laundry to the washing-tub 13 in and out can be facilitated.

[0230] Also, in the embodiment 2, the upper-cover 12: once extends toward the outer circumferential direction of the washing-tub-lib 15 in the washing-tub 13 from the outer circumference part of the open part of the case 2; next was bended and was connected to the upper end of the outer-tub 4; was made like a cylinder, is equipped with. This upper-cover 12, though the shape is more complex than the embodiment 1, when the washing-laundry is put in and out for the washing-tub 13, it is the same that putting the washing-laundry in between the case 2 and the outer-tub 4 and between the outer-tub 4 and the washing-tub 13 is restrained.

[0231] Also, in the embodiment 2, the open part of the washing-tub 13 is equipped so as to incline shifting to the front side of the axis line of the outer-shaft 8, thereby the rolling-wheel 16 can be arranged without overlapping to the washing-tub-lid 15, is formed sequentially around the circumferential direction by centering on the axis line of the washing-tub-shaft 14. For that reason the production of the rolling-wheel 16 and the mounting into the washing-tub 13 are easy compared with the embodiment 1.

[0232] Also, in the end of the inner-shaft 19 in the embodiment 2, the mixing-impeller 26 wherein the four impellers 26a that was extended radially toward the circumference from the inner-shaft 19 was equipped is fixed instead of the disk 18 in the embodiment 1. On the outer circumference of the impeller 26a the ring-shaped rail 28 is fixed, the rolling-wheel 16 is touching this rail 28. That is, the impeller 26a is used as the support-material that supports the rail 28, and the rail 28 is used as the support-material that keeps the impeller shape of the mixing-impeller 26. When the inner-shaft 19 and mixing-impeller 26 are rotated without rotating the outer-shaft 8 via the rotating-switching-part 20 by the motor 21, the rail 28 is rotated around the axis line of the outer-shaft 8, the rolling-wheel 16 is rolled on the rail 28, the washing-tub 13 is rotated around the axis line of the washing-tub-shaft 14. By the way, here, the impeller 26a of the mixing-impeller 26 shall have four pieces, but if the configuration is that the rail 28 is supported by plural impellers 26a, the number of the wing 26a may be any number.

[0233] Thus because the mixing-impeller 26 was equipped outside the washing-tub 13, the effect that is stirred the water and the washing laundry when washing operates, the air and the washing laundry when drying operates, can be improved.

[0234] Also, in the embodiment 2, a part of the wall surface of the washing-tub 13, for example the open part, is formed with the large net etc, the stirring effect by the mixing-impel-

ler 26 makes to spread in the washing-tub 13, the washing effect becomes to go up more.

[0235] Also, in the embodiment 1 the balancer 9 is equipped on the support-body 7, whereas the ring-shaped balancer is equipped on the washing-tub 13 in the embodiment 2. Thus balancer 9a has the effect of reinforcing the structure stiffness of the washing-tub 13. And, because balancer 9a is projected into inside of the washing-tub 13, the stirring effect too can be get when the washing-tub 13 is rotated around the axis line of the washing-tub-shaft 14.

[0236] The other points are similar to the embodiment 1, and similar effect is achieved.

[0237] Next, the variable embodiment of the embodiment 2 except the above-mentioned describing is explained as follows.

[0238] In the above-mentioned embodiment 2, with the configuration wherein the spherical washing-tub 13 that rotates around the axis line of the washing-tub-shaft 14 is always equipped in the support-body 7 that rotates around the axis line of the outer-shaft 8, the special washing machine 1 that is possible to rotate around the axis lines of two shafts was shown as example, but may not be such special washing machine 1.

[0239] For example, in generally a vertical washing machine that is equipped with a bottom-mixing-impeller on a bottom in a washing-tub (hereafter, it is called a cylinder-washing-tub to distinguish from the above-mentioned spherical washing-tub 13) of the shape like a cylinder with a bottom, and that the bottom-washing-tub and the bottom-mixing-impeller is rotatable synchronously or separately, the spherical washing-tub 13 that was explained to the embodiment 2 in the cylinder-washing-tub shall be configured to be demountable. When the spherical washing-tub 13 was mounted in the cylinder-washing-tub, the cylinder-washing-tub becomes the support-body 7, the washing-tub 13 is configured to be supported to be rotatable around the axis line of a pair of the washing-tub-shaft 14 in the inner side surface of the cylinder-washing-tub. And the mixing-impeller 26 that has the rail 28 that touches the rolling-wheel 16 formed in a body in the washing-tub-13 is mounted to the bottom-mixing-impeller, thereby it becomes a structure similar to the washing machine 1 in the embodiment 2 indicated in FIG. 4 when the spherical washing-tub 13 was mounted in the cylinder-washing-tub.

[0240] By the way, in this case so that mounting/removing the washing-tub-13 in the cylinder-washing-tub is easy, the open-part of the case shall be the open part that is bigger than the washing-tub-13. It is configured like this, at when the washing-tub 13 is not mounted into the cylinder-washing-tub, the a general vertical washing machine, that the bottom-mixing-impeller only is rotated and the inside of the cylinder-washing-tub is stirred by the bottom-mixing-impeller, is got, at when the washing-tub 13 is mounted in the cylinder-washing-tub, the washing machine, similar to the embodiment 2 explained in the above-mentioned, that the rolling-wheel rolls on the rail 28 and the washing-tub 13 is rotated around the axis line of the washing-tub-shaft 14, is got, using together easily becomes possible.

[0241] Also, when the washing-tub was removed, the washing-tub 13 becomes able to use as a laundry basket. How to remove the washing-tub 13 can be able to separate on the way from the washing-tub-shaft 14, or to separate the washing-tub 13 and the washing-tub-shaft 14, or to separate from the parts other than those of the support-body 7 with the states that the washing-tub 13 and the washing-tub-shaft 14 was

connected to the support-bearing **11** and the general material of the surrounding support-body **7**.

[0242] By such configuration, for example when the capacity of the washing laundry is large, to remove the washing-tub **13** can be made to use as the vertical washing machine. Consistent processes from washing-operation to drying-operation is used and specially making-to-short-time and energy-saving of drying-operation can be attempted, then, because generally in the vertical washing machine to dry is to need time, driving is performed after the washing-tub **13** is mounted to the cylinder-washing-tub. Therefore, to divide using can be done.

Embodiment 3

[0243] FIG. 6 is a block diagram to see from side of the washing machine **1** according to embodiment 3 of the present invention.

[0244] The following is explained about the washing machine of the embodiment 3 around a point different from the embodiment 1.

[0245] In the embodiment 1, the disk **18** was to be used as including the toroidal-rail-part in the present invention, but in the embodiment 3, the ring-shaped rail **28** that is fixed to the inner-shaft **19** by the plural rail-support-material **29** extended to radial from the inner-shaft **19** is used as the toroidal-rail-part. By this configuration the rail **28** is supported rotatably around the axis line of the outer-shaft **8**.

[0246] In the embodiment 1, the rolling-wheel **16** as the rolling-part in the present invention was mounted to project toward outside from the external surface of the washing-tub **13**, but in the embodiment 3, the part that is touched at the rail **28** of the external surface of the washing-tub **13** is dented, the rolling-part **27** was formed to itself the wall surface of the washing-tub **13**. The rolling-part **27** that was formed to the external surface of the washing-tub **13** is one example of the rolling-part that is the concavity formed so as to round the external surface of the washing-tub at one with the washing-tub.

[0247] As shown in FIG. 6; by denting the external surface too of the washing-tub **13** near the washing-tub-shaft **14** opposite the washing-tub-shaft **14** by which the rolling-part **27** was formed the non-rolling-part **27a** is formed so as not to touch the rail **28**.

[0248] Also as that the rolling-part **27** of external surface of the washing-tub **13** can roll surely touching the rail **28**, the rail **28** is configured with metal, the part that touches the rolling-part **27** is a material that has elasticity such as a synthetic rubbers etc. And the part that touches the rolling-part **27** may be the gear structure etc.

[0249] By being configured like this, the number of materials decreases compared with the washing machine **1** in embodiment 1 and 2, moreover because the distance between the washing-tub **13** and the support-body **7** can be mounted adjacently more, a useless space can be decreased further more, it becomes easy for the compact washing machine **1** to be formed.

[0250] Also, the washing-tub **13** can have a relief structure necessarily on the inner circumference surface, the structure stiffness is improved, and the effect too of the stir can be expected.

[0251] The other points are similar to the embodiment 1, and similar effect is achieved.

Embodiment 4

[0252] FIG. 7 is a block diagram to see from side of the washing machine **1** according to embodiment 4 of the present invention.

[0253] The following is explained about the washing machine of the embodiment 4 around a point different from the embodiment 1.

[0254] In the embodiment 1 and 2, the rolling-wheel **16** was equipped to the outer circumference surface of the washing-tub **13**; the rolling-wheel **16** was caused to roll in the inside of the support-body **7** touching the disk **18** and the rail **28**. In the embodiment 4, for these configuration, one side of a pair of the washing-tub-shaft **14** was projected to the outer side than the support-body **7**, the configuration was that the rolling-wheel **16a** like a wheel was fixed in the protruded end of the washing-tub-shaft **14**, the configuration was that the rolling-wheel **16a** rolls in the outside of the support-body **7** touching the ring-shaped rail **28**.

[0255] By the way, the rolling-wheel **16a** is one example of the rolling-part formed separately with the washing-tub. To attempt the miniaturization of the washing machine **1**, the rolling-wheel **16a** is desirable to be equipped adjacent to outside of the support-body **7** as much as possible, is adjacent to the external surface of the washing-tub **13**.

[0256] Also, in the embodiment 4, the auxiliary-wheel **30** that can rotate around the axis line of the auxiliary-wheel-shaft **31** that was fixed to the support-body **7** is mounted. For the rail **28** to touch as well as the rolling-wheel **16a** and to rotate, the auxiliary-wheel **30** is mounted. The auxiliary-wheel **30** put the axis line of the inner-shaft **19a** between, is equipped in three places of the position of the rolling-wheel **16a** and the opposed position and the orthogonal position.

[0257] By the way, the number and position of the auxiliary-wheel **30** may be things except these, but because the collapse of the balance is restrained when the support-body **7** was rotated at high-speed, to be arranged at equal intervals is preferable. And the outer diameter of the auxiliary-wheel **30** may be bigger or smaller than the rolling-wheel **16a**. Thus by mounting the auxiliary-wheel **30** the decentering of the rail **28** by rolling the rolling-wheel **16a** is restrained, for the rolling-wheel **16a** to roll surely touching on the rail **28** becomes easy.

[0258] Also, the embodiment 1 and 2 was the configuration that the direction of the axis line of the washing-tub-shaft **14** becomes the horizontal position, but the embodiment 4 is the configuration that the direction of the axis line of the washing-tub-shaft **14** becomes the position inclined from the horizontality. Thus the degree of freedom at the arrangement position of the rolling-wheel **16a** where the rotating force is transmitted and the rail **28** can be done higher, and because the outer diameter of the rolling-wheel **16a** and the rail **28** can be selected freely, it becomes easy to change these rotational speed ratios.

[0259] Itself that the inner-shaft **19a** and the outer-shaft **8a** become the double rotating shafts structure that can be rotated around the same axis lines is similar to embodiment 1, but in the embodiment 4 one end of the inner-shaft **19a** in the inside is fixed to the support-body **7**, the inner-shaft **19a** becomes the shaft to rotate the support-body **7**. And the hollow outer-shaft supports the rail **28** through the plural rail-support-material **29** that is extended radially, becomes the shaft to rotate the rail

28 around the axis line of the same axis with the inner-shaft 19a, in this respect, the location becomes opposite to the embodiment 1.

[0260] Thereby some operations become different for the embodiment 1.

[0261] In the embodiment 1, when through the rotating-switching-part 20 by the motor 21 the outer-shaft 8 is fixed and the inner-shaft 19 only is rotated around the axis line, the support-body 7 is not rotated, the washing-tub 13 only was rotated around the axis line of the washing-tub-shaft 14. To this, in the embodiment 4, when through the rotating-switching-part 20 by the motor 21 the outer-shaft 8 is fixed and the inner-shaft 19a only is rotated around the axis line, becoming at one with the support-body 7 the washing-tub 13 is rotated around the axis line of the inner-shaft 19a, the rolling-wheel 16a is rolled touching on the rail 28, the washing-tub 13 becomes rotated around the axis line of the washing-tub-shaft 14.

[0262] In the embodiment 4, the motor 21 and the rotating-switching-part 20 is the one used with a general vertical washing machine as well as the embodiment 4, the inner-shaft 19a and the outer-shaft 8a can be rotated at one with. When drying that needs high speed operates, the inner-shaft 19a and the outer-shaft 8a allow to be rotated around the axis line of the inner-shaft 19a synchronously at one, thereby the washing-tub 13 can be rotated around the axis line of the inner-shaft 19a at one with the support-body 7 as well as the embodiment 1 and 2.

[0263] In the washing machine 1 of the embodiment 4, as well as the configuration explained in the variable embodiment of the embodiment 1, in the rotating-switching-part 20, when the simple configuration that the connected gear to rotate around the axis line fixed to the outer-shaft 4 is equipped between the inner-shaft 19a and the outer-shaft 8a is added, the inner-shaft 19a is rotated by the motor 21 so that the rotating driving power of the motor 21 is not transmitted to the outer-shaft 8a, then the connected gear is rotated, thereby the outer-shaft 8a always can become rotated opposite direction to the inner-shaft 19a, the washing-tub 13 can become rotated around the axis line of the washing-tub-shaft 14 at higher speed.

[0264] The other points are similar to the embodiment 1, and similar effect is achieved.

[0265] Next, the variable embodiment of the embodiment 4 except the above-mentioned describing is explained as follows.

[0266] In the embodiment 4 except the above-mentioned describing, the configuration was that the rail 28 was supported through the plural rail-support-material 29 that was extended to radial from the outer-shaft 8a, but the rail-support-material to support the rail 28 may be the shape like a bowl so as to cut a part of the spherical surface. When the rail-support-material was the shape like a bowl like this, the rail-support-material is preferable to open the bore properly for drain. Thus the stiffness that supports the rail 28 becomes easy to improve, also the parts count decrease, it becomes easy to manufacture at a low price.

[0267] By the way, in the embodiment 4, because the configuration was that the rolling-wheel 16a that was formed separately with the washing-tub 13 is fixed to the one end of the washing-tub-shaft 14, the rolling-wheel 16a is rotated around the axis line of the washing-tub-shaft 14 at same rotating speed as the washing-tub 13, but if the configuration is that the rolling-wheel 16a is rotated synchronously to the

washing-tub 13, it the configuration may be that these rotational speed is different. For example, the configuration may be that the washing-tub 13 is rotated around the axis-line of the washing-tub-shaft 14 at the half rotational speed compared to the rotational speed of the rolling-wheel 16a. For example, another rotating shaft that was connected with the washing-tub-shaft 14 by the gear is equipped for the support-body 7 to be fixed, when the configuration may be that the rolling-wheel is fixed another rotating shaft of this, the rotational speed ratio of the washing-tub-shaft 14 and the rolling-wheel 16a can be freely changed according to the coupling ratio of the gear.

Embodiment 5

[0268] FIG. 8 is a block diagram to see from side of the washing machine 1 according to embodiment 5 of the present invention.

[0269] The following is explained about the washing machine of the embodiment 5 around a point different from the embodiment 4.

[0270] In the embodiment 5, a inner-shaft 19b and a outer-shaft 8b too become the double rotating shafts structure similar to the inner-shaft 19a and the outer-shaft 8a in the embodiment 4, but in the embodiment 5 the inner-shaft 19b is driven to rotate by the motor 21, but the outer-shaft 8b is not driven to rotate by the motor 21, and is only supported by a outer-tub-bearing 6 so as to be able to rotate around the axis line of the outer-shaft 19b.

[0271] Also, the rail 28 that was supported by the plural rail-support-material 29 that was extended radially from the outer-shaft 8b is touched for the rolling-wheel 16a to be able to be rolled as well as the embodiment 4, in the embodiment 5 the disk or the rail-driving-wheel 32 in a wheel, so that the rail 28 is driven to rotate around the axis line of the inner-shaft 19b, is touched to the rail 28. The rail-driving-wheel 32 is fixed at the end of the rail-driving-shaft 33 that is different rotating shaft from the inner-shaft 19b. The rail-driving-shaft 33 is connected to the rail-motor 35 that was equipped to the outside of the outer-tub 4 through the outer-tub 4, is supported by the rail-driving-bearing 34 that was fixed to the outer-shaft 4 so as to be able to be rotated around the axis line of the rail-driving-shaft 33.

[0272] According to the above-mentioned configuration, in the embodiment 5, when the rail-driving-shaft 33 is driven to rotate around the axis line by the rail-motor 35, because the rail-driving-wheel 32 is rotated touching the rail 28, the rail 28 becomes rotated around the axis line of the inner-shaft 19b. And the support-body 7 is driven to rotate around the axis line of the inner-shaft 19b by the motor 21. Thereby the support-body 7 and the rail 28 become able to be rotated around the axis line of the inner-shaft 19b by controlling independently respectively the rotating direction and rotating speed etc.

[0273] For example, when around the axis line of the inner-shaft 19b the rail is not rotated and the support-body 7 only is rotated, the rolling-wheel 16a is rolled on the rail 28, the washing-tub 13 is rotated around two axis lines of the inner-shaft 19b and the washing-tub-shaft 14. Thus when the rail is rotated to opposite direction of the support-body 7, the washing-tub 13 is rotated around the axis line of the washing-tub-shaft 14 at higher speed than the above-mentioned, also when the rail 28 is rotated to same direction more early for the support-body 7, the washing-tub 13 is rotated around the axis line of the washing-tub-shaft 14 at opposite rotational direction to the above-mentioned.

[0274] Also, when the rail 28 is rotated in sync with the support-body 7 (being assumed is at rotating at high-speed when dewatering operates), the rolling-wheel 16a becomes not rolled on the rail 28, the washing-tub 13 is not rotated around the axis line of the washing-tub-shaft 14, becomes rotated around the axis line of the inner-shaft 19b at one with the support-body 7.

[0275] That is, when the rotational speed of support-body-7 made equal to the speed wherein the rail-28 is rotated around the axis line of the inner-shaft-19b, the washing-tub 13 is not rotated around the axis line of the washing-tub-shaft 14, when rotational speed of these made different, the washing-tub 13 is rotated around the axis line of the washing-tub-shaft 14 depending on the difference of the rotational speed.

[0276] Because the rotation of the support-body 7 and rail 28 can be controlled respectively independently, the rotational patterns (rotational speed, reversal of rotational direction, etc.) of the washing-tub 13 that is appropriate for a variety of driving operation of the washing machine 1 become able to select more easily freely.

[0277] The other points are similar to the embodiment 4, and similar effect is achieved.

[0278] Next, the variable embodiment of the embodiment 5 except the above-mentioned describing is explained as follows.

[0279] In the above-mentioned embodiment 5, the direction of the rail-driving-shaft 33 was allowed to be vertical, but the rail-driving-shaft 33 is inclined, the rail-driving-wheel 32 is configured so as to touch the rail 28 at the inclined angle, the rail-driving-wheel 32 may be arranged between the outer-tub 4 and support-body 7. Thereby the clearance between the outer-tub 4 and support-body 7 can be decreased, and washing can operate by less water.

[0280] Also in the above-mentioned embodiment 5, the configuration is that for the rail-driving-wheel 32 to touch on the outer circumference surface of the rail 28 the rail 28 is rotated around the axis line of the inner-shaft 19b, but the rail-driving-shaft 33 is inclined, the rail-driving-wheel 32 that is rotated at the inclined angle is touched on the inner circumference surface of the rail 28, the rail 28 may be configured so as to rotate around the axis line of the inner-shaft 19b.

[0281] Also in the above-mentioned embodiment 5, the rail-28 made be supported so as to be able to rotate around the axis line of the inner-shaft 19b by the plural rail-support-material 29 that was extended radially from the outer-shaft 8b, but the rail 28 may be supported by another method if the inner-shaft 19b can be rotated around the axis line.

[0282] FIG. 9 and FIG. 10 is indicated about a block diagram of the importance part to explain other methods to support the rail 28.

[0283] In the method of support shown in FIG. 9, a ring-shaped rail-hold-part 36 that was fixed to the outer-shaft 4 is equipped in the under of the rail 28, so that interdigitating a groove-part 38 that was mounted to the circumferential direction of the rail-hold-part 36 a plural interlocking-part 37 that was mounted to the circumferential direction of the rail 28 move sliding to the circumferential direction, the rail 28 becomes able to be rotated around the axis line of the inner-shaft 19b. By the way, the configuration may be that the groove-part 38 is equipped in the rail-28, that the interlocking-part 37 is equipped in the rail-hold-part 36. And the wheel and bearing is equipped in the contact zone of the interlocking-part 37 and groove-part 38, becoming able to move sliding with few resistance is desirable.

[0284] Next, in the method of support shown in FIG. 10, a plural rail-hold-wheel 39 that can be rotated around the axis line of a rail-hold-shaft 40 that was fixed to the outer-shaft 4 is equipped to the circumferential direction around the axis line of the inner-shaft 19b, the rail 28 becomes supported rotatably around the axis line of the inner-shaft 19b.

[0285] When the method of support made the configuration as shown in FIG. 9 and FIG. 10, because the outer-shaft 8b becomes unnecessary, the double rotating shaft structure may not be equipped, the rotation drive structure from motor 21 becomes easier.

[0286] By the way, in each embodiments, the washing-tub 13 took to be spherical, but if the rolling-wheel 16 and rolling-wheel 16a is configured to be rolled touching always the disk-18 and rail 28, the washing-tub 13 may be not the pure sphere. For example, so that the straight line that connects two focuses equals the central shaft of the washing-tub-shaft 14, the outer shape of a section that includes the central shaft of the washing-tub-shaft 14 may be spherical like a elliptical shape.

[0287] As explained above, the configuration of the motor 21 and rotating-switching-part 20 that is used in the embodiments from 1 to 4 is not the special one and is the motor mechanism of the double shafts structure that is used in the generally vertical washing machine. By using the motor mechanism of the double shafts structure that is a simple configuration and has long achievements, the operation wherein the washing-tub is rotated by respectively centering on two rotating shafts of different directions can be achieved in high reliability.

[0288] Also, in the washing machine 1 of the embodiment 5 and variable embodiment (FIG. 3) of the embodiment 1, because there is not the rotating switching structure, similarly, the operation wherein the washing-tub is rotated by respectively centering on two rotating shafts of different directions can be achieved in a simple configuration and in high reliability.

[0289] Also, the washing machine of the conventional configuration as patent document 1 and patent document 2, the gear and the rotating shaft of horizontal direction to change the rotating direction is necessary and indispensable on the way from the rotating shaft of the vertical direction to the horizontal rotating shaft, the configuration is complex, there was a problem that a transmitting loss too of the rotation power is large. Also, for the mechanism wherein the rotation power is transmitted to the rotating shaft of the horizontal direction of the washing-tub there was a problem that the space between the washing-tub and the support-body is large. And it was structurally difficult that the washing-tub is rotated around both axis line of the horizontal axis line and the vertical axis line at the same time.

[0290] In the washing machine of the present invention, the rotating direction of rotation power that is transmitted to the washing-tub is not changed to plural directions, also the washing-tub can become rotated freely around the axis lines of two rotating shafts of the different directions without wasting space in a simple configuration, that is, The washing machine of this invention is what these conventional problems too of above mentioned solve.

[0291] Next and, though it explains each execution examples according to the related invention of the present

invention based on figure, in each figure, the material and the part in the same or equality is explained assigning the same sign.

Execution Example 1

[0292] FIG. 13 is a block diagram to see from side of the washing machine (101R) of execution example 1 pertaining to the related invention in the present invention.

[0293] The washing machine 101R of execution example 1 is provided with: a case 2R; a outer-tub 5R that is equipped to inside of this case 2R, wherein water can be stored inside when washing (wash or rinse) operates; the washing-tub 9R that is equipped to inside of the outer-tub 5R, that a washing laundry is stored inside, and that is rotated horizontally around a axis-line L of a vertical washing-tub-rotating-shaft 11R. The outer-tub 5R is supported so as to be hanged by plural outer-support-materials 7R that is extended from the upper part of the case 2R to the lower part of the outer-tub 5R. The spring, and the elastic body using gas pressure etc that was enclosed, is equipped in the intermediate part and end of this outer-support-material 7R, because this elastic body expands and contracts, the transmission of the oscillation that is generated by the rotation of the washing-tub 9R is restrained. By the way, the outer-support-material 7R may be being to support the outer-tub 5R from the bottom of the case 2R, also the number may be any number if the outer-tub 5R can be supported to restrain the oscillation.

[0294] In the respective upper part of the case 2R, the outer-tub 5R, and the washing-tub 9R, the open part that can put in and out the washing-laundry to inside of the washing-tub 9R is formed. The case 2R has a case-lid 3R that opens and shuts the open part of the case 2R. The case-lid 3R is the shape of a flat board, the hinge (not indicated in figure), that was equipped to the intermediate part and the based part, becomes a fulcrum, the washing-tub-lid 3R is folded and opened, the open part of the case-2R is opened and is shut. In the open part of case 2R the cover 4R wherein one end part is fixed to the case 2R, wherein other end part is fixed to the outer-tub 5R, wherein the halfway is extended toward the washing-tub 9R is equipped, when the washing laundry is put in and out to inside of the washing-tub 9R, that the washing laundry is get in between the case 2R and the outer-tub 5R and between the outer-tub 5R and the washing-tub 9R is restrained by this cover 4R. at least part of the cover 4R use the elastic materials of synthetic rubber etc as material quality, has elasticity so that the washing-tub may shake with the rotational shake of the washing-tub 9R. By the way, the cover 4R may double as the function as the outer-support-material 7R to support the outer-tub 5R.

[0295] The washing-tub 9R has a washing-tub-rotating-shaft 11R that was extended to the vertical lower side from the bottom, this washing-tub-rotating-shaft 11R is supported rotatably by the outer-tub-bearing 6R that is equipped to the outer-tub 5R. Thus the washing-tub 9R becomes rotatable by centering on the axis line of the washing-tub-rotating-shaft 11R. The washing-tub-rotating-shaft 11R corresponds to one example of the washing-tub-self-rotating-shaft of the related invention to the present invention. The washing-tub-rotating-shaft 11R penetrates through the outer-tub 5R, is connected to the motor 12R that is equipped to outside of the outer-tub 5R. When the motor 12R drives to rotate the washing-tub-rotating-shaft 11R, the washing-tub 9R rotates horizontally. The motor 12R corresponds to one example of the washing-power-generating-part of the related invention to the present

invention. Between the outer-tub 5R and the outer-tub-bearing 6R and between the outer-tub-bearing 6R and the washing-tub-rotating-shaft 11R there is the watertight structure that was attached thickly so that the water of inside of the outer-tub 5R does not leak even if the washing-tub-rotating-shaft 11R rotates.

[0296] The bottom side of the washing-tub 9R is formed to the shape of the curved surface of the hemisphere surface etc, two mixing-impellers 17R is equipped in the inside of the shape of the curved surface. Two mixing-impeller 17R are arranged to the line-symmetrical position based on the axis-line L of the washing-tub-rotating-shaft 11R when seeing from side. The mixing-impeller 17R is mounted to the rotating-shaft 18R that penetrates through the washing-tub 9R and that is equipped, this rotating-shaft 18R is supported rotatably by the washing-tub-bearing 20R that was equipped to the washing-tub 9R. Thereby the mixing-impeller 17R becomes self-rotatable by centering on the axis-line M of the rotating-shaft 18R. By the way, as the washing-tub-bearing 20R for example the thrust-ball-bearing can be used. The thrust-ball-bearing is formed by interleaving the bearing arranged round by doughnut-shaped material from the top and bottom, can be used as that for example the upper side material is fixed to the wall surface of the washing-tub 9R and the under side material is fixed to the rotating-shaft 18R. Also the washing-tub-bearing-20R may supports the rotating-shaft 18R to be self-rotatable by centering on the axis-line M, without particularly the thrust-ball-bearing etc to reduce the rotational resistance, the configuration may be that the open size of the perforated part is opened only little larger than the external diameter of the rotating-shaft 18R. The axis-line M of the rotating-shaft 18R is equipped with a constant angle (for example, alpha is about 30 degrees) for the axis-line L of the washing-tub-rotating-shaft 11R. In the outer side of the washing-tub 9R of the rotating-shaft 18R, the rolling-wheel 19R that rotates by centering on the axis-line of the rotating-shaft 18R at one with the mixing-impeller 17R and the rotating-shaft 18R is equipped. By the way, the rotating-shaft 18R corresponds to one example of the mixing-impeller-self-rotating-shaft of the related invention in the present invention, the rolling-wheel 19R corresponds to one example of the rolling-part of the related invention in the present invention.

[0297] The rail 13R: that made to the ring-shaped form by centering on the axis-line L of the washing-tub-rotating-shaft 11R in the outside of the washing-tub 9R and in the inside of the outer-tub 5R; wherein the rolling-wheel 19R was supported so as to be able to roll, is equipped. The rail 13R corresponds to one example of the contact-material of the related invention in the present invention, corresponds to one example of the 1st-rail-material. The mixing-impeller 17R, the rotating-shaft 18R, and the rolling-wheel 19R revolves by centering on the washing-tub-rotating-shaft 11R by the rotation of the washing-tub 9R, thereby the rolling-wheel 19R has been rolling on the rail 13R, the mixing-impeller-17R self-rotates by centering on the rotating-shaft 18R by the rotation of the rolling-wheel. Therefore if the touched part of the rolling-wheel 19R and the rail 13R do not slip, the rotation speed of the mixing-impeller 17R is uniquely decided by the outer diameter of the rolling-wheel 19R, the diameter of the outer surrounding part of the rail 13R wherein the rolling-wheel 19R touches, and the rotation speed of the washing-tub 9R. For example, if the outer diameter of the rolling-wheel 19R is smaller than the outer surrounding diameter of the rail 13R, the mixing-impeller 17R rotates at higher rotating speed

than the washing-tub 9R. Also the rail 13R is supported to the rail-support-part 14R through the rail-elastic-part 15R, this rail-support-part 14R is supported so as to be able to move to the direction (the vertical direction in this execution example) of the axis-line L of the washing-tub-rotating-shaft 11R by the rail-support-driving-part 16R that was fixed to the outer-tub 5R. This rail-elastic-part 15R, rail-support-part 14R, and rail-support-driving-part 16R is arranged at intervals in the plural positions to the surrounding direction by centering on the axis-line L of the washing-tub-rotating-shaft 11R. By the way, the rail-support-driving-part 16R that is one example of the 1st-separated-part of the related invention in the present invention may be to move up and down the rail-support-part 14R by the motor that is equipped individually, the pump as not indicated in figure is equipped, the plural rail-support-part-14R together may become to move up and down by oil pressure, gas pressure, and water pressure. Also the solenoid etc. may be used though waterproof becomes necessary. By the way, the rail-support-driving-part 16R may be fixed to the case 2R, not to the outer-tub 5R.

[0298] too much force that is added from the rolling-wheel 19R to the rail 13R with the rotating shake of the washing-tub 9R by centering on the axis-line L of the washing-tub-rotating-shaft 11R can be reduced by the rail-elastic-part 15R. By the way, the number of the rail-elastic-part 15R, rail-support-part 14R, and rail-support-driving-part 16R may be any number, but by large number the effect of decreasing the rotating shake becomes high, also to touch between the rolling-wheel 19R and the rail 13R is more certain. Also in touching zone between the rolling-wheel 19R and the rail 13R, if the engagement structure of the gear etc. is equipped in both, or if the material with a large friction of rubber etc. is equipped, the generation of the wheel slip etc. becomes difficult, and rolling becomes more certain. By being driven by the rail-support-driving-part 16R, the rail-support-part 14R is put in and out to axial direction (the vertical direction in the execution example) of the washing-tub-rotating-shaft 11R, the rail 13R touches the rolling-wheel 19R when lifting, the rail 13R become not to touch the rolling-wheel 19R when putting down. Thereby, rotating the washing-tub 9R by centering on the axis-line L of the washing-tub-rotating-shaft 11R, the mixing-impeller 17R can make to rotate by centering on the axis-line M of the rotating-shaft 18R, or can make not to rotate.

[0299] In the wall of the washing-tub 9R, so as to pass through outside and inside, many water-bore (not indicated in the figure) that water can pass is formed over all surfaces. By this water-bore, the water and the washing-laundry can be mixed in the inside of the washing-tub 9R when washing operates, the water in the inside of the washing-tub 9R can be discharged outward when dewatering operates and when drain operates. In the lowermost of the outer-tub 5R, the drain path 8R is connected so as to discharge the stored water in the inside of the outer-tub 5R to outside, the drain-valve (not indicated in figure) that opens and shuts the drain-path 8R is equipped in this drain-path 8R. By this drain-valve the water can be stored in the outer-tub 5R, the stored water in the inside of the outer-tub 5R can be discharged. The ring-shaped balancer 10R by centering on the axis-line L of the washing-tub-rotating-shaft 11R is mounted in the upper part of the washing-tub 9R. the liquid is cooped up inside this balancer 10R, the rotating shake of the washing-tub 9R which rotates at high speed by centering on the washing-tub-rotating-shaft 11R is restrained when dewatering operates. By the way, when

dewatering rotating the washing-tub 9R at high speed operates, it is desirable that the rolling-wheel 19R do not touch the rail 13R by driving the rail-support-driving-part 16R. The reason is that the rotation of the mixing-impeller 17R is especially unnecessary when dewatering operates, also is that the rotating loss and noise by means of touching with the rolling-wheel 19R the rail 13R can be restrained. The washing machine 101R is equipped with: a heater (not indicated in figure) that generates the warm air; a heat exchanger (not indicated in figure) that cools the warm air so as to condense the moisture of the warm air, is the washing and drying all-in-one design that had the function of the washing and drying.

[0300] A ventilation duct (not indicated in figure) is formed in the upper part of the surrounding side surface of the outer-tub 5R or in the side surface of the cover 4R, a outlet duct (not indicated in figure) is formed in the surrounding surface and bottom surface of the outer-tub 5R, the warm air is supplied from the outlet duct to the inside of the outer-tub 5R, the warm air's circulation path (not indicated in figure) that discharges the warm air with moisture from the outlet duct to outside of the outer-tub 5R is formed. By the way, the ventilating direction of the warm air may be the reverse of the above so that the warm air is supplied from the outlet duct to inside of the outer-tub 5R and is discharged from the ventilation duct to outside of the outer-tub 5R. And so that the warm air is generated and a cold energy to be used when moisture is condensed is generated, a heat-pump that uses the condensation, the evaporation, the expansion, and the compression of the refrigerant, a heat-exchanger that exchanges the heat between the refrigerant and the circulating warm air may be used. Also a part of the drain-path 8R may be used so that the warm air is supplied to inside of the outer-tub 5R or so that the warm air is discharged to outside of the outer-tub 5R.

[0301] Also if the lid shall be equipped to too the open part of the washing-tub 9R and the outer-tub 5R to the open part of the washing-tub 9R and the outer-tub 5R between the case-lid 3R and a warm air's vented opening, or if the washing-tub-lid 3R shall be the two layers structure wherein inside becomes hollow, the adiabaticity becomes raised, the excessive temperature rise on an outside surface of case-lid 3R caused by the warm air can be restrained, also the heat radiation from the case-lid 3R decreases and the thermal efficiency at drying can be improved. Also, a control-part 130R to operate each configuration including the motor 12R, the rail-support-driving-part 16R, etc. has been equipped. Next the movement of the washing machine 101R pertaining to execution example 1 is explained. The washing operation of this washing machine 101R advances in order of the cleansing operation, the rinse operation, and the dewatering operation. At the beginning the cleansing operation is explained.

[0302] First the user of the washing machine 101R opens the washing-tub-lid 3R, and accepts the washing-laundry to inside of the washing-tub 9R. If the user pushes a switch (not indicated in figure) after the washing-tub-lid 3R was shut, the weight of the washing-laundry is calculated detecting the weight change in the entire outer-tub 5R by means (not indicated in figure) of the detection with weight sensor equipped in the outer-tub-support-material 7R, of the detection of torque change of motor 12R when the washing-tub 9R was rotated at low speed, etc. After the drain-valve of the drain-path 8R is shut, the water is supplied automatically from the water-pipe (not indicated in the figure) to inside of the outer-tub 5R according to the weight of the washing-laundry. the

detergent is put in by the user in the inside of the washing-tub 9R after completing the required water supply, and the washing operation is begun. By the way without detecting the weight of the washing-laundry the user may collect the water manually in the inside of the outer-tub 5R by opening and shutting the valve, etc. of the water pipe. Also it may be other timing though it is preferable the timing that the detergent put in to the washing-tub 9R is before the washing-tub 9R rotates.

[0303] Next, the motor 12R is driven with the rail 13R and the rolling-wheel 19R made to drive the rail-support-driving-part 16R and to be touched, then the washing-tub 9R horizontally rotates to one direction around axis-line L of the washing-tub-rotating-shaft 11R, two rolling-wheel 19R revolve around axis-line L. It synchronizes, two rolling-wheels 19R synchronously roll on the rail 13R, thereby two mixing-impellers 17R rotate around axis-line M of each rotating-shaft 18R. For instance, in view of above, if the motor 12R was driven like being anti-clockwise washing-tub-rotating-shaft 11R (refer to arrow A), the mixing-impeller 17R will rotate anti-clockwise (refer to arrow B). Thus, the mixing-impeller 17R self-rotates by using the rotating force where the washing-tub 9R self-rotates in the execution example 1. By the way, the mixing-impeller 17R when viewing from the front on FIG. 13 rotates clockwise, and the mixing-impeller 17R on the back side will rotate anti-clockwise. Moreover, the axis-line M of the rotating-shaft 18R of two mixing-impellers 17R has intersected on the axis-line L. By the way, the drive of the motor 12R is controlled, the rotating direction and the rotational speed of the washing-tub 9R may be switched at regular intervals. As a result, the rotating direction and the rotational speed of mixing-impeller 17R are switched at regular intervals.

[0304] Because two mixing-impellers 17R rotates with the rotation of the washing-tub 9R around the axis-line that are different from washing-tub-rotating-shaft 11R, a complex stir that always changes into not only the horizontal but also vertical direction in the washing-tub 9R is caused in the washing-tub 9R, water and washing-laundry in the washing-tub 9R are intensely stirred. when the ruggedness not shown in washing-tub 9R is equipped further, because the rotation of washing-tub 9R is stirred in washing-tub 9R, the effect of the stir rises further more. On the way of the cleansing operation, the rail-support-driving-part 16R is driven and the rail 13R and rolling-wheel 19R are alienated, there may be the washing-mode that the washing-tub 9R only was rotated without self-rotating the mixing-impeller 17R, like dewatering-operation at a low rotational speed (describe later). The washing operation ends when predetermined time passes, the drain-valve is opened and water inside in the outer-tub 5R is drawn off from drain-path 8R outside. Next, the rinse operation is explained. After water inside in the outer-tub 5R was drawn off, the drain valve is shut again, water is supplied internally in the outer-tub 5R, and the rinse operation is begun. By the way, only the point that the detergent is not put in is different, and this rinse operation is operation similar to the above-mentioned cleansing operation. The drain valve is opened again when the rinse operation is begun, and predetermined time passes, and water inside in outer-tub 5R is drained off outside. The rinse operation ends after specified number of this rinse operation is repeated.

[0305] Next, the dewatering operation is explained. The gear (not indicated in figure) in the motor 12R changes the speed after water inside outer-tub 5R is drawn off, the dewatering operation wherein the washing-tub 9R rotates by a

faster rotational speed than at washing (cleansing or rinse) operation is begun. When high-speed rotating when dewatering operates, the rail-support-driving-part 16R is driven, it becomes the state to alienate the rail 13R and the rolling-wheel 19R. Thus, because the rolling-wheel 19R can not roll on the rail 13R, two mixing-impellers 17R becomes the state of non-rotation, the washing-tub 9R only rotates around the axis-line L of the washing-tub-rotating-shaft 11R. The water in the washing-tub 9R is drained off to outside of the washing-tub 9R by the centrifugal force of the high-speed rotation of the washing-tub 9R through the water-bore of the washing-tub 9R, and washing-laundry is dewatered. By the way, the high-speed rotation of the washing-tub 9R may not limit the gear of the motor 12R to changing the speed, and for instance change the frequency of the electric power supplied to the motor 12R by the inverter etc. Furthermore, the washing-tub 9R may rotate at high-speed by using both the converter drive position of the gear and the inverter etc. The water that was discharged through the water-bore of washing-tub 9R to outside of the washing-tub 9R flows to the surroundings side surface and the bottom surface in outer-tub 5R, and is drained outside through drain-path 8R. Even if the washing-laundry has been biased in the washing-tub 9R while dewatering operates, the rotating shake by centering on the washing-tub-rotating-shaft 11R is restrained by the balancer 10R. By the way, when the washing-laundry had been biased to a level beyond restraint by balancer 10R, it is detected by the torque change or the acceleration change etc. of the motor 12R, the rotation of the washing-tub 9R is stopped temporarily, the water is supplied to the washing-tub 9R, the rinse operation described to the above-mentioned is executed for a short time, the washing-laundry is disentangled, or the arrangement of the washing-laundry is moved, the dewatering operation is executed again, thereby it is improved in many cases. Even if such operation of a prescribed frequency is repeated, if the decentering is not improved, the user is informed by the buzzer etc., the dewatering operation is generally interrupted. It is well executed that the user that was informed the interruption of the dewatering operation unties the washing-laundry manually, or moves the arrangement of the washing-laundry, and executes the dewatering operation again.

[0306] By the way, when the washing-laundry had been biased, the rail-support-driving-part 16R is driven before the rinse operation like the above-mentioned is executed, after the rail 13R and rolling-wheel 19R are made to be touched, the washing-tub 9R is rotated at low speed by the motor 12R, there may be a try to move the washing-laundry that adhered to the inner surrounding surface of washing-tub 9R by rotating the mixing-impeller 17R. In this case, the effect of improving the decentering of the washing-tub 9R can be expected by canceling bias of the washing-laundry without adding water in the washing-tub 9R. After the washing-tub 9R rotated at the high-speed at prescribed time, the washing-tub 9R is stopped. Afterwards, the user opens the case-lid 3R, the washing-laundry is taken out outside of the case 2R, and the washing operation and the dewatering operation of the washing machine 101R end. By the way, continuously the warm-air is made to circulate in the washing-tub 9R at prescribed time when the washing-laundry is dried, the washing-laundry in the washing-tub 9R is dried.

[0307] When this drying operates, while rotating the washing-tub 9R around the axis-line L of the washing-tub-rotating-shaft 11R as well as when washing (cleansing and rinse) operates, further, the rail-support-driving-part 16R is made to

be driven and the rail 13R and rolling-wheel 19R are made to be touched, while rotating the mixing-impeller 17R around the axis-line M of the rotating-shaft 18R, thereby the washing-laundry becomes easy to be moved in the washing-tub 9R by the mixing-impeller 17R, the washing-laundry becomes easy to be dried with few mottles. When the drying the washing-laundry ends, the user takes out the washing-laundry from the washing-tub 9R to the outside of the case 2R, the operation of the washing machine 101R ends. By the way, when the mixing-impeller 17R is rotated besides the washing operation, rotating at slow speed is more desirable than when washing operates to restrain rubbing of the washing-laundry by contact with the mixing-impeller 17R.

[0308] As explained above, in the outside of the washing-tub 9R and outside of the outer-tub 5R the rail 13R that was formed to the toroidal around the axis-line L of the washing-tub-rotating-shaft 11R is equipped, the rotation of the mixing-impeller 17R around the axis-line M of rotating-shaft 18R can be achieved by simple structure wherein rolling-wheel 19R that rotates together with the mixing-impeller 17R and rotating-shaft 18R is rolled on the rail 13R. Also because the mixing-impeller that continuously rotates around the axis-line M of rotating-shaft 18R different from the axis-line L of the washing-tub-rotating-shaft 11R stirs the inside of the washing-tub 9R, a complex stir not uniform can be positively caused in washing-tub 9R, the ability of cleansing and the rinse of the washing-laundry can be improved. Also because the mixing-impeller 17R is rotated when drying operates, the washing-laundry becomes easy to move up and down in the washing-tub 9R, the washing-laundry becomes easy to be dried with few mottles. Also because two mixing-impeller 17R stir in the washing-tub 9R, it becomes easy for a more complex stir to be caused in the washing-tub 9R. Also because the rail-support-driving-part 16R that is one example of the 1st-separated-part of the related invention to the present invention has been equipped, to alienate the rail 13R from rolling-wheel 19R or to touch is easily switched, the rotation of the mixing-impeller 17R only can be stopped by alienating without any relation to the rotation of the washing-tub, the washing-tub only can be rotated without rotating the mixing-impeller when dewatering etc.

[0309] The transforming example of the execution example 1 is explained as follows. In the execution example, that two mixing-impellers 17R were equipped was shown, but 1 or over 3 mixing-impellers 17R may have been equipped. Also in the execution example, though the axis-line L of the washing-tub-rotating-shaft 11R has been equipped in the vertical direction, there may be the washing machine 101R wherein the axis-line L inclines. Also in the execution example, though the section in the rail 13R is assumed to be a triangle wherein the top is arranged upside, the shape of the section is not limited to this, any shape may be acceptable if the rolling-wheel 19R is rolled on rail 13R. Also in the execution example 1, Though the one that the rail 13R was arranged under the rolling-wheel 19R was shown, that rail 13R may be arranged so as to come in contact above the rolling-wheel 19R. However, the movement of the rail-support-driving-part 16R when alienating from the rolling-wheel 19R reverses, when the rail 13R and the rolling-wheel 19R are alienated, the rail 13R will be lifted up. In that case, the rolling-wheel 19R will rotate in the counter direction of arrow B when the washing-tub 9R is rotated in the direction of arrow A. Also in the execution example, though the rail-elastic-part 15R has been equipped between the rail-support-part 14R and the rail

13R, the elasticity part is equipped between the outer-tub 5R and case 2R that is fixed the rail-support-driving-part 16R and rail-support-driving-part 16R, the configuration may be that the excessive power added from the rolling-wheel 19R to the rail 13R is absorbed and decreased. Also one example of separated-part of the related invention to the present invention corresponds to the rail-support-driving-part 16R, though the rail 13R can be moved to the direction of the axis-line L of the washing-tub-rotating-shaft 11R by equipping the rail-support-driving-part 16R by the plural places to the surrounding direction of the washing-tub-rotating-shaft 11R, the rail 13R is supported by the one like balloon, the configuration may be to move the rail 13R in the direction of axis-line L of the washing-tub-rotating-shaft 11R by expanding and shrinking the one like balloon by the pressures of the gas, the water, and the oil enclosed inside the one like balloon. When such 1st-separated-part is configured, the effect that absorbs and decreases the excessive power added from the rolling-wheel 19R to the rail 13R is achieved, the rail-elastic-part 15R may be not equipped. By the way, in the execution example, the rail-support-driving-part 16R is equipped, but the rail-support-part 14R may be fixed to the outer-tub 5R or the case 2R without equipping the rail-support-driving-part 16R. In this case, when the washing-tub 9R rotates around the axis-line L of the washing-tub-rotating-shaft 11R when doing like this, the rolling-wheel 19R always rolls on the rail 13R, the mixing-impeller 17R always rotates around the axis-line M of the rotating-shaft 18R. Therefore, especially when dewatering operates, by rolling the rolling-wheel 19R on the rail 13R the noise and the rotation loss is increased, but the effect of when washing operates is similarly achieved. Also to restrain the rub of the washing-laundry due to touch the mixing-impeller 17R, it is preferable that the thickness of the axis direction of the rotating-shaft 18R of mixing-impeller 17R is restrained.

[0310] Also in the above execution example 1, in view from the side of the washing-tub 9R, or in view of the plan, two mixing-impellers 17R wherein the axis-line of the washing-tub-rotating-shaft 11R is inserted between are arranged in symmetry, the example of the mixing-impeller 17R that rotated around the axis-line M that inclined to the axis-line L of the washing-tub-rotating-shaft 11R was shown as example, but two mixing-impellers 17R may not be arranged to become symmetry in the axis-line L. Also the bottom of washing-tub 9R is formed like the flat surface like execution example 7 described later, one or two or more mixing-impeller that rotate around the axis-line M that is parallel to the axis-line L of the washing-tub-rotating-shaft 11R at the horizontally different position may be equipped. Also in each mixing-impeller 17R the fixed position to the washing-tub 9R is changed, the external diameter of the rolling-wheel 19R may be different. Thereby, the rotational speed of each mixing-impeller 17R will change, and a more complex stir becomes possible. Also the external surrounding diameter and the shape of each mixing-impeller 17R may be changed and the change in the effect of the stir of each mixing-impeller 17R may be given. And in the above execution example, it showed the motor arrangement that arranged the motor 12R on the axis-line L of the washing-tub-rotating-shaft 11R, that is direct drive method, but the motor 12R is arranged at a position that is not on the same axis-line as the washing-tub-rotating-shaft 11R and that is away, the rotation of motor 12R may be transmitted by the belt and the gear, etc. Also in the above execution example, the bottom side of the washing-tub 9R is formed with the curved surface shape of the hemisphere

surface etc., but this shape is not the thing limited, the bottom may be formed with the flat surface, or other shape may be formed. However, because there is the fear that the washing-laundry is bitten when the space becomes empty between the mixing-impeller 17R and the washing-tub 9R, the flat surface or the gradual curved surface around the axis-line of the rotating-shaft 18R is formed, furthermore, in consideration of the mounted angle on the washing-tub 9R side of mixing-impeller 17R when rotating, it is preferable that the space between the mixing-impeller 17R and the washing-tub 9R is not large. Also in the above execution example, the rolling-wheel 19R corresponded to one example of the rolling-part of the related invention to the present invention was the wheel and the disk, but the thing that can roll touching the rail 13R corresponded to one example of the contact-material of the related invention to the present invention may be any shape. For instance, the other one example of the rolling-part of the related invention to the present invention may be the sphere, especially when it is the sphere, the freedom degree of the contact angle with the rail 13R rises, therefore the freedom degree of the mounted angle, of the mounted position of the rotating-shaft 18R, and of the mounted position of the rail 13R becomes rise.

Execution Example 2

[0311] the washing machine of the execution example 2 pertaining to the related invention in the present invention is explained as follows. The washing machine of the execution example 2 is basically the same configuration as the washing machine of execution example 1, but the point to have made the rail 13R rotatable is different. Therefore, it explains around this difference point. FIG. 14 is a block diagram to see from side of the washing machine 102R of execution example 2 according to the related invention in the present invention. The washing machine 102R of the execution example 2 makes rotating the rail 13R to the surrounding direction by centering on the axis-line L of the washing-tub-rotating-shaft 11R in addition to the washing machine 101R of execution example 1. In the execution example 2, the ring-shaped rail-rotating-hold-part 22R is equipped under the rail 13R, the rail-rotating-interlocking-part 21R that was fixed to the rail 13R, and wherein the section was like the reverse-T character is engaged to the concave part that was formed in the rail-rotating-hold-part 22R, and that was like the reverse-T character. This rail-rotating-interlocking-part 21R is for the thing wherein the rail-rotating-hold-part 22R and the rail 13R is not separated to the direction of axis-line L, and may be equipped in the toroidal over all surrounding of surrounding direction by centering on the axis-line L of the washing-tub-rotating-shaft 11R of the rail 13R, or may be equipped to a plural partial position of the surrounding direction in places. The bearing not shown in the figure is equipped between the rail-rotating-interlocking-part 21R and the rail-rotating-hold-part 22R, the rail 13R can rotate around the axis-line L of the washing-tub-rotating-shaft 11R with moving sliding the rail-rotating-interlocking-part 21R and the rail-rotating-hold-part 22R. Also contrary to the above-mentioned, the section of the rail-rotating-hold-part 22R may be formed like T character, the concavity like T character may be equipped so that the rail-rotating-hold-part 22R was engaged under the rail 13, the number of parts becomes few as compared to the above-mentioned, and the configuration becomes easy. Also the section of the concavity of the rail-rotating-interlocking-part

21R and rail-rotating-hold-part 22R may be It may be the shape other than like T character such as like L character.

[0312] The rail-rotating-hold-part 22R is supported at the rail-support-part 14R through the rail-elastic-part 15R as well as rail the 13R in the execution example 1, also the rail-support-part 14R is supported at the rail-support-driving-part 16R that was fixed at the outer-shaft 5R to be possible to move to the direction of the axis-line L (vertical direction in this execution example) of the washing-tub-rotating-shaft 11R. This rail-elastic-part 15R, rail-support-part 14R, and rail-support-driving-part 16R is arranged at intervals in the plural positions to the surrounding direction by centering on the axis-line L of the washing-tub-rotating-shaft 11R. The rail 13R is configured so that the rolling-wheel 19R rolls touching as well as the execution example 1 and is configured so that the rail-driving-wheel 23R touches. The rail-driving-wheel 23R is fixed to the rail-driving-shaft 24R, the rail-driving-shaft 24R is supported to be rotatable by the rail-driving-bearing 25R that is equipped to the outer-tub 5R. Also the rail-driving-shaft 24R penetrates through the outer-tub 5R through the rail-driving-bearing 25R, and is connected with the rail-motor 26R equipped in outside of the outer-tub 5R. When the rail-motor 26R drives to rotate the rail-driving-shaft 24R, The rail-driving-wheel 23R rotates around the axis-line of the rail-driving-shaft 24R, further the rail 13R that has touch the rail-driving-wheel 23R rotates around the axis-line of the washing-tub-rotating-shaft 11R. By the way, one example of the driving-power-generating-part of the related invention to the present invention corresponds to the rail-motor 26R of the execution example, one example of the driving-shaft of the related invention to the present invention corresponds to the rail-driving-shaft 24R of the execution example. Also one example of the transmitting-material of the related invention to the present invention corresponds to the rail-driving-wheel 23R of the execution example. And Between the outer-tub 5R and the rail-driving-bearing 25R and between the rail-driving-bearing 25R and the rail-driving-shaft 24R there is the watertight structure that was attached thickly so that the water of inside of the outer-tub 5R does not leak even if the rail-driving-shaft 24R rotates.

[0313] Next, the operation of the washing machine 102R of this execution example is explained. When the rail 13R rotates around the axis-line L of washing-tub-rotating-shaft 11R as stated above, the rolling-wheel 19R rolls on the rail 13R, the mixing-impeller 17R rotates around the axis-line M of the rotating-shaft 18R, and stirs the inside of the washing-tub 9R. By the way, when the rail-support-driving-part 16R is driven, the rail-support-part 14R can be put in and out to the direction of the axis-line L (vertical direction in the execution example) of the washing-tub-rotating-shaft 11R, when the rail-support-hold-part 22R and the rail 13R is lifted, the rolling-wheel 19R and the rail-driving-wheel 23R can touch the rail 13R. Also the rail-rotating-hold-part 22R and the rail 13R is pulled down, the rolling-wheel 19R and the rail-driving-wheel 23R is separated from the rail 13. by this configuration, when the rolling-wheel 19R and the rail-driving-wheel 23R have been separated from the rail 13, the mixing-impeller 17R is not rotated around the axis-line M of the rotating-shaft 18R, the washing-tub 9R only can be rotated around the axis-line L of the washing-tub-rotating-shaft 11R. On the other hand, when the rolling-wheel 19R and the rail-driving-wheel 23R has touch the rail 13, two forces of the rotation around the axis-line of the washing-tub-rotating-shaft 11R of the washing-tub 9R and of the rotation of the rail-driving-wheel 23R is

received, and rolling-wheel 19R will rotate on the rail 13R. That is, with rotating around the axis-line L of the washing-tub 9R, the mixing-impeller is revolved around the axis-line L, the rotation of rolling-wheel 19R is decided by the synthesis of two rotating forces: by rotating the rolling-wheel 19R on the rail 13R; by rotating the rolling-wheel 19R rotating the rail 13R with the rotation of the rail-driving-wheel 23R. Thus in the execution example 2, the mixing-impeller 17R will be self-rotated by the rotating force of the rail-driving-wheel 23R together with the rotating force of the washing-tub-rotating-shaft 11R wherein the washing-tub 9R self-rotates. The transmitted force from this rail-driving-wheel 23R to the mixing-impeller 17R corresponds to one example of the force except the self-rotating force if the related invention in the present invention. Thereby, as the execution example 1, thereby, the rotation of rolling-wheel 19R is not decided only by the rotation around the axis-line L of washing drum 9R, the rotation of the mixing-impeller 17R by centering on the axis-line M can be freely decided by changing the rotation of the rail-driving-wheel 23R. For example, when the rail 13R is rotated around the axis-line L of the washing-tub-rotating-shaft 11R to synchronize with the washing-tub 9R, the washing-tub 9R only can be rotated, the mixing-impeller 17R is able not to rotate around the axis-line M of the rotating-shaft 18R. Also when the rail 13R is rotated earlier than the washing-tub 9R around the axis-line L of the washing-tub-rotating-shaft 11R or is rotated oppositely later, the rotation of the washing-tub 9R is same, the rotating direction by centering on the axis-line M of the rotating-shaft 18R of the mixing-impeller 17R can be changed. Also the rotating speed of the mixing-impeller 17R becomes able to be changed easily by changing the rotating speed of the rail 13.

[0314] In addition, when concretely explaining, the washing-tub 9R shall be constantly rotated to arrow A (anti-clockwise when viewing from the upper side) in figure, and the rotation of the mixing-impeller 17R by the rotation of the rail 13R is explained. When the washing-tub 9R only is rotated in the direction of arrow A with stopping the rail 13R, the mixing-impeller 17R will rotate in the direction of arrow B (in view of above, anti-clockwise) as well as execution example 1. When the rail 13R is rotated from this state in the counter direction in arrow A and the speed is increased, the rotating speed in the direction of B of the mixing-impeller 17R (in view of above, anti-clockwise) will increase. On the other hand, the rail 13R is rotated in the direction of arrow A, the rotating speed is increased gradually and closes to the rotating speed of the washing-tub 9R, thus the rotation of the direction of arrow B of the mixing-impeller 17R slows, the self-rotation of the mixing-impeller 17R stops when the rotating speed of the rail 13R is corresponding to the rotating speed of the washing-tub 9R. And, the mixing-impeller 17R will rotate to the counter direction in arrow B when the rail 13R is rotated faster than the rotation of the washing-tub 9R. In this execution example 2 in the above-mentioned, there is an effect similar to execution example 1, and because there are the configuration that the rail 13R is possible to rotate around the axis-line L of the washing-tub-rotating-shaft 11R, the rotating direction and rotating speed of the rotation by centering on the axis-line M of the rotating-shaft 18R of the mixing-impeller 17R can be freely selected regardless of the rotating direction or rotating speed of the rotation by centering on the axis-line L of the washing-tub-rotating-shaft 11R of the washing-tub 9R, the complex various stirs are caused in the washing-tub 9R, and the ability of the cleansing and the rinse

of the washing-laundry can be improved. The one that had the rail-support-driving-part 16R was shown in the above-mentioned embodiment, but the rail-support-driving-part 16R is not equipped, it may be the configuration wherein the rail 13R cannot be moved in the direction of the axis-line L of the washing-tub-rotating-shaft 11R. By synchronizing the rotating direction and the rotating speed by centering on the axis-line L of the washing-tub-rotating-shaft 11R among the rail 13R and the washing-tub 9R, it can become the state that the rolling-wheel 19R is not rolled on the rail 13R as well as time when the rail 13R and rolling-wheel 19R in the above-mentioned execution example was made not to be touched. Thus, the state that stops the rotation by centering on the axis-line M of the rotating-shaft of the mixing-impeller 17R can be achieved more easily at few parts. It may be properly similar configuration in even of the above-mentioned and the following execution example.

Execution Example 3

[0315] The washing machine of the execution example 3 pertaining to the related invention in the present invention is explained as follows. The washing machine of the execution example 3 is basically the same configuration as the washing machine 102R of execution example 2, but the configuration to have made to rotate the rail 13R is different. Therefore, it explains around this difference point. FIG. 15(a) is a block diagram seen from the side of the washing machine 103R pertaining to this execution example 3. In the washing machine 103R pertaining to this execution example as shown in FIG. 15(a), the rail-rotating-shaft 27R that rotates around the axis-line L of the washing-tub-rotating-shaft 11R is equipped on the outer surrounding side of the washing-tub-rotating-shaft 11R, the rail-rotating-shaft 27R is connected to the motor 12R through the rotating-switching-part 30R. By the way, between the washing-tub-rotating-shaft 11R and the rail-rotating-shaft 27R it becomes the watertight so that the water does not leak even if there is the rotating difference. The washing-tub-rotating-shaft 11R and the rail-rotating-shaft 27R rotates by centering on the same axis-line L, is supported to the outer-tub 5R rotatably by the outer-tub-bearing 6R. The rail-rotating-shaft 27R and the rail 13R is connected with by plural rail-rotating-support-parts 28R that expand radially, the rail 13R rotates by centering on the axis-line L of the washing-tub-rotating-shaft 11R when the rail-rotating-shaft 27R rotates by centering on the axis-line L of the washing-tub-rotating-shaft 11R. The joint of the rail 13R and rail-rotating-support-part 28R, and the joint of the rail-rotating-shaft 27R and rail-rotating-support-part 28R is connected in the rail-folding-fulcrum 29R. Because the rail-rotating-support-part 28R is configured rotatably by centering on the rail-folding-fulcrum 29R, the angle of the rail-support-rotating-part 28R can be changed. Therefore, the rail-rotating-support-part 22R and rail 13R will be able to be moved to the direction of the axis-line L of the washing-tub-rotating-shaft 11R by driving the rail-support-driving-part 16R, that the rail 13R and rolling-wheel 19R is touched or separated can be changed as well as execution example 2. By the way, one example of "the driving-power-generating-part that is doubled as a washing-power-generating-part to rotate the washing-tub" of the related invention of the present invention corresponds to the rail-motor 12R, one example of the driving-shaft of the related invention of the present invention corresponds to the rail-rotating-shaft 27R. Also, one example of the transmitting-material and rod-like-material of the

related invention of the present invention corresponds to the rail-rotating-support-part 28R. Also the transmitted force from the rail-rotating-shaft 27R to the mixing-impeller 17R corresponds to one example of “the force except the rotating force wherein the said washing-tub self-rotates” of the related invention of the present invention. In the execution example 3, the mixing-impeller 17R will self-rotate by the rotating force of the rail-rotating-shaft 27R with the rotating force of the washing-tub-rotating-shaft 11R wherein the washing-tub 9R self-rotates. Also in the rotating-switching-part 30R of the execution example, because rotating of the washing-tub-rotating-shaft 11R, rotating the rail-rotating-shaft 27R, or rotating both parties together is switched, the gear and the clutch, etc. can be built in properly, the rotating speed and rotating direction of the washing-tub-rotating-shaft 11R and rail-rotating-shaft 27R can be set variously. The operation of the washing machine 103R of this execution example 3 with the configuration of the rotating-switching-part 30R is explained as follows. A case wherein a simple configuration similar to a conventional washing machine is used as one example of this rotating-switching-part 30R is explained. The conventional washing machine has the mixing-impeller that rotates to the bottom of the washing-tub by centering on a rotating-shaft (inner-shaft) that is the same straight as the rotating-shaft (outer-shaft) of the washing-tub, the rotating-switching-part of such a washing machine is generally a simple configuration that: when cleansing and rinse operates, only the inner-shaft is rotated, only the mixing-impeller of the bottom part is rotated; when dewatering operates, the inner-shaft and outer-shaft is rotated at one, only the washing-tub is rotated. When the rotating-switching-part 30R of an easy configuration similar to this conventional rotating-switching-part is used, when cleansing and rinse operates, when only the washing-tub-rotating-shaft 11R that corresponds to the inner-shaft is rotated by centering on the axis-line L, because the washing-tub 9R rotates around the axis-line L and the rail 13R does not rotate, the rolling-wheel 19R rolls the rail 13R, the mixing-impeller 17R rotates around the axis-line M. Also when dewatering operates, when the rail-rotating-shaft 27R that corresponds to a past outer-shaft and the washing-tub-rotating-shaft 11R that corresponds to the inner-shaft shall be rotated at one by centering on the axis-line L, because the rolling-wheel 19R revolves by centering on the axis-line L together with the washing-tub 9R and does not roll on the rail 13R, the mixing-impeller 17R does not rotate by centering on the axis-line M and only the washing-tub 9R rotates around the axis-line L. Because this execution example 3 was configured as mentioned above, the point in the effect by being able to select respectively freely the rotating direction and rotating speed of the washing-tub 9R and mixing-impeller 17R is inferior to the execution example 2, but the effect similar to the execution example 2 is gained in other points, he rail-motor 26R to rotate the rail 13R like the execution example 2 becomes unnecessary, the configuration can be easier.

[0316] By the way, in inside of the rotating-switching-part 30R, for example, there may be the configuration: the gap is had between the outer surface of the washing-tub-rotating-shaft 11R and the inner surface of the rail-rotating-shaft 27R; the gear that is not revolved by centering on the axis-line L and that is fixed in the gap is equipped; the outer surface of this gear and washing-tub-rotating-shaft 11R and the inner-surface of the rail-rotating-shaft 27R are engaged by the gear structure, the rail-rotating-shaft 27R can be rotated in the opposite direction at the same time with the rotating direction

of the washing-tub-rotating-shaft 11R. Also the configuration can be that: moving this gear to the direction of the axis-line L releases the engagement; thereby even if the washing-tub-rotating-shaft 11R is rotated, the rail-rotating-shaft 27R does not rotate. Also this gear shall be configured revolvable around the axis-line L, the gear, the washing-tub-rotating-shaft 11R, and the rail-rotating-shaft 27R are rotated in the same direction at one with around the axis-line L, thereby without rotating the mixing-impeller 17R around the axis-line M, the washing-tub 9R only can be rotated around the axis-line L and that is, the state can become done as when dewatering operates. And the connection of the washing-tub-rotating-shaft 11R and motor 12R is removed by the clutch mechanism etc. equipped on the way as the rotating-switching-part 30R, the configuration where the rail-rotating-shaft 27R only can be rotated by the motor 12R can be used. When the connection of this washing-tub-rotating-shaft 11R is removed and the control that rotates only the rail-rotating-shaft 27R is done, the washing-tub-rotating-shaft 11R is not fixed, so the washing-tub 9R too rotates by inertia around the axis-line L, but the rail 13R will rotate around the axis-line L, the rolling-wheel 19R rotates on the rail 13R, the mixing-impeller 17R only rotates mainly around the axis-line M. Thus, the state that the mixing-impeller 17R only rotates mainly by using an appropriate composition to the rotating-switching-part 30R becomes possible, too. Also in above-mentioned execution example 3 it was shown the configuration that equips the rotating-switching-part 30R wherein rotating the washing-tub-rotating-shaft 11R of the inner-shaft side in a double structures; rotating the rail-rotating-shaft 27R of the outer-shaft side; or rotating both at same time is switched, but it is also possible to assume the configuration where the washing-tub 9R and mixing-impeller 17R can be rotated individually and freely as well as the execution example 2. FIG. 15(b) is the one concrete example, the washing-tub-rotating-shaft 11R is able to rotate by the motor 12R connected directly, on the other hand the rail-driving-wheel 23aR that has the gear structure in contact-part V and that engages the outer surface of the rotating-shaft 27aR is equipped, the rail-driving-wheel 23aR is rotated by the rail-motor 26aR through the rail-driving-shaft 24aR, thereby the rail-rotating-shaft 27R becomes rotatable. By the way, the motor 12R and rail-motor 26aR are fixed to the outer-tub 5R and case 2R. In doing like this, the rail-rotating-shaft 27R and the washing-tub-rotating-shaft 11R can rotate freely in the individual rotating speed and the rotating direction around the axis-line L, the rotating direction and rotating speed becomes possible to control the washing-tub 9R and mixing-impeller 17R individually freely, the effect similar to embodiment 2 becomes gained. By the way, in the configuration of this FIG. 15(b), the rail-motor 26aR corresponds to one example of the driving-power-generating-part of the related invention of the present invention. The configuration equipped the motor 12R and rail-motor 26aR in FIG. 15(b) corresponds to one example of the configuration equipped separately the washing-tub-power-generating-part and driving-power-generating-part of the related invention of the present invention is equipped to the configuration of FIG. 15(a) wherein the motor 12R that is one example of “the driving-power-generating-part that is doubled as the washing-power-generating-part to rotate the washing-tub” of the related invention of the present invention is equipped. Also FIG. 15(b) is the configuration wherein the rail-rotating-shaft 27R is rotated by engaging the rail-driving-wheel 23aR with the gear structure, but it

may be the configuration wherein the transmitting belt connects between the rail-driving-wheel **23aR** and rail-rotating-shaft **27R**. Thus, degree of freedom at the position where the rail-motor **26aR** is set up is high. Also in the execution example 3 it is configured so that the rail **13R** and rail-rotating-hold-part **22R** is not alienated by engaging by the rail-rotating-interlock-part **21R** as well as the execution example 2, but the spring is equipped in the rail-rotating-support-part **28R**, it is configured to press between the rail **13R** and rail-rotating-hold-part **22R** by the pressure of the spring, when both are prevented from alienating, the configuration may not be that the rail **13R** with rail-rotating-hold-part **22R** is engaged by the rail-rotating-interlock-part **21R**. Also, in the above execution example 3, the rail-support-driving-part **16R** that is the 1st-separated-part was equipped, but the washing-tub-rotating-shaft **11R** and rail-rotating-shaft **27R** are rotated in the same direction together by centering on the axis-line **L** by the control of the rotating speed and the rotating-direction of the rotating-switching-part **30R** and rail-motor **26aR** in FIG. **15(b)**, thereby the operation that rotates only the washing-tub **9R** around the axis-line **L** without rotating the mixing-impeller **17R** around the axis-line **M** is possible, the rail-support-driving-part **16R** that is one example of the 1st-separated-part of the related invention of the present invention may not be equipped. At this time, in addition, without the rail-rotating-hold-part **22R**, the rail-support-part **14R**, rail-elastic-part **15R**, or rail-rotating-interlock-part **21R**, etc., the spring is equipped in the rail-rotating-support-part **28R**, the rail **13R** and rolling-wheel **19R** may be touched always by the pressure of the spring, the configuration becomes further more easier.

Execution Example 4

[0317] The washing machine of execution example 4 pertained to the related invention to the present invention is explained as follows. The a basic configuration of the washing machine of this execution example 4 is the same as the washing machine **103R** of execution example 3, but the configuration in which the mixing-impeller **17R** is rotated is different. Therefore the point around this difference is explained. FIG. **16** is a block diagram seen from the side of the washing machine **104R** pertained to execution example 4. In the above washing machine of execution example 1 to 3, the rolling-wheel **19R** is rolled touching the rail **13R**, the mixing-impeller **17R** was rotated around the axis-line **M** of the rotating-shaft **18R**, but in the washing machine **104R** pertained to the execution example 4, the mixing-impeller **17R** is configured rotatably without using the rail **13R**. In the washing machine **104R** pertained to the execution example 4, the driving-shaft **44R** that rotates around the axis-line **L** of the washing-tub-rotating-shaft **11R** is installed on the outer surrounding side of the washing-tub-rotating-shaft **11R**, this driving-shaft **44R** is connected with the motor **12R** through the rotating-switching-part **30R**. The double structure wherein the washing-tub-rotating-shaft **11R** and driving-shaft **44R** rotates around the axis-line **L** of the same washing-tub-rotating-shaft **11R** is configured, the driving-shaft **44R** is supported rotatably with the outer-tub-bearing **6R** that is fixed to the outer-tub **5R**. In the rotating-switching-part **30R** the gear and the clutch, etc. is built in so as to change the rotation of the washing-tub-rotating-shaft **11R**, the rotation of the driving-shaft **44R**, or the rotation of the washing-tub-rotating-shaft **11R** and driving-shaft **44R** at the same time. The washing-tub-rotating-shaft **11R** and driving-shaft **44R** of this

execution example can be rotated by the rotating-switching-part **30R** with various rotating patterns similar to the washing-tub-rotating-shaft **11R** and rail-rotating-shaft **27R** of the execution example 3. In this execution example, the rolling-wheel **49R** that is one example of the rolling-part of the related invention to the present invention is formed like the curved surface that made the center of the axis-line **M** of the rotating-shaft **18R** a concave portion, the outer surrounding part touches directly the driving-shaft **44R**, the driving-shaft **44R** rotates around the axis-line of the washing-tub-rotating-shaft **11R**, then the rolling-wheel **49R** rolls on the driving-shaft **44R**, the mixing-impeller **17R** rotates around the axis-line **M** of the rotating-shaft **18R**. By the way one example of “the driving-power-generating-part that is doubled as the washing-power-generating-part to rotate the washing-tub” of the related invention of the present invention corresponds to the motor **12R** of the execution example, one example of the driving-shaft that is doubled as the contact-material that is equipped to the outside of the washing-tub-self-rotating-shaft of the related invention of the present invention corresponds to the driving-shaft **44R** of the execution example.

[0318] More concretely, the movement of the washing machine **104R** of this execution example 4 is explained with the configuration of the rotating-switching-part **30R**. When the past simple configuration was used as the rotating-switching-part **30R** as well as execution example 3, the mixing-impeller **17R** is able not to be self-rotated by centering on the axis-line **M** of the rotating-shaft **18R** by rotating the driving-shaft **44R** synchronizing with the washing-tub-rotating-shaft **11R** when becoming a high-speed rotation at dewatering operation etc. Also, when only washing drum **9R** only is rotated to the direction of the arrow **A** (it is anti-clockwise in the upper side) with driving-shaft **44R** stopped, the mixing-impeller **17R** will rotate to the direction of the arrow **B** (in view of above, it is anti-clockwise) as well as the execution example 1. By the way, the force transmitted from the driving-shaft **44** to the mixing-impeller **17R** corresponds to one example of “the force except the rotating force wherein the washing-tub self-rotates” of the related invention of the present invention. Thus, the mixing-impeller **17R** will self-rotate by the rotating force of the driving-shaft **44R** with the rotating force of the washing-tub-rotating-shaft **11R** where the washing-tub **9R** self-rotates in this embodiment 4. In the washing machine **104R** of this execution example 4 as explained above, by the simple structure: that the driving-shaft **44R** rotating around the axis-line **L** of the washing-tub-rotating-shaft **11R** is equipped to the outer surrounding side of the washing-tub-rotating-shaft **11R**; that the outer surrounding part of the rolling-wheel **19R** rolls on the driving-shaft **44R** with touching directly the driving-shaft **44R**, the configuration that the mixing-impeller **17R** can be rotated by centering on the axis-line **M** of the rotating-shaft **18R** that is the mixing-impeller-rotating-shaft can be achieved. Because the mixing-impeller **17R** that rotates continuously around the axis-line **M** of the rotating-shaft **18R** different from the axis-line **L** of the washing-tub-rotating-shaft **11R** is stirred in the washing-tub **9R**, a complex stir not uniform can be positively caused in the washing-tub-**9R**, the ability of cleansing and the rinse of the washing-laundry can be improved. Moreover, to cause a more complex stir in the washing-tub **9R** becomes easy because two stir wings **17R** are stirred in the washing-tub **9R**. Moreover, because two mixing-impellers **17R** stir in the washing-tub **9R**, it becomes easy for a more complex stir to cause in washing drum **9R**. By the way, for instance, the gap

between the external surface of the washing-tub-rotating-shaft 11R and the inside surface of the driving-shaft 44R is equipped in inside of the rotating-switching-part 30R, the gear that was fixed in the gap is installed without revolving by centering on the axis-line L, the configuration may be had so as to engage this gear and external surface of the washing-tub-rotating-shaft 11R and internal surface of the driving-shaft 44R by the gear structure. In such a configuration, the washing-tub-rotating-shaft 11R is rotated, when the washing-tub 9R is rotated in the direction of arrow A (It is anti-clockwise in the upper side), the driving-shaft 44R can be rotated in the opposite direction with the rotating direction of the washing-tub-rotating-shaft 11R, the mixing-impeller 17R rotates in the direction of arrow B (In view of above, it is anti-clockwise) at higher speed. Moreover, when the engagement is released by moving this gear in the direction of the axis-line L, even if the washing-tub-rotating-shaft 11R is rotated, the driving-shaft 44R can not rotate. And the configuration that this gear can be revolved around the axis-line L shall be gained, the gear, the washing-tub-rotating-shaft 11R, and the driving-shaft 44R are rotated in the same direction at one around the axis-line L. then, the state that the washing-tub 9R only is rotated around the axis-line L without rotating the mixing-impeller 17R around the axis-line M can be gained, that is, it can become the state in dewatering operation. And the rotating-switching-part 30R can use the configuration that the connection of the washing-tub-rotating-shaft 11R and motor 12R is removed with the clutch mechanism etc. installed on the way and that the driving-shaft 44R only can be rotated by the motor 12R. Thus, the connection with the washing-tub-rotating-shaft 11R is removed, the control that rotates only the rail-rotating-shaft 27R. is done, then the washing-tub-rotation-shaft 11R is not fixed, so the washing-tub 9R too is rotated by inertia around the axis-line L, but the rolling-wheel 19R is rolled touching to the external surrounding part of the driving-shaft 44R, the mixing-impeller 17R only is rotated mainly by centering on the axis-line M. Thus, the state that the mixing-impeller 17R only is rotated chiefly by using an appropriate configuration to the rotating-switching-part 30R becomes possible, too. It composes as shown in FIG. 15(b) in the transformed example of the execution example 3, the driving-shaft 44R (corresponds to the rail-rotating-shaft 27R of FIG. 15(b)) and washing-tub-rotating-shaft 11R may be to able to rotate individually the rotating speed and the rotating direction. In this case, because the driving-shaft 44R can be rotated around the axis-line L of the washing-tub-rotating-shaft 11R besides the washing-tub-rotating-shaft 11R, the rotating speed and rotating direction in the rotation by centering on the axis-line M of the rotating-shaft 18R of the mixing-impeller 17R can be freely selected regardless of the rotation by centering on the axis-line L of the washing-tub-rotating-shaft 11R of the washing-tub 9R, therefore, the complex stirs are variously caused in the washing-tub 9R, the ability of the cleansing and rinse of the washing-laundry can be improved. By the way, the rolling-wheel 19R is touched directly to the driving-shaft 44R and the mixing-impeller 17R is rotated, but the discoid mixing-impeller-driving-body is installed in the driving-shaft as shown in the following execution example 10, the configuration that rotates the mixing-impeller for the rolling-wheel 49R to roll touching the external surrounding part of this mixing-impeller-driving-body may be equipped. Also a part of the rotating-shaft 18R is doubled as the rolling-part, the configuration that the mixing-impeller-driving-body touches directly with the

rotating-shaft 18R may be equipped. And thus, without raising the rotating speed of the driving-shaft 44R too much, it is easy to raise the rotating speed of the mixing-impeller 17R.

Execution Example 5

[0319] The washing machine of execution example 5 pertained to the related invention to the present invention is explained as follows. The basic configuration of the washing machine of this execution example 5 is the same as the washing machine 103R of execution example 3, but the configuration in which the mixing-impeller 17R is rotated is different. Therefore the point around this difference is explained. FIG. 17(a) is a block diagram seen from the side of the washing machine 105R pertained to this execution example 5. The washing machine 105R pertained to this execution example 5 will rotate the mixing-impeller 17R without using the rail 13R in another way unlike the washing machine 103R of the execution example 3. In the washing machine 105R pertained to this execution example 5, the mixing-impeller-driving-shaft 37R (it is the rail-driving-shaft 27R in the execution example 3) that is rotated around the axis-line L of the washing-tub-rotating-shaft 11R is installed on the external surrounding side of the washing-tub-rotating-shaft 11R as well as the execution example 3, The mixing-impeller-driving-shaft 37R is connected with the motor 12R through the rotating-switching-part 30R. The washing-tub-rotating-shaft 11R and mixing-impeller-driving-shaft 37R is rotated around the same axis-line L of the washing-tub-rotating-shaft 11R and is supported rotatably by the outer-tub-bearing 6R that was fixed to the outer-tub 5R. The rotating-switching-part includes the gear and clutch etc so as to switch which rotating the washing-tub-rotating-shaft 11R, rotating the mixing-impeller-driving-shaft 37R, or rotating both of the washing-tub-rotating-shaft 11R and the mixing-impeller-driving-shaft 37R. The washing-tub-rotating-shaft 11R and mixing-impeller-driving-shaft 37R of this execution example can be rotated by the rotating-switching-part 30R by the various rotation patterns similar to the washing-tub-rotating-shaft 11R and rail-rotating-shaft 27R in the execution example 3. The rotating-wheel 40R that is rotated around the axis-line M of the rotating-shaft 18R together with the mixing-impeller 17R and rotating-shaft 18R has been equipped to outside of the washing-tub 9R of the rotating-shaft 18R instead of the rolling-wheel 19R explained in each execution example 1 mentioned above. The mixing-impeller-driving-shaft 37R and plural rotating-wheels 40R shift the position to the direction of the axis-line L of the mixing-impeller-driving-shaft 37R in each rotating-wheels 40R, and each rotating-wheels 40R are connected by the transmitting-belt 38R, the rotation of the mixing-impeller-driving-shaft 37R will be transmitted to the rotating-wheel 40R. The transmitting-belt 38R can use the synthetic rubber and the one in the fibrous structure made of the resin etc. Also the ditch and partition is equipped in the engaged part in transmitting-belt 38R of the rotating-wheel 40R and mixing-impeller-driving-shaft 37R, the transmitting-belt 38R does not shift or come off to each axis direction. [0320] In FIG. 17, the rotating-wheel 40R and mixing-impeller-driving-shaft 37R are connected directly by the transmitting-belt 38R, but there is the case that becomes easy to shift axially by adding the unreasonable power to the transmitting-belt 38R by connecting directly because two axes are not arranged in parallel. In this case, the pulleys etc. may be equipped on the external wall of the washing-tub 9R between the rotating-wheel 40R and mixing-impeller-driv-

ing-shaft 37R to ease the power to add to the transmitting-belt 38R. The rotating-shaft 40R is connected with this pulleys by the belt, the load that adds to the transmitting-belt can be decreased by equipping the configuration in which the mixing-impeller-driving-shaft 37R is connected with pulleys by the belt. This pulleys too are forming the ditch, the swerving of the belt to axial direction is restrained. By the way, one example of the rotating-part in the related invention to the present invention corresponds to the rotating-wheel 40R in this execution example, one example of the driving-part in the related invention to the present invention corresponds to the mixing-impeller-driving-shaft 37R in this execution example. And one example of “the driving-power-generating-part that is doubled as the washing-power-generating-part to rotate the washing-tub” in the related invention to the present invention corresponds to the motor 12R in this execution example, one example of the belt-like-material in the related invention to the present invention corresponds to the transmitting-belt 38R in this execution example.

[0321] Because it is configured as mentioned above, the mixing-impeller-driving-shaft 37R is rotated at the rotating speed and rotating direction different from the washing-tub-rotating-shaft 11R, then the transmitting-belt 38R rotates, thereby the rotating-wheel 40R rotates, the mixing-impeller 17R rotates around the axis-line M of the rotating-shaft 18R, the water and washing-laundry in the washing-tub 9R are stirred. when dewatering operates becoming the high-speed rotation as well as the execution example 3, the mixing-impeller-driving-shaft 37R and washing-tub-rotating-shaft 11R are rotated synchronizing at one with, the mixing-impeller-17R may be made not to rotate by centering on the axis-line of the rotating-shaft 18R. And concretely the rotating direction of the washing-tub 9R, the washing-tub-rotating-shaft 11R, the mixing-impeller 17R, and transmitting-belt 38R rotated are explained with the configuration of the rotating-switching-part 30R. FIG. 17(b) is a part necessary imitative chart seen from the upper side to explain the rotation of washing drum rotation axis 11R, stir wing drive axis 37R, turning wheel 40R, and transmission belt 38R. FIG. 17(b) is a schematic diagram seen from the upper side to explain a rotating direction of the washing-tub-shaft 11R, mixing-impeller-driving-shaft 37R, rotating-wheel 40R and transmitting-belt 38R. When the simple configuration used with the conventional washing machine so as to be explained by the execution example 3 as the rotating-switching-part 30R of this execution example was used, the connection of the mixing-impeller-driving-shaft 37R is separated from the motor 12R at cleansing and rinse operation, and the washing-tub-rotating-shaft 11R only rotates. Thus, with the state that the mixing-impeller-driving-shaft 37R was stopped, the rotating-wheel 40R will be revolved by centering on the axis-line L to the direction of arrow A when the washing-tub-rotating-shaft 11R is rotated to the direction of arrow A at the fixed speed. In this time, because the mixing-impeller-driving-shaft 37R stops and does not slip between the transmitting-belts 38R, the power may work so as to wind up the transmitting-belts 38R to the surroundings of the mixing-impeller-driving-shaft 37R, thereby 38a side of the transmitting-belt 38R will be pulled to the mixing-impeller-driving-shaft 37R. On the other hand, the tension will be loosened by 38b side of the transmitting-belt 38R. Therefore, the transmitting-belt 38R will be rotated to the direction of arrow C, the rotating-wheel 40R will be rotated to the direction of arrow C, too. That is, the rotating-wheel 40R will be rotated itself to the direction (the

direction of arrow C) by centering on the axis-line M that is opposite to the revolving direction (arrow A) by centering on the axis-line L. On the other hand, when dewatering operates, both of the washing-tub-rotating-shaft 11R and mixing-impeller-driving-shaft 37R are connected to the motor 12R and are rotated together by centering on the axis-line L, so the mixing-impeller 17R does not be rotated around the axis-line M, the washing-tub 9R only is rotated around the axis-line L. Thus, in this execution example 5, the mixing-impeller 17R will be self-rotated by the rotating force of the mixing-impeller-driving-shaft 37R with the rotating force of the washing-tub-rotating-shaft 11R where the washing-tub 9R is self-rotated.

[0322] In this execution example 5 as explained above, it is equipped the configuration that the mixing-impeller-driving-shaft 37R that is rotated around the axis-line L of the washing-tub-rotating-shaft 11R is equipped on the external surrounding side of the washing-tub-rotating-shaft 11R and that the mixing-impeller-driving-shaft 37R is connected with the transmitting-belt 38R and rotates the rotating-wheel 40R, it can be achieved to rotate the mixing-impeller 17R around the axis-line M of the rotating-shaft 18R different from the axis-line L of the washing-tub-rotating-shaft 11R stirs inside of the washing-tub 9R, the complex stir not uniform can be positively caused inside of the washing-tub 9R, The ability of cleansing and rinse of the washing-laundry can be improved. And it becomes easy to cause a more complex stir in inside of the washing-tub 9R because two the mixing-impellers 17R stir in inside of the washing-tub 9R. By the way, the rotating-switching-part 30R can use the configuration wherein: the connection of the washing-tub-rotating-shaft 11R and motor 12R is removed with the clutch mechanism etc installed on the way, and the mixing-impeller-driving-shaft 37R only can be rotated by the motor 12R. Thus, when the connection of the washing-tub-rotating-shaft 11R is removed and the control that rotates the mixing-impeller-driving-shaft 37R only is done, the transmitting-belt 38R is rotated to the direction C by rotating the mixing-impeller-driving-shaft 37R to the direction of arrow C. the rotating-wheel 40R too will be rotated to the direction of arrow C, In this time, because the washing-tub-rotating-shaft 11R is not fixed, the washing-tub 9R is rotated somewhat by inertia around the axis-line L, too, but there is a difference of the rotating speed between the washing-tub-rotating-shaft 11R and mixing-impeller-driving-shaft 37R, thereby the mixing-impeller 17R is rotated mainly around the axis-line M. Also in the rotating-switching-part 30R, it may equip the configuration that: for instance, the gap is installed between the external surface of the washing-tub-rotating-shaft 11R and the inside surface of the mixing-impeller-driving-shaft 37R; the gear that is fixed to the gap without revolving around the axis-line L is equipped; this gear and the external surface of the washing-tub-rotating-shaft 11R and the internal surface of the mixing-impeller-driving-shaft 37R are engaged by the gear structure. In such configuration, when the washing-tub-rotating-shaft 11R is rotated, the washing-tub-rotating-shaft 11R and the mixing-impeller-driving-shaft 37R are rotated to the opposite direction. For instance, the washing-tub-rotating-shaft 11R is rotated to the direction of arrow A, the mixing-impeller-driving-shaft 37R is rotated to the direction of arrow C, then the rotation of the rotating-wheel 40R will be quick more than the time when the mixing-impeller-driving-shaft 37R is not

rotated, the rotation of the mixing-impeller 17R to the direction of arrow C will increase. Also the configuration that this gear can revolve around the axis-line L is equipped, by rotating the gear and washing-tub-rotating-shaft 11R and mixing-impeller-driving-shaft 37R to the same direction together around the axis-line L, the state that rotate only the washing-tub 9R around the axis-line L without rotating the mixing-impeller 17R around the axis-line M can be gained, the state in so-called dewatering operation can be gained. Also it composes as shown in FIG. 15(b) in the transformed example of execution example 3, the mixing-impeller-driving-shaft 37R (corresponds to the rail-rotating-shaft 27R of FIG. 15(b)) and washing-tub-rotating-shaft 11R may be able to be rotated individually at the rotating speed and rotating direction. Thus, because the mixing-impeller-driving-shaft 37R is rotated around the axis-line L of the washing-tub-rotating-shaft 11R besides the washing-tub-rotating-shaft 11R, the rotating direction and rotating speed of rotating by centering on the axis-line M of the rotating-shaft 18R of the mixing-impeller 17R can be freely selected regardless of rotating by centering on the axis-line of the washing-tub-rotating-shaft 11R of the washing-tub 9R, the complex stirs variously can be caused in the inside of the washing-tub 9R, the ability of cleansing and rinse of the washing-laundry can be improved. In above-mentioned execution example 5, one example of the belt-like-material of the related invention to the present is the transmitting-belt 38R of the rubber and made of the resin, but it is acceptable also in the chain etc. made of the metal and resin though the noise is larger. In that case, the ruggedness is equipped in the lying part of the chain that is the external surrounding part of the rotating-wheel 40R and mixing-impeller-driving-shaft 37R and that is the transmitting body, the open part of the chain is engaged, then without removing and without running idle, the rotating transmission from the mixing-impeller-driving-shaft 37R to the rotating-wheel 40R becomes more certain.

Execution Example 6

[0323] The washing machine of execution example 6 pertained to the related invention to the present invention is explained as follows. The basic configuration of the washing machine of this execution example 6 is the same as the washing machine of the execution example 1, but the point in which two rails are equipped is different. Therefore the point around this difference is explained. FIG. 18 is a block diagram to see from side of the washing machine 106R pertained to the execution example 6. The washing machine 106R pertained to the execution example 6, in addition to washing machine 101R of the execution example 1, two rails (the 1st-rail 13aR and the 2nd-rail 13bR) wherein one rolling-wheel is rolled shall be equipped. It equips with the 1st-rail 13aR and the 2nd-rail 13bR that: is formed to the toroidal by centering on the axis-line L of the washing-tub-rotating-shaft 11R in the outside of the washing-tub 9R and the inside of the outer-tub 5R; is supported to be able to roll the rolling-wheel 19R that is one example of the rolling-part of the related invention to the present invention. By the way, each of the 1st-rail 13aR and the 2nd-rail 13bR corresponds to one example of the contact-material of the related invention to the present invention, one example of the 1st-rail-material of the related invention to the present invention corresponds to the 1st-rail 13aR of this execution example, one example of the 2nd-rail-material of the related invention to the present invention corresponds to the 2nd-rail 13bR of this execution

example. The lower side of rolling-wheel 19R is rolled touching the 1st-rail 13aR, the upper side of rolling-wheel 19R is rolled touching the 2nd-rail 13bR. The rolling-wheel 19R is rolled on either of the 1st-rail 13aR and the 2nd-rail 13bR, thereby the mixing-impeller 17R is rotated around the rotating-shaft 18R. The 1st-rail 13aR is supported to the 1st-rail-support-part 14aR through the 1st-rail-elastic-part 15aR, this 1st-rail-support-part 14aR is supported to be able to move to the axis direction (it is a vertical direction in this execution example) of the washing-tub-rotating-shaft 11R in the 1st-rail-support-driving-part 16aR that was fixed to the outer-tub 5R. This 1st-rail-elastic-part 15aR, 1st-rail-support-part 14aR, and 1st-rail-support-driving-part 16aR is arranged in plural places to the surrounding direction by centering on the axis-line of the washing-tub-rotating-shaft 11R at intervals. This 1st-rail-support-driving-part 16aR corresponds to one example of the 1st-separated-part in the related invention to the present invention. Also the 2nd-rail 13bR is supported to the 2nd-rail-support-part 14bR through the 2nd-rail-elastic-part 15bR, this 2nd-rail-support-part 14bR is supported to be able to move the axis direction of the washing-tub-rotating-shaft 11R (it is a vertical direction in this execution example) in the 2nd-rail-support-driving-part 16bR that was fixed to the outer-tub 5R. This 2nd-rail-elastic-part 15bR, 2nd-rail-support-part 14bR, and 2nd-rail-support-driving-part 16bR is arranged in plural places to the surrounding direction by centering on the axis-line of the washing-tub-rotating-shaft 11R at intervals. This 2nd-rail-support-driving-part 16bR corresponds to one example of the 2nd-separated-part in the related invention to the present invention. By the way, the 1st-rail-support-driving-part 16aR and 2nd-rail-support-driving-part 16bR may be fixed to the case 2R respectively. The excessive force added to the 1st-rail 13aR from the rolling-wheel 19R along with the rotating shake of the washing-tub 9R by centering on the axis-line L of the washing-tub-rotating-shaft 11R can be decreased by the 1st-rail-elastic-part 15aR. By the way, the number of the 1st-rail-elastic-part 15aR, 1st-rail-support-part 14aR and 1st-rail-support-driving-parts 16aR may be any number, but the effect of decreasing the rotating shake becomes higher when it is a lot of, and the rolling-wheel 19R and 1st-rail 13aR is more certainly touched. The excessive force added to the 2nd-rail 13bR from the rolling-wheel 19R along with the rotating shake of the washing-tub 9R by centering on the axis-line of the washing-tub-rotating-shaft 11R can be decreased by the 2nd-rail-elastic-part 15bR. The number of the 2nd-rail-elastic-part 15bR, 2nd-rail-support-part 14bR and 2nd-rail-support-driving-parts 16bR may be any number, but the effect of decreasing the rotating shake becomes higher when it is a lot of, and the rolling-wheel 19R and 2nd-rail 13bR is more certainly touched. Also on the surface of action between the 1st-rail 13aR or the 2nd-rail 13bR and the rolling-wheel 19R, both have the engaging structure such as gears, or the material with a large friction of rubber etc is equipped, thereby it becomes difficult to generate the idling etc., the rolling becomes more certain. The 1st-rail-support-part 14aR is put in and out to the axis direction (it is a vertical direction in this execution example) of the washing-tub-rotating-shaft 11R by driving the 1st-rail-support-driving-part 16aR, it comes in contact with the rolling-wheel 19R when the 1st-rail 13aR is pushed up, if the 1st-rail 13aR is pulled down, it becomes noncontact with the rolling-wheel 19R. Also the 2nd-rail-support-part 14bR is put in and out to the axis direction (it is a vertical direction in this execution example) of the washing-tub-ro-

tating-shaft 11R by driving the 2nd-rail-support-driving-part 16bR, it comes in contact with the rolling-wheel 19R when the 2nd-rail 13bR is pushed up, if the 2nd-rail 13bR is pulled down, it becomes noncontact with the rolling-wheel 19R. The rolling-wheel 19R are made to be touched to either of the 1st-rail 13aR or the 2nd-rail 13bR, when the washing-tub 9R is rotated around the axis-line L of the washing-tub-rotating-shaft 11R, the mixing-impeller 17R is rotated around the axis-line M of the rotating-shaft 18R, then the rotating direction of rolling-wheel 19R is reversed with which of the 1st-rail 13aR or the 2nd-rail 13bR it comes in contact. For instance, when the washing-tub-rotating-shaft 11R was rotated to the direction of arrow A (in view of above, it is anti-clockwise), and when the 1st-rail 13aR is touched to the rolling-wheel 19R without touching the 2nd-rail 13bR, the rolling-wheel 19R will be rotated to the direction of arrow B (in view of above, it is anti-clockwise). By the way, when dewatering that rotates the washing-tub 9R at high-speed operates, it is preferable for the rolling-wheel 19R not to touch both the 1st-rail 13aR and the 2nd-rail 13bR. The reason is because the rotation of the mixing-impeller 17R is especially unnecessary when dewatering operates, and it is because the rotating loss and noise of contact with the rolling-wheel 19R, the 1st-rail 13aR or the 2nd-rail 13bR can be restrained. Because the execution example 6 was as mentioned above configured, the effect similar to the execution example 1 can be gained, and the corresponding rail-support-driving-part 16 (the 1st-rail-support-driving-part 16aR and the 2nd-rail-support-driving-part 16bR) is driven, the rail (the 1st-rail 13aR and the 2nd-rail 13bR) where the rolling-wheel 19R touches is switched, thereby even if the rotating direction by centering on the axis-line of the washing-tub-rotating-shaft 11R of the washing-tub 9R is not changed, the rotating direction where the axis-line M of the rotating-shaft 18R of the mixing-impeller 17R can be changed. Also because the external diameter is different from the 1st-rail 13aR and the 2nd-rail 13bR, when the rail 13 where the rolling-wheel 19R touches changes, even if the speed that rotates around the axis-line L of the washing-tub-rotating-shaft 11R of the washing-tub 9R is not changed, the rotating speed also can be easily changed together with the direction that rotates the mixing-impeller 17R.

Execution Example 7

[0324] The washing machine of execution example 7 pertained to the related invention to the present invention is explained as follows. The basic configuration of the washing machine of this execution example 7 is the same as the washing machine of the execution example 6, but the shape of the washing-tub 9R is different. Therefore the point around this difference is explained. FIG. 19 is a block diagram to see from side of the washing machine 107R of the execution example 7. In the above-mentioned each execution example, the bottom side of the washing-tub 9R is formed with the curved surface shape of the hemisphere face etc., the one wherein two mixing-impellers 17R that is rotated around the axis-line of the rotating-shaft 18R that is inclined from the axis line of the washing-tub-rotating-shaft 11R were equipped in inside of the curved surface shape was shown, but In the washing machine 107R pertained to this execution example 7, as well as the general vertical washing machine, one bottom-mixing-impeller 31R that is rotated around the same axis-line L as the washing-tub-rotating-shaft 11R is equipped in the bottom of the washing-tub 79R like a cylinder, and two mixing-impel-

lers 17R (the 1st-mixing-impeller 17aR and the 2nd-mixing-impeller 17bR) were equipped in the mixing-impeller-attachment 39R where a part of a cylinder side of the washing-tub 79R was made a flat surface. In the washing machine 107R pertained to this execution example 7, the washing-tub-rotating-shaft 11R is fixed to the bottom of the washing-tub 79R like a cylinder, also the bottom-mixing-impeller-rotating-shaft 32R that is rotated around the axis-line L of the washing-tub-rotating-shaft 11R is equipped in the same axis inside of the washing-tub-rotating-shaft 11R, the bottom-mixing-impeller 31R that is rotated to the bottom of the washing-tub 79R like a cylinder around the same axis line L as the washing-tub-rotating-shaft 11R has been equipped. The washing-tub-rotating-shaft 11R and bottom-mixing-impeller-rotating-shaft 32R penetrate through the outer-tub 5R, and is connected with the motor 12R through the rotating-switching-part 30R. The washing-tub-rotating-shaft 11R and bottom-mixing-impeller-rotating-shaft 32R is rotated by centering on the same axis-line L, and is supported rotatably by the outer-tub-bearing 6R that is fixed to the outer-tub 5R. The rotating-switching-part 30R is built in the gear and clutch etc to switch whether to rotate the washing-tub-rotating-shaft 11R or to rotate the bottom-mixing-impeller-rotating-shaft 32R. The 1st-rolling-wheel 19aR that is rotated together with the 1st-rotating-shaft 18aR is installed in the outside penetrated through the washing-tub 79R in the 1st-rotating-shaft 18aR that is the rotating-shaft of the 1st-mixing-impeller 17aR, The 1st-rotating-shaft 18aR is supported rotatably by the 1st-washing-tub-bearing 20aR that was fixed to the mixing-impeller-attachment 39R where a part of the cylinder side of the washing-tub 79R was made the flat surface. The 1st-mixing-impeller 17aR, 1st-rotating-shaft 18aR, and 1st-rolling-wheel 19aR and 2nd-mixing-impeller 17bR, 2nd-rotating-shaft 18bR, and 2nd-rolling-wheel 19bR is equipped at the position opposed the axis-line of the washing-tub-rotating-shaft 11R in view of the axis direction of the washing-tub-rotating-shaft 11R, and the axis-line of the 1st-rotating-shaft 18aR and the 2nd-rotating-shaft 18bR is equipped to shift to the axis direction of the washing-tub-rotating-shaft 11R. The purpose where the mixing-impeller-attachment 39R is the shape of the flat surface is not to put the washing-laundry between the big gap that is caused between the mixing-impeller 17R and washing-tub 79R. These 1st-rolling-wheels 19aR and the 2nd-rolling-wheels 19bR correspond to one example of the rolling-part of the related invention to the present invention.

[0325] By the way, the mixing-impeller-attachment 39R that is not the shape of the flat surface, that projects only the part of the 1st-rotating-shaft 18aR and 2nd-rotating-shaft 18bR that is one example of the mixing-impeller-rotating-shaft of the related invention to the present invention to the inside of the washing-tub 79R, and that is dented toward the external surrounding part of the rotation of the 1st-mixing-impeller 17aR and 2nd-mixing-impeller 17bR, is formed, the 1st-mixing-impeller 17aR and 2nd-mixing-impeller 17bR is formed along the dented shape so as not to cause the gap between the mixing-impeller-attachment 39R, then the capacity of the inside of the washing-tub 79R is gained larger than the shape of the flat surface that is formed. The 1st-rail 16aR where the 1st-rolling-wheel 19aR is rolled and the 2nd-rail 16bR where the 2nd-rolling-wheel 19bR is rolled are formed in the toroidal by centering on the axis-line L of the washing-tub-rotating-shaft 11R, and are equipped in the outside of the cylinder of the washing-tub 79R and in the inside

of the outer-tub 5R. The 1st-rolling-wheel 19aR is rolled when the lower side touches the 1st-rail 13aR, the 2nd-rolling-wheel 19bR is rolled when the lower side touches the 2nd-rail 13bR. The 1st-stir-mixing-impeller 17aR is rotated by centering on the axis-line P of the 1st-rotating-shaft 18aR when the 1st-rolling-wheel 19aR is rolled on the 1st-rail 13aR, the 2nd-stir-mixing-impeller 17bR is rotated by centering on the axis-line Q of the 2nd-rotating-shaft 18bR when the 2nd-rolling-wheel 19bR is rolled on the 2nd-rail 13bR. By the way, one example of the contact-material of the related invention to the present invention corresponds to each of the 1st-rail 13aR and the 2nd-rail 13bR of the execution example. Also one example of the rolling-part of the related invention to the present invention corresponds to each of the 1st-rolling-wheel 19aR and the 2nd-rolling-wheel 19bR of the execution example. The 1st-rail 13aR is supported to the 1st-rail-support-part 14aR through the 1st-rail-elastic-part 15aR, this 1st-rail-support-part 14aR can be supported to be able to move to the axis direction of the washing-tub-rotating-shaft 11R (it is a vertical direction in this execution example) in the 1st-rail-support-driving-part 16aR that was fixed to the outer-tub 5R. This 1st-rail-elastic-part 15aR, the 1st-rail-support-part 14aR, and the 1st-rail-support-driving-part 16aR is arranged by centering on the axis-line of the washing-tub-rotating-shaft 11R to the surrounding direction in the plural places at intervals. By the way, the 1st-rail-support-driving-part 16aR in this execution example corresponds to one example of the 1st-separated-part of the related invention to the present invention. Also the 2nd-rail 13bR is supported to the 2nd-rail-support-part 14bR through the 2nd-rail-elastic-part 15bR, this 2nd-rail-support-part 14bR can be supported to be able to move to the axis direction of the washing-tub-rotating-shaft 11R (it is a vertical direction in this execution example) in the 2nd-rail-support-driving-part 16bR that was fixed to the outer-tub 5R. This 2nd-rail-elastic-part 15bR, the 2nd-rail-support-part 14bR, and the 2nd-rail-support-driving-part 16bR is arranged by centering on the axis-line of the washing-tub-rotating-shaft 11R to the surrounding direction in the plural places at intervals. By the way, the 2nd-rail-support-driving-part 16bR of this execution example corresponds to one example of the 2nd-separated-part of the related invention to the present invention. And the 1st-rail-support-driving-part 16aR and the 2nd-rail-support-driving-part 16bR may respectively be fixed to the case 2R.

[0326] The excessive force added to the 1st-rail 13aR from the 1st-rolling-wheel 19aR can be decreased by the 1st-rail-elastic-part 15aR along with the rotating shake of the washing-tub 79R by centering on the axis-line L of the washing-tub-rotating-shaft 11R. And the 1st-rail-elastic-part 15aR, the 1st-rail-support-part 14aR, and the 1st-rail-support-driving-shaft 16aR may be any number, but by large number the effect of decreasing the rotating shake becomes high, and the 1st-rolling-wheel 19aR and the 1st-rail 13aR is touched more certainly. The excessive force added to the 2nd-rail 13bR from the 2nd-rolling-wheel 19bR can be decreased by the 2nd-rail-elastic-part 15bR along with the rotating shake of the washing-tub 79R by centering on the axis-line L of the washing-tub-rotating-shaft 11R. The 2nd-rail-elastic-part 15bR, the 2nd-rail-support-part 14bR, and the 2nd-rail-support-driving-shaft 16bR may be any number, but by large number the effect of decreasing the rotating shake becomes high, and the 2nd-rolling-wheel 19bR and the 2nd-rail 13bR is touched more certainly. Also on the surface of action between the 1st-rail 13aR and the 1st-rolling-wheel 19aR or the 2nd-rail

13bR and the 2nd-rolling-wheel 19bR, both have the engaging structure such as gears, or the material with a large friction of rubber etc is equipped, thereby it becomes difficult to generate the idling etc., the rolling becomes more certain. The 1st-rail-support-driving-part 16aR is driven, then the 1st-rail-support-part 14aR is put in and out to the axis direction of the washing-tub-rotating-shaft 11R (it is a vertical direction in this execution example), the 1st-rail 13aR is touched to the 1st-rolling-wheel 19aR when pushing up, the 1st-rail 13aR becomes noncontact to the 1st-rolling-wheel 19aR when pulling down. For instance, the 1st-rolling-wheel 19aR is made to touch the 1st-rail 13aR, the 2nd-rolling-wheel 19bR is made to touch the 2nd-rail 13bR, the washing-tub 79R is made to rotate by centering on the axis-line L of the washing-tub-rotating-shaft 11R, then the 1st-mixing-impeller 17aR is self-rotated by centering on the axis-line P of the 1st-rotating-shaft 18aR, the 2nd-mixing-impeller 17bR is self-rotated by centering on the axis-line Q of the 2nd-rotating-shaft 18bR. By the way, for instance, when the washing-tub 79R was rotated anti-clockwise (refer to arrow A) in the upper side, the 1st-mixing-impeller 17aR will be rotated anti-clockwise when viewing from the axis line L, the 2nd-mixing-impeller 17bR will be rotated clockwise. Therefore, both of the 1st-mixing-impeller 17aR (refer to arrow F) and the 2nd-mixing-impeller 17bR (refer to arrow E) will be rotated in the clockwise direction when viewing from the front. It will rotate in the same direction at the position opposed like this. the lengthwise rotation water current can be caused in the inside of the washing-tub 79R when both mixing-impellers are rotated. And rotating only either one of the 1st-mixing-impeller 17aR or the 2nd-mixing-impeller 17bR can be easy with fitting to the amount of the washing-laundry in the washing-tub 79R,

[0327] When dewatering that at high-speed rotates the washing-tub 79R operates, the rolling-wheel 19 is preferable to make not to touch both of the 1st-rail 13aR and the 2nd-rail 13bR. The reason is that the rotation of the mixing-impeller (the 1st-mixing-impeller 17aR and the 2nd-mixing-impeller 17bR) is especially unnecessary when dewatering operates, and is because the rotating loss and noise by touching the rail (the 1st-rail 13aR and the 2nd-rail 13bR) and rolling-wheel (the 1st-rolling-wheel 19aR and the 2nd-rolling-wheel 19bR) can respectively be restrained. And the bottom-mixing-impeller 31R can select independently separately whether to stir by the 1st-mixing-impeller 17aR or the 2nd-mixing-impeller 17bR. The effect similar to the execution example 1 can be gained in the execution example 7 as explained above, the stir that is more various are caused in the inside of the washing-tub 79R by using the bottom-mixing-impeller 31R, the 1st-mixing-impeller 17aR, and the 2nd-mixing-impeller 17bR, thereby the ability of the cleansing and rinse of the washing-laundry can be improved. Also, because the mixing-impeller 17aR and 17b are mounted in the side, the mixing-impeller is properly rotated when the decentering is detected when dewatering operates, then to improve the decentering of the washing-laundry in the washing-tub can be hoped. And when the mixing-impeller is properly rotated when drying operates, the washing-laundry becomes easy to move up and down, the circulation wind becomes easy to hit to the washing-laundry, the drying effect rises, and the time for drying and the energy that is required to dry can be decreased. As for this execution example 7, the 1st-rail 13aR and the 2nd-rail 13bR are configured as above-mentioned execution example 2 and 3, the configuration that can be rotated by centering on the axis-line

L of the washing-tub-rotating-shaft 11R may be equipped, the 1st-rail 13aR and the 2nd-rail 13bR can be rotated at the independent rotating speed and the independent rotating direction, further more the various stir patterns can be constructed.

Execution Example 8

[0328] The washing machine of execution example 8 pertained to the related invention to the present invention is explained as follows. The basic configuration of the washing machine of this execution example 8 is the same as the washing machine of the execution example 1, but the point that the outer-tub is not equipped is different. Therefore the point around this difference is explained. FIG. 20 is a block diagram seen from the side of the washing machine 108R pertained to this execution example 8. In the above-mentioned each execution example, the one that was equipped with the outer-tub 5R to store water to the outside of the washing-tub after the water-bore is equipped on the wall surface of the washing-tub 9R, 79R is indicated, but the washing machine of this execution example 8 is the one that has the washing-tub 89R without the water-bore on the wall surface of the washing-tub 9R for the execution example 1, and that is configured without the outer-tub. The hold-body 33R is equipped under the outside of the washing-tub 89R of this execution example 8, This hold-body 33R is supported being hung from the four corners of the case 2R by the hold-body-support-part 34R similar to the outer-tub-support-part 7R of the above-mentioned each execution example. The washing-tub-rotating-shaft 11R is fixed to the bottom of the washing-tub 89R, the washing-tub-rotating-shaft 11R is supported to be able to rotate by the hold-body-bearing 35R that was equipped in the hold-body 33R, and is connected to the motor 12R that was fixed to the hold-body 33R. As a result, when the washing-tub-rotating-shaft 11R is rotated by the motor 12R, the washing-tub 89R is rotated horizontally by centering on the axis line L of the washing-tub-rotating-shaft 11R. The washing-tub-rotating-shaft 11R is formed with in midair, the midair part is the path to drain off the water from the inside of the washing-tub 89R to the outside of the washing-tub 89R, and is connected to the drain-path 8R through the drain-connect-part 36R that the washing-tub-rotating-shaft 11R that is rotated and the drain-path that is not rotated is connected being watertight by for instance contact pressures. Even if the washing-tub-rotating-shaft 11R rotates, the drain-connect-part 36R will not leak the water to the outside. Also, the drain-valve as not indicated in figure on the way of drain-path 8R is equipped, whether the water is stored in the inside of the washing-tub 89R or is drained from the washing-tub 89R is controlled by opening and shutting the drain-valve. The cylindrical cover 4R that expands from the case 2R has been equipped to be inserted in the open-part of the upper part of the washing-tub 89R.

[0329] As well as the execution example 1, the bottom side of the washing-tub 89R is formed with the curved surface shape of the hemisphere face etc., two mixing-impellers 17R are had in the inside of the curved surface shape. Two mixing-impellers 17R in view of a plane, put in the axis line L of the washing-tub-rotating-shaft 11R and are arranged at the symmetry position. The mixing-impeller 17R is mounted in the rotating-shaft 18R that is equipped to penetrate through the washing-tub-89R, This rotating-shaft 18R is supported rotatably to the washing-tub-bearing 20R that is equipped in the washing-tub 89R. Thereby the mixing-impeller 17R will be

able to be rotated by centering on the axis-line M of the rotating-shaft 18R. Even if the rotating-shaft 18R rotates around axis-line M, the structure between the rotating-shaft 18R and the washing-tub-bearing 20R becomes watertight so as not to leak the water. The axis-line M of the rotating-shaft 18R has been equipped with the axis-line L of the washing-tub-rotating-shaft 11R with a constant angle. By the way, the rotating-shaft 18R corresponds to one example of the mixing-impeller-rotating-shaft of the related invention to the present invention, and the rolling-wheel 19R corresponds to one example of the rolling-part of the related invention to the present invention. The rail 13R that is formed to the toroidal by centering on the axis-line L of the washing-tub-rotating-shaft 11R, and that shall be able to roll the rolling-wheel 19R, has been equipped with in the outside of the washing-tub 89R and in the inside of the case 2R. This rail 13R corresponds to one example of the contact-material of the related invention to the present invention. The mixing-impeller 17R is rotated by centering on the rotating-shaft 18R because the rolling-wheel 19R is rolled on the rail 13R. Therefore, the rotating speed of the mixing-impeller 17R is decided uniquely by the external diameter of the rolling-wheel 19R, the external surrounding diameter of the part of the rail 13R that the rolling-wheel 19R touches, and the rotating speed of the washing-tub 89R if there is not slipping of the contact part between the rolling-wheel 19R and the rail 13R. The rail 13R is supported to the rail-support-part 14R through the rail-elastic-part 15R, this rail-support-part 14R is supported to be able to move to the axis direction of the washing-tub-rotating-shaft 11R (it is a vertical direction in this execution example) in the rail-support-driving-part 16R that was fixed to the hold-body 33R. This rail-elastic-part 15R, rail-support-part 14R, and rail-support-driving-part 16R is arranged in the plural places to the surrounding direction by centering on the axis-line of the washing-tub-rotating-shaft 11R at intervals. By the way, the rail-support-drive-part 16R corresponds to one example of the 1st-separated-part of the related invention to the present invention. And the rail-support-driving-part 16R may be fixed to the case 2R. And the excessive force added from the rolling-wheel 19R to the rail 13R along with the rotating shake of the washing-tub 89R by centering on the axis-line of the washing-tub-rotating-shaft 11R can be decreased by the rail-elastic-part 15R. By the way, the rail-elastic-part 15R, rail-support-part 14R, and rail-support-driving-part 16R may be any number, but by large number the effect of decreasing the rotating shake becomes high, and the rolling-wheel 19R and the rail 13R is touched more certainly. Also on the surface of action between the rail 13R and the rolling-wheel 19R, both have the engaging structure such as gears, or the material with a large friction of rubber etc is equipped, thereby it becomes difficult to generate the idling etc., the rolling becomes more certain. The rail-support-driving-part 16R is driven, then the rail-support-part 14R is put in and out to the axis direction of the washing-tub-rotating-shaft 11R (it is a vertical direction in this execution example), the rail 13R is touched to the rolling-wheel 19R when pushing up, the rail 13R becomes noncontact to the rolling-wheel 19R when pulling down. As a result, with the washing-tub 89R rotated around the axis-line of the washing-tub-rotating-shaft 11R, doing not to rotate or to rotate the mixing-impeller 17R around the axis-line of the rotating-shaft 18R is able easy. As explained above, even if the washing machine 108R does not be equipped with the outer-tub, the configuration that has the effect similar to execution example 1 can be gained, and because the outer-tub

is not necessary to provide with, it is possible to wash in less water, and it becomes water saving. Also, because the space that rises temperature especially when drying operates decreases, the energy saving can be attempted. Also, because the amount of the outside tank may not be secured in the space between the case 2R and the washing-tub 89R, the case 2R can be formed more compactly. Or the more large internal capacity of the washing-tub 89R can be formed when the case 2R shall be the same size. And because there is no outer-tub, neither the inside surface of the outer-tub nor the outside surface of the washing-tub 89R get wet because of water, fungi etc. are not generated easily, and it becomes a sanitary washing machine. Also, because the rolling-wheel 19R, the rail 13R, the rail-elastic-part 15R, or the rail-support-part 14R, etc. do not get wet because of water, it is difficult to corrode compared with the case equipped with the outer-tub, and the durability rises, and the material that corrosion resistance is low, and cheaper can be selected. Of course each of the above-mentioned and following-mentioned execution example may be the one that the outside tank is not equipped as well as this execution example 8.

Execution Example 9

[0330] The washing machine of execution example 9 pertained to the related invention to the present invention is explained as follows. The basic configuration of the washing machine of this execution example 9 is the same as the washing machine of the execution example 5, but the shape of the transmitting-belt and the number of the mixing-impeller is different. Therefore the point around this difference is explained. FIG. 21 is a plan of the important part of the bottom part of the washing machine 109R of execution example 9 pertained to the related invention to the present invention to see from lower side. The execution example 5 mentioned above is the configuration wherein the rotating driving power is transmitted to two mixing-impellers 17R by each of the transmitting-belt 38R from the mixing-impeller-driving-shaft 37R to two rotating-shafts 40R, two transmitting-belts 38R will be hung in the mixing-impeller-driving-shaft 37R at the different position to the axis direction, but the configuration in this execution example 9 is the one that the plural (FIG. 21 is four, but may be other numbers) rotating-shaft 40R, that is the mixing-impeller 17R, is rotated by one transmitting-belt 138R. In such configuration, the effect similar to execution example 5 is gained, and the transmitting-belt 138R is hung in only one place of the mixing-impeller-driving-shaft 37R, then the length to the axis direction in the part where the transmitting-belt 138R of the mixing-impeller-driving-shaft 37R is hung can be shortened, the space to axis direction between the outer-tub 5R and the washing-tub 9R can become minimum, thereby the space saving can be planned, the water of that extent is saved. Also It becomes easy to equip with more mixing-impellers 17R.

Execution Example 10

[0331] The washing machine of execution example 10 pertained to the related invention to the present invention is explained as follows. The basic configuration of the washing machine of this execution example 10 is the same as the washing machine of the execution example 4, but the point that the rolling-wheel is arranged in the inside of the washing-tub is different. Therefore the point around this difference is explained. FIG. 22 is a block diagram to see from the side of

the washing machine 110R pertained to the execution example 10. FIG. 23 is a plan of the important part that is indicated the mixing-impeller 117R of the washing machine 110R of the execution example 10. In above-mentioned execution example 4, the rolling-wheel 49R that is one example of the rolling-part in the related invention to the present invention is rolled directly touching the driving-shaft 44R that is one example of the contact-material in the related invention to the present invention in the outside of the washing-tub 9R, thereby the configuration to rotate the mixing-impeller 17R was shown, but the washing machine 110R of this execution example 10 becomes the configuration wherein the rolling-wheel 119R that is a lower part of the mixing-impeller 117R that was equipped in the inside of the washing-tub 9R is rolled touching the disk-shaped mixing-impeller-driving-body 41R that was equipped in the top part of the driving-shaft 45R and thereby the mixing-impeller 117R is rotated. The rolling-wheel 119R and the mixing-impeller 117R may be formed at one, the mixing-impeller 117R may be formed by mounted the radial material in the surface of the rolling-wheel 119R. As shown in FIG. 22 and FIG. 23, the mixing-impeller 117R of this execution example 10 has the disk-shaped rolling-wheel 119R and the plural mixing-impeller-parts 43R that was formed radially in the upper surface from the center of the rotation toward the external surrounding. And the mixing-impeller-driving-body 41R too has the plural impeller-part-of-bottom-mixing-impeller 31aR that is the disk-shaped body with thickness to touch with the external surrounding part in the rolling-wheel 119R and was formed radially in the upper surface from the center of the rotation toward the external surrounding. Further, the rolling-wheel 19R and the mixing-impeller-driving-body 41R are the curved surface shape that the rotating central portion becomes a concave portion along the curved surface shape of the washing-tub 9R. By the way, one example of the rolling-part in this present invention corresponds to the rolling-wheel 119R of this execution example, one example of the a disk-shaped material that was equipped in the said driving-shaft in the related invention to the present invention corresponds to the mixing-impeller-driving-body 41R of this execution example. Also, One example of “the driving-power-generating-part that is doubled as the washing-power-generating-part to rotate the washing-tub” in of the related invention to the present invention corresponds to the motor 12R of this execution example, one example of the driving-shaft that is equipped in the inside of the washing-tub-self-rotating-shaft of the related invention to this present invention corresponds to the driving-shaft 45R of this execution example. And the force that is transmitted from the driving-shaft 45R to the mixing-impeller 117R corresponds to one example of “the force except the rotating force that self-rotates the washing-tub” in the related invention to this present invention. The mixing-impeller-driving-body 41R is fixed to the top part of the driving-shaft 45R, the external surrounding part of the mixing-impeller-driving-body 41R touches the two rolling-wheels 119R that were equipped in the inside of the washing-tub 9R, the rolling-wheel 119R is rolled on the external surrounding of the mixing-impeller-driving-body 41R by rotating the driving-shaft 45R, the mixing-impeller 117R that has the rolling-wheel 119R is rotated by centering on the axis-line M of the rotating-shaft 18R. By the way, the rotating speed ratio of the driving-shaft 45R and mixing-impeller 117R is proportional to the outside diameter ratio of the mixing-impeller-driving-body 41R and rolling-wheel 19R,

the change of the rotating speed of the mixing-impeller 117R can be easily selected by changing this outside diameter ratio. Also, in above-mentioned execution example 4, the configuration was the double structure that the driving-shaft 44R to rotate the mixing-impeller 117R is formed to the midair and the washing-tub-rotating-shaft 11R to rotate the washing-tub 9R is equipped in the inside, but in this execution example 10, the structure becomes the one that the washing-tub-rotating-shaft 11R that the upper part is fixed to the washing-tub 9R is formed with the midair and the driving-shaft 45R is equipped in the inside. The rotation of the motor 12R will switch by the rotating-switching-part 30R the rotating pattern that the driving-shaft 45R is rotated, the washing-tub-rotating-shaft 11R is rotated or the washing-tub-rotating-shaft 11R, or the driving-shaft 45R is rotated at same time. As the mechanism that drives the washing-tub and the bottom-mixing-impeller, the configuration that was equipped with the rotatable bottom-mixing-impeller on the same axis as the washing-tub-rotating-shaft in the bottom part of such the rotatable washing-tub is the one similar to the configuration of the washing machine that was shown by patent document 1 and execution example 7.

[0332] According to the above-mentioned configuration, in this execution example 10, with the rotating force of the washing-tub-rotating-shaft 11R where the washing-tub 9R is self-rotated, the mixing-impeller 117R will rotate by the rotating force of the driving-shaft 45R. By the way, in this execution example 10, the mixing-impeller 117R wherein the plural impeller-part-of-mixing-impeller-parts 43R are projected radially from the center of the rotation to the inside of the washing-tub 9R on the inside surface in the washing-tub 9R of rolling-wheel 119R that is the disk body is formed. That is, the mixing-impeller 117R and the rolling-wheel 119R are double use. Of course, the mixing-impeller may be equipped on the rotating-shaft 18R besides the rolling-wheel. Also the rolling-wheel 119R is not a disk body, may be formed with the circular body that was supported by the spoke radially extended from the rotating-shaft 18R. In addition, as shown in the mixing-impeller 117R of FIG. 24 at this time, the spoke of rolling-wheel 119R may use combinedly the impeller-part-of-mixing-impeller-parts 43R. Also in this execution example 10, the mixing-impeller-driving-body 41R is radially project the plural impeller-parts-of-bottom-mixing-impeller 31aR from the center of the rotation to the inside of the washing-tub 9R, and is double use as the bottom-mixing-impeller 31R, but the surface of the mixing-impeller-driving-body 41R is formed so as not to have fair lines, the configuration may be the one that is equipped, without the bottom-mixing-impeller, or with the bottom-mixing-impeller besides the mixing-impeller-driving-body 41R. Also the mixing-impeller-driving-body 41R is not the disk body, and may be the circular body supported by the spoke radially extended from the center of the rotation. In addition, this spoke may be double use as the impeller-part-of-mixing-impeller 31aR by the configuration similar to the mixing-impeller 117R shown in FIG. 24 at this time. Other points are similar to execution example 4. The effect similar to embodiment 4 is achieved because the execution example 10 was configured as explained in above mentioned, and it can be achieved to rotate the washing-tub 9R, the bottom-mixing-impeller 31R, and the mixing-impeller 117R in the easy driving mechanism similar to the conventional washing machine that was equipped with the rotatable bottom-mixing-impeller 31R in the bottom part of the rotatable washing-tub 9R on the same

axis as the axis-line L of the washing-tub 9R by the various rotating patterns. Also it becomes easy to improve the ability of the cleansing and the rinse of the washing-laundry further more because the various rotating patterns can be achieved. And it configures as shown in FIG. 15(b) in the modified example of the execution example 3, the rotating speed and the rotating direction of the washing-tub-rotating-shaft 11R (corresponds to the rail-rotating-shaft 27R of the external axis side in FIG. 15(b)) and driving-shaft 45R (corresponds to the washing-tub-rotating-shaft 11R on the inner axis side in FIG. 15(b)) may be able to be rotated individually freely.

Execution Example 11

[0333] The washing machine of execution example 11 pertained to the related invention to the present invention is explained as follows. The basic configuration of the washing machine of this execution example 11 is the same as the washing machine of the execution example 10, but the point that the shape of the washing machine is the cylinder shape similar to the execution example 7 and that the mixing-impeller-driving-body 41R is not equipped is different. Therefore the point around this difference is explained. FIG. 25 is the chief partial block diagram to view the bottom vicinity of the washing machine 111R pertained to the execution example 11 from the side, FIG. 26 is a plan of the chief part that shows the bottom part of the washing-tub 79R of the washing machine 111R. By the way, FIG. 25 is RST section imitative chart of FIG. 26. This execution example 11 is the configuration that the rolling-wheel 139 is rolled touching the contact-material of the related invention to the present invention in the inside of the washing-tub 79R as well as the execution example 10 and that the mixing-impeller 137R is self-rotated, but the mixing-impeller-driving-body 41R is not equipped and the mixing-impeller 137R is not curved different to the mixing-impeller 117R of the execution example 10. In the above-mentioned execution example 10, the bottom part of the washing-tub 9R was formed like the hemisphere surface, the mixing-impeller 117R that was rotated around the axis-line M of the rotating-shaft 18R that was inclined to the axis-line L of the washing-tub-rotating-shaft 11R was equipped, but in this execution example 11, the bottom surface of the washing-tub 79R is formed like the flat surface, the mixing-impeller 137R that is rotated around the axis-line M of the parallel rotating-shaft 18R to the axis-line L of the washing-tub-rotating-shaft 11R is equipped to three places. Also the mixing-impeller-driving-body 41R is not equipped as well as the execution example 10, the rolling-wheel 139 is rolled touching directly the driving-shaft 44R. By the way, one example of the driving-shaft doubled as the contact-material that is equipped in the inside of the washing-tub-rotating-shaft of the related invention to the present invention corresponds to the driving-shaft 44R of this execution example, one example of the rolling-part of the related invention to the present invention corresponds to the rolling-wheel 139 of this execution example. According to such a configuration, in this execution example 11, with the rotating force of the washing-tub-rotating-shaft 11R where the washing-tub 79R is self-rotated, the mixing-impeller 137R will be rotate by the rotating force of the driving-shaft 44R. Other points is similarly to execution example 10, the effect similar to the execution example 10 is achieved, and it becomes easy to enlarge the external diameter of the mixing-impeller 137R to more than the execution example 10 and to arrange the mixing-impeller 137R to be able to stir the bottom of the washing-

tub 79R effectively with the wide range, the effect of the stir becomes higher. Also with the configuration as shown in FIG. 15(b) in the modified example of the execution example 3, the rotating speed and the rotating direction of the washing-tub-rotating-shaft 11R (corresponds to the rail-rotating-shaft 27R on the outside axis of FIG. 15(b)) and the driving-shaft 44R (corresponds to the washing-tub-rotating-shaft 11R on the inside axis in FIG. 15(b)) may be able to be rotated individually freely.

Execution Example 12

[0334] The washing machine of execution example 12 pertained to the related invention to the present invention is explained as follows. The basic configuration of the washing machine of this execution example 12 is the same as the washing machine of the execution example 11, but the configuration that the mixing-impeller is rotated is different. Therefore the point around this difference is explained. FIG. 27 is a chief part block diagram to view the bottom vicinity of the washing machine 112R pertained to the execution example 12 from the side, FIG. 28 is a plan of the chief part that is shown the bottom of the washing-tub 9R of the washing machine 112R. By the way, FIG. 27 is RST section imitative chart of FIG. 28. In the execution example 11, because of the outside diameter ratio of the driving-shaft 44R and rolling-wheel 139R, the driving-shaft 44R that is one example of the contact-material of the related invention to the present invention must be rotated at higher speed, so there is a difficult point in the high-speed rotation of the mixing-impeller 137R. In this execution example 12, the mixing-impeller-driving-body 41R that is one example of the discoid material that is equipped in the driving-shaft of this invention is equipped in the upper end part of the driving-shaft 45R as well as the execution example 10, the rolling-wheel 129R is rolled touching the mixing-impeller-driving-body 41R. And in the execution example 10 and 11, the rotating outer surrounding of the mixing-impeller 117R and 137R was the same outside diameter as the rolling-wheel 119R and 139R, but the outside diameter of the rolling-wheel 129R shall be smaller than the rotating outer surrounding of the mixing-impeller 127R in this execution example 12. Thus, the effect similar to the execution example 10 is gained, and without rotating the driving-shaft 45R at higher speed than the necessity, the mixing-impeller 127R becomes able to be rotated at high speed. Thus, the mixing-impeller 117R will be self-rotated too by the rotating force of driving-shaft 45R with the rotating force of the washing-tub-rotating-shaft 11R that rotates the washing-tub 159R in this execution example 12. Also in the above-mentioned execution example 10 and 11, because the rolling-wheel 119R and 139R project in the inside of the washing-tub 9R and 79R, there was possibility that the washing-laundry is bitten between the rolling-wheel 119R, 139R, and the driving-shaft 44R. This execution example 12 is the configuration that equips the washing-tub 159R that the bottom-concavity 42R concaved the bottom was formed along the shape of the rolling-wheel 129R and mixing-impeller-driving-body 41R and that the rolling-wheel 129R and the mixing-impeller-driving-body 41R is stored in the bottom-concavity 42R. Thus, the effect similar to execution example 10 and 11 is gained and for the washing-laundry to be bitten is restrained.

[0335] By the way, in this execution example 12, the bottom-concavity 42R was equipped in the planar section of the bottom of the washing-tub 159R. but the concave portion may be equipped in the hemisphere face of the washing-tub 9R of

the above-mentioned execution example 10 bottom, the similar effect is achieved. Also with the configuration as shown in FIG. 15(b) in the modified example of the execution example 3, the rotating speed and the rotating direction of the washing-tub-rotating-shaft 11R (corresponds to the rail-rotating-shaft 27R on the outside axis in FIG. 15(b)) and the driving-shaft 45R (corresponds to the washing-tub-rotating-shaft 11R on the inside axis in FIG. 15(b)) may be able to be rotated individually freely. As explained in the above-mentioned each execution example, according to the washing machine pertained to the related invention to the present invention, the mixing-impeller that can be rotated continuously by centering on the axis-line that is different from the washing-tub-rotating-shaft is stirred in the inside of the washing-tub, so the complex stir not uniform can be positively caused in the inside of the washing-tub, the ability of the cleansing and rinse of the washing-laundry can be improved.

[0336] By the way, in the execution example 1, 6, 7, and 8 mentioned above, the mixing-impeller 17R is self-rotated by the rotating force where the washing-tub 9R and 79R is rotated, in the execution example from 2 to 5 and from 9 to 12, the mixing-impeller 17R, 117R, 127R, and 137R was rotated by using the driving force by the rail-motor 26R and motor 12R in addition to the rotating force of the washing drum, but the configuration that the mixing-impeller does not be rotated by the rotating force of the washing-tub and is self-rotated only by the other driving force may be equipped. As such a configuration, for instance, in washing machine 101R of execution example 1, the configuration that the motor is connected directly with the rotating-shaft 18R without equipping the rail 13R, the rail-support-part 14R, or the rail-elastic-part 15R is enumerated. However, the insulation treatment of the motor should be certain because it goes under water when equipping with the outer-tub, also, as the supplying power method to the motor that is fixed to the rotating washing-tub, it is necessary to give the supplying power method that turns on electricity contacting by the slip ring etc, or to give the supplying power method that is noncontact by the electromagnetic induction. And in the above-mentioned embodiment, the mixing-impeller 17R, 117R, 127R, and 137R is arranged symmetrically by centering on the axis-line L, but the arrangement may not be symmetrical, the shape of the each mixing-impeller may be changed. However, the thing that the position of the center of gravity of the washing-tub that had the mixing-impeller is on the axis-line L is more desirable because it is difficult to generate the decentering when the washing-tub is rotated. In the above-mentioned each execution example, the mixing-impeller was shown by the one that had been arranged to go under water when washing operated, but it is not the one limited to this. For instance, the configuration that a part of the mixing-impeller becomes the position that is higher than the water surface may be gained. Thus, the washing-laundry is not only stirred in the water, it becomes easy for the water that contains the cleansing agent to bubble, the cleansing property can be expected to improve by the effect of the bubble. Moreover, of course, the various modified-example that was described to the each above-mentioned execution example becomes applicable properly to the above-mentioned other execution example or the modified example.

[0337] The related invention to the present invention is summarized as follows. The problems are to provide the washing machine that can improve the stir force. the summary is the washing machine 101R comprising: a washing-tub 9R

that can store the washing-laundry internally, and equipped to be able to self-rotate; a washing-tub-rotating-shaft 11R that is equipped in the washing-tub 9R, and that becomes the shaft of self-rotation of the washing-tub; a mixing-impeller 17R that is equipped to be able to self-rotate in the inside of the washing-tub 9R, that stirs the washing-laundry in the inside of the washing-tub 9R together with the water; a mixing-impeller-self-rotating-shaft 18R that is equipped to the mixing-impeller 17R, that becomes the shaft of the self-rotation of the mixing-impeller 17R, and wherein the mixing-impeller-self-rotating-shaft 18R is arranged on the axis-line that is different from the washing-tub-rotating-shaft 11R. Typical figure is FIG. 13.

INDUSTRIAL APPLICABILITY

[0338] The washing machine that relates to the present invention has a novel and excellent configuration wherein a washing tub can rotate respectively by centering on two rotating-shafts oriented in different directions, and it is useful as the washing machine wherein the washing-tub that stores the washing-laundry internally and rotates by centering on two rotating-shafts of different direction is equipped in the inside of the case.

EXPLANATION OF SIGN

[0339] 1 washing machine, 2 case, 3 case-lid, 4 outer-tub, 5 outer-tub-support-material, 6 outer-tub-bearing, 7 support-body, 8 outer-shaft, 8a outer-shaft, 8b outer-shaft, 9 balancer, 9a balancer, 10 support-body-cover, 10a notch, 11 support-body-bearing, 12 upper-cover, 13 washing-tub, 14 washing-tub-shaft, 15 washing-tub-lid, 16 rolling-wheel, 16a rolling-wheel, 17 rolling-wheel-on-lid, 18 disk, 19 inner-shaft, 19a inner-shaft, 19b inner-shaft, 20 rotating-switching-part, 21 motor, 22 drain-path, 23 drain-valve, 24 upper-air-conduit, 25 lower-air-conduit, 26 mixing-impeller, 26a impeller, 27 rolling-part, 27a non-rolling-part, 28 rail, 29 rail-support-material, 30 auxiliary-wheel, 31 auxiliary-wheel-shaft, 32 rail-driving-wheel, 33 rail-driving-shaft, 34 rail-driving-bearing, 35 rail-motor, 36 rail-hold-part, 37 interlocking-part, 38 groove-part, 39 rail-hold-wheel, 40 rail-hold-shaft, 41 outer-shaft-driving-wheel, 42 outer-driving-shaft, 43 outer-shaft-motor, 2R case, 3R case-lid, 4R cover, 5R outer-tub, 6R outer-tub-bearing, 7R outer-tub-support-part, 8R drain-path, 9R, 79R, 89R, 159R washing-tub, 10R balancer, 11R washing-tub-rotating-shaft, 12R motor, 13R rail (contact-material), 13aR 1st-rail (contact-material) 13bR 2nd-rail (contact-material) 14R rail-support-part, 14aR 1st-rail-support-part, 14bR 2nd-rail-support-part, 15R rail-elastic-part, 15aR 1st-elastic-part, 15bR 2nd-elastic-part, 16R rail-support-driving-part (separated-part) 16aR 1st-rail-support-driving-part (separated-part), 16bR 2nd-rail-support-driving-part (separated-part), 17R, 117R, 127R, 137R mixing-impeller, 17aR 1st-mixing-impeller (mixing-impeller) 17bR 2nd-mixing-impeller (mixing-impeller) 18R rotating-shaft (mixing-impeller-rotating-shaft), 18aR 1st-rotating-shaft (mixing-impeller-rotating-shaft) 18bR 2nd-rotating-shaft (mixing-impeller-rotating-shaft) 19R, 119R, 129R, 139R rolling-wheel (rolling-part) 19aR 1st-rolling-wheel (rolling-part) 19bR 2nd-rolling-wheel (rolling-part) 20R washing-tub-bearing, 20aR 1st-washing-tub-bearing, 20bR 2nd-washing-tub-bearing, 21R rail-rotating-interlocking-part, 22R rail-rotating-hold-part, 23R rail-driving-wheel, 23aR rail-driving-wheel, 24R rail-driving-shaft, 24aR rail-driving-shaft, 25R

rail-driving-bearing, 26R rail-motor, 26aR rail-motor, 27R rail-shaft, 28R rail-rotating-support-part, 29R rail-folding-fulcrum, 30R rotating-switching-part, 31R bottom-mixing-impeller, 31aR impeller-part of bottom-mixing-impeller, 32R bottom-mixing-impeller-rotating-shaft, 33R hold-body, 34R hold-body-support-part, 35R hold-body-bearing, 36R drain-connect-part, 37R mixing-impeller-driving-shaft, 38R transmitting-belt (transmitting-material), 39R mixing-impeller-attachment, 40R rotating-wheel (rotating-part), 41R mixing-impeller-driving-body (contact-material), 42R bottom-concavity, 43R mixing-impeller-part, 44R driving-shaft (contact-material), 45R driving-shaft, 101R, 102R, 103R, 104R, 105R, 106R, 107R, 108R, 109R, 110R, 111R, 112R washing machine

1. A washing machine comprising:

- a outer-tub;
- a support-body that is arranged in the inside of the said outer-tub and is rotatable;
- a toroidal-rail-part that is arranged in the inside of the said outer-tub and is rotatable by the same axis as a support-body-shaft that shall be a rotating shaft of the said support-body;
- a washing-tub that is arranged in the inside of the said support-body and was connected to the said support-body so as to be rotatable by a washing-tub-shaft;
- a rolling-part that is arranged in the inside of the said outer-tub, that is formed with separately or at one the said washing-tub, and that is rotatable by gearing mutually with the rotation of the said washing-tub wherein the said washing-tub-shaft shall be a rotating shaft, and wherein: the said rolling-part touches the said toroidal-rail-part so as to be able to transmit the rotation force; the said support-body-shaft is non coaxial to the said washing-tub-shaft.

2. The washing machine according to claim 1, wherein the said rolling-part is a concavity part or a convexity part of the said washing-tub that was formed at one with the said washing-tub.

3. The washing machine according to claim 1, wherein the said toroidal-rail-part is a proximity part of the outer circumference in the curved or the not-curved disk by centering on the said support-body-shaft.

4. The washing machine according to claim 1, wherein the said toroidal-rail-part is fixed to the outer edge of a radiating impeller that rotates by centering on the said support-body-shaft.

- 5. The washing machine according to claim 2, wherein: the external shape of the said washing-tub is spheroidal; the said rolling-part is formed so as to round the external surface of the said washing-tub by centering on the said washing-tub-shaft.

6. The washing machine according to either one of claim from 2 to 5, comprising:

- a coaxial-two-axis-structure that has a outer-shaft and has a inner-shaft that was inserted in the inside of the said outer-shaft;
- a motor that drives the said coaxial-two-axis-structure, and wherein: the said outer-shaft is connected to the said support-body; a center axis of the said outer-shaft accords the said support-body-shaft; the said inner-shaft is connected to the said toroidal-rail-part;

when by the said motor the said outer-shaft does not rotate and the said inner-shaft rotates, the said support-body does not rotate, the said washing-tub rotates by centering on the said washing-tub-shaft for the rotating force of the said toroidal-rail-part to transmit to the said rolling-part; when by the said motor the said outer-shaft and the said inner-shaft was rotated to the same rotating direction with the same rotating speed, the said washing-tub does not rotate by centering on the said washing-tub-shaft and rotates together with the said support-body by centering on the said support-body-shaft.

7. The washing machine according to claim 1, wherein the said rolling-part is a rolling-wheel that is another body of the said washing-tub and is on the said washing-tub-shaft.

8. The washing machine according to claim 7, wherein: the external form of the said washing-tub is spheroidal; the said rolling-wheel is equipped adjacently outside the surface of the external form of the said washing-tub.

9. The washing machine according to claim 7 or claim 8 comprising:

a coaxial-two-axis-structure that has a outer-shaft and has a inner-shaft that was inserted in the inside of the said outer-shaft;

a motor that drives the said coaxial-two-axis-structure, and wherein:

the said inner-shaft is connected to the said support-body, and a center axis of the said inner-shaft accords to the said support-body-shaft;

the said outer-shaft is connected with the said toroidal-rail-part;

when by the said motor the said outer-shaft does not rotate and the said inner-shaft rotates, the said support-body rotates by centering on the said support-body-shaft, the said rolling-wheel rotates by centering on the said support-body-shaft while osculating to the said toroidal-rail-part, thereby the said rolling-wheel rotates by centering on the said washing-tub-shaft, the said washing-tub too rotates by centering on the said washing-tub-shaft;

when by the said motor the said outer-shaft and the inner-shaft is rotated to the same rotating direction with the same rotating speed, the said support-body rotates by

centering on the said support-body-shaft, the said washing-tub does not rotate by centering on the said washing-tub-shaft and rotates together with the said support-body by centering on the said support-body-shaft.

10. The washing machine according to either one of claim from 2 to 5 or 7 or 8, comprising:

a coaxial-two-axis-structure that has a outer-shaft and has a inner-shaft that was inserted in the inside of the said outer-shaft;

a first-motor that drives the said inner-shaft;

a second-motor that drives the said outer-shaft.

11. The washing machine according to claims 7 or claim 8, comprising:

a motor that is rotated the said support-body;

a rail-motor that is rotated a driving-wheel that touched for a rotating force to be able to transmit to the said toroidal-rail-part,

and wherein:

when at least one in the said motor and the said rail-motor rotated for the rotating speed of the said support-body to be different from the rotating speed of the said toroidal-rail-part rotated by centering on the said support-body-shaft, the said rolling-wheel touched to the said toroidal-rail-part rotates by centering on the said washing-tub-shaft, the said washing-tub too rotates by centering on the said washing-tub-shaft;

when the said motor and the said rail-motor rotated for the said rotating speed of the said support-body to be equal with the speed of the said toroidal-rail-part rotated by centering on the said support-body-shaft, the said support-body rotates by centering on the said support-body-shaft, the said washing-tub does not rotate by centering on the said washing-tub-shaft and rotates together with the said support-body by centering on the said support-body-shaft.

12. The washing machine according to the either one of the claims from 1 to 11, wherein a support-body-cover: is arranged to the surrounding of the said washing-tub between the said outer-tub and the said washing-tub; restrains the airflow between the upper part and the lower part, is mounted to the said support-body.

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