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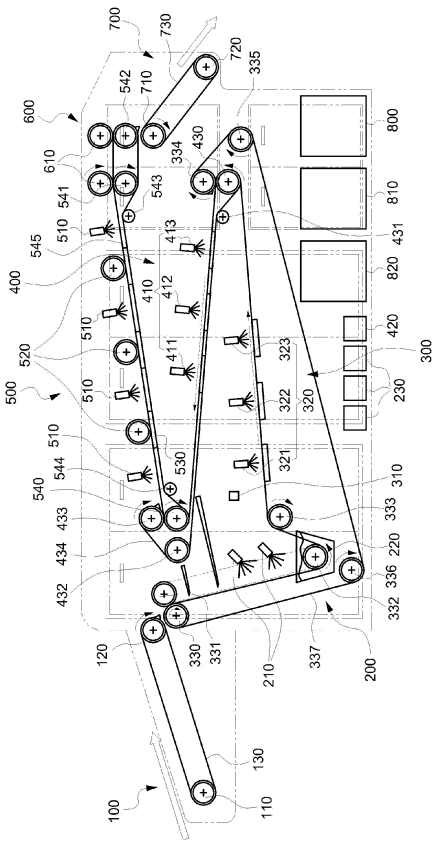
(54) INTEGRATED WASHING APPARATUS

(57) The present invention relates to an integrated washing apparatus comprising; a conveyor provided to transfer laundry put thereon; and a washing part having at least one washing nozzle provided to discharge a washing water to the laundry transferred by means of conveyor, and recycles, as rinsing water, the water generated after spinning and recycles the rinsing water so as to reduce the use amount of water by approximately 50% or more compared with a conventional washing apparatus.

[Fig. 1]



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Description

[Technical Field]

[0001] The present disclosure relates to a washing machine, and more particularly, to an integral type washing machine capable of continuously performing washing, rinsing and dewatering with a single apparatus.

[Background Art]

[0002] In general, various laundries are generated in daily life. Such laundries are required to be periodically washed for a clean and hygienic life.

[0003] At ordinary homes, bedding such as quilt or blanket, and large laundries such as carpet, sofa cloth, curtain or the like are generated. These laundries are hard to be washed at the home. Thus, the washing of the laundries is typically performed by a washing plant of a special treatment establishment.

[0004] In addition, laundries generated in a multi-use facility such as a hotel, a factory, a boarding house, a training center, a hospital or the like are very large. In addition, such laundries have a relatively large size and thus, are mainly treated in a specialized treatment establishment and a washing plant.

[0005] On the other hand, the washing plant typically uses a drum-type washing machine to wash the laundry. In the case of using the drum-type of washing machine, water discharged every time when processes such as a main washing, a primary rinsing, a secondary rinsing and a dewatering are performed is discarded *in-situ.* Thus, very large volumes of water may be consumed. In addition, from the viewpoint of economic compensation, underground water may be irrationally dug and used. This may cause a problem in that wastage of water resources and discharge of polluted water have an adverse effect on the environment.

[Prior Art Document]

[Patent Documents]

[0006]

Patent Document 0001: Korean Laid-Open Patent Publication No. 10-2008-0005222 (published on January 10, 2008)
Patent Document 0002: Korean Patent Registration No. 10-0822644 (registered on April 16, 2008)

[Summary of Invention]

[Technical Problem]

[0007] The present disclosure is made in view of the above problem, and an object of the present disclosure is to provide an integral type washing machine which is designed to wash laundries in a new manner completely different from the conventional manner, by discharging a washing water toward the laundries which are being conveyed through a conveyor to wash the laundries, discharging a rinsing water to rinse the laundries, and allowing the laundries to pass between rollers to dewater the laundries.

[Solution to Problem]

[0008] To accomplish the above objects, an integral type washing machine according to the present disclosure includes a conveyor installed to convey a laundry placed thereon, and a washing part including at least one washing nozzle configured to discharge a washing water toward the laundry which is being conveyed by the conveyor.

[0009] In addition, the integral type washing machine according to the present disclosure includes at least one of: a feeding part including a feeding conveyor installed to convey the laundry to the washing part when the laundry is placed on the feeding conveyor while being unfolded; a rinsing part including at least one rinsing nozzle installed to discharge a rinsing water so as to rinse the laundry passed through the washing part; a dewatering part including rollers installed in a vertical relationship with each other to pass the laundry therethrough and to squeeze the laundry passed through the washing part or the rinsing part; and a discharging part installed to discharge the laundry passed through the washing part, the rinsing part or the dewatering part. In this case, the laundry is conveyed to the washing part, the rinsing part, the dewatering part, or the discharging part by the conveyor.

[0010] In addition, the washing part includes at least one of: a first washing part including a first washing nozzle configured to discharge the washing water toward the laundry conveyed from the feeding part and a soaking tank configured to soak the laundry passed through the first washing nozzle therein; a second washing part including a sensor installed to sense the laundry discharged and conveyed from the soaking tank, and a second washing nozzle installed to discharge the washing water toward the laundry sensed by the sensor; and a third washing part including a third washing nozzle installed to discharge the washing water toward the laundry passed through the second washing part. In this case, a detergent or a fabric softener is contained in the washing water of the first washing part, the second washing part or third washing part.

[0011] In addition, the second washing nozzle includes at least one of a 2-1st washing nozzle, a 2-2nd washing nozzle and a 2-3rd washing nozzle, which are installed to discharge the washing water with respect to the laundry under conveyance, in a vertical direction, at an angle of 5 to 45 degrees in a conveyance direction of the laundry, or at an angle of 5 to 45 degrees in a direction opposite the conveyance direction.

[0012] In addition, the third washing nozzle includes at

least one of a 3-1st washing nozzle, a 3-2nd washing nozzle and a 3-3rd washing nozzle, which are installed to discharge the washing water with respect to the laundry under conveyance, in the vertical direction, at the angle of 5 to 45 degrees in the conveyance direction of the laundry, or at the angle of 5 to 45 degrees in the direction opposite the conveyance direction.

[0013] In addition, the washing part further includes at least one of a detergent tank and a fabric softener tank which are installed to supply a detergent or a fabric softener to the washing water to be supplied to the first washing nozzle, the soaking tank, the second washing nozzle or the third washing nozzle.

[0014] In addition, the conveyor further includes at least one of a first conveyor, a second conveyor and a third conveyor, the first conveyor including a plurality of rollers and a first belt installed to span over the plurality of rollers so as to convey the laundry from the first washing part to the second washing part, the second conveyor including a plurality of rollers and a second belt installed to span over the plurality of rollers so as to convey the laundry from the third washing part to the rinsing part, and the third conveyor including a plurality of rollers and a third belt installed to span over the plurality of rollers so as to convey the laundry from the rinsing part to the dewatering part.

[0015] In addition, the first conveyor further includes at least one of: a first roller and a second roller which are installed in parallel to pass therethrough the laundry conveyed from the feeding part, a third roller installed inside the soaking tank to soak the laundry passed through the first roller and the second roller in the soaking tank, a fourth roller installed at a front side of the second washing nozzle to switch the conveyance direction of the laundry discharged from the soaking tank, a fifth roller installed at a rear side of the second washing nozzle to switch the conveyance direction of the laundry discharged from the soaking tank, and a sixth roller and a seventh roller installed to return the first belt spanned over the fifth roller to the first roller.

[0016] In addition, the second conveyor further includes at least one of: an eighth roller disposed above the first conveyor in the vicinity of the fifth roller so as to apply a tension to the first belt spanned over the fifth roller, a tenth roller installed at a rear side of the third washing nozzle, a 11th roller installed to return the second belt spanned over the tenth roller to the eighth roller, a ninth roller installed so as to apply a tension to the second belt spanned over the first roller and the 11th roller.

[0017] In addition, the third conveyor further includes at least one of: a 12th roller disposed above the second conveyor in the vicinity of the 11th roller so as to apply a tension to the second belt spanned over the 11th roller, 13th and 14th rollers installed at a rear side of the rinsing nozzle, a 15th roller installed so as to apply a tension to the third belt spanned over the 14th roller and the 12th roller.

[0018] In this case, the first belt, the second belt and the third belt are general flat belts or belts having a net shape or a porous shape in which the washing water or the rinsing water passes. The fabric softener tank is configured to be connected to at least one of the rinsing nozzles which have a dewatering function of removing the detergent.

[0019] In addition, the dewatering part includes at least one dewatering roller installed above the 13th roller or the 14th roller and configured to dewater the laundry which being conveyed through the third belt by allowing the laundry to pass through the at least one dewatering roller.

[0020] In addition, the integral type washing machine according to the present disclosure further includes at least one of: a first water collection tank installed to collect the water discharged from the dewatering part and feed the collected water to the rinsing nozzle of the rinsing part; a second water collection tank installed to collect the water discharged from the rinsing part and feed the collected water to the second washing nozzle of the second washing part and the third washing nozzle of the third washing part; and a third water collection tank installed to collect the water discharged from the second washing part and the third washing part, and feed the collected water to the first washing nozzle of the firth washing part and the soaking tank.

[Advantageous Effects of Invention]

[0021] According to the disclosure, as described above, the present disclosure has an effect of providing an integral type washing machine which is designed to wash laundries in a new manner completely different from the conventional manner, by discharging a washing water toward the laundries which are being conveyed through a conveyor to wash the laundries, discharging a rinsing water to rinse the laundries, and allowing the laundries to pass between rollers to dewater the laundries.

[0022] In addition, the present disclosure has an effect of reducing water consumption to approximately 50% or less by reusing the discharged water as the rinsing water and reusing the rinsing water as the washing water, compared with the case of treating, as the wastewater, the water discharged in each process as in the related art.

[0023] In addition, it is possible to wash the laundries more effectively by arranging the first washing nozzle, the second washing nozzle and the third washing nozzle so as to have a certain angle, compared to the case of arranging the nozzles at a single angle.

[Brief Description of Drawings]

[0024] The accompanying drawings, which are incorporated in the specification, illustrate preferable embodiments of the present disclosure, and together with the detailed description of the embodiments given below, serve to explain the technical features of the present dis-

closure. Thus, it should be noted that the present disclosure is limited to the details set forth in the drawings.

FIG. 1 is a side view schematically showing an integral type washing machine according to a preferable embodiment of the present disclosure.
FIG. 2 is an enlarged view of "A" portion in FIG. 1.
FIG. 3 is an enlarged view of "B" portion in FIG. 1.
FIG. 4 is a schematic configuration diagram of a recycling water treatment process illustrated in FIG. 1.

<EXPLANATION OF REFERENCE NUMERALS>

[0025]

100: feeding part
110: first feeding roller
120: second feeding roller
130: feeding belt
200: first washing part
210: first washing nozzle
220: soaking tank
230: detergent tank
300: second washing part
310: sensor
320: second washing nozzle
321: 2-1st washing nozzle
322: 2-2nd washing nozzle
323: 2-3rd washing nozzle
330: first roller
331: second roller
332: third roller
333: fourth roller
334: fifth roller
335: sixth roller
336: seventh roller
337: first belt
400: third washing part
410: third washing nozzle
411: 3-1st washing nozzle
412: 3-2nd washing nozzle
413: 3-3rd washing nozzle
420: fabric softener tank
430: eighth roller
431: ninth roller
432: tenth roller
433: 11th roller
434: second belt
500: rinsing part
510: rinsing nozzle
520: rinsing roller
530: lower support
540: 12th roller
541: 13th roller
542: 14th roller
543: 15th roller
544: 16th roller
545: third belt
600: dewatering part
610: dewatering roller
700: discharging part
710: first discharge roller
720: second discharge roller
730: discharge belt
800: first water collection tank
810: second water collection tank
820: third water collection tank.

[Description of Embodiment]

[0026] Hereinafter, preferred embodiments of the present invention will be described in detail so as to allow those skilled in the art to easily implement the present invention with reference to the following drawings. But, in describing the operation principles of the preferred embodiments of the present invention, if the detail descriptions for the related known functions or configurations can disturb the scope of the present invention unnecessarily, the detail description thereof can be omitted.

<Configurations>

[0027] An integral type washing machine of the present disclosure employs a new method of washing laundries by placing and conveying the laundries on a conveyor in which a plurality of divided sections is provided, and strongly injecting a washing water or a rinsing water toward the conveying laundries using a nozzle. To do this, the washing machine may be provided with: a power unit including a motor for driving the conveyor to wash the laundries while conveying the laundries to the conveyor, a pump installed to discharge the washing water or the rinsing water from the nozzle, and the like; and a control part for controlling an injection pressure and operation of the nozzle while controlling the power unit. In this case, a belt of the conveyor may be a general flat belt, or a belt having a net shape or a porous shape in which the washing water or the rinsing water can pass.

Detailed description thereof will be given below.

[0028] As shown in FIG. 1, the integral type washing machine according to a preferable embodiment of the present disclosure includes a feeding part 100, a first washing part 200, a second washing part 300, a third washing part 400, a rinsing part 500, a dewatering part 600, a discharging part 700 and a water collection tan1e Here, FIG. 1 shows a schematic side view for facilitating a clear understanding of configuration of the present disclosure. However, in the case of a large laundry such as a curtain, carpet or the like, the washing machine may be provided to have a width of a certain length in a plan view in order to wash the large laundry while conveying the large laundry in a fully expanded state or in a half folded state.

[0029] First, the feeding part 100 includes a feeding

conveyor which is provided with a first feeding roller 110, a second feeding roller 120, and a feeding belt 130 which are used to convey the laundry to the first washing part 200. The feeding conveyor is operable to convey the laundry to the first washing part 200. For the sake of convenience in description, a roller positioned adjacent to the first washing part 200 will be referred to as the second feeding roller 120. At this time, the laundry can be conveyed in a direction from the first feeding roller 110 arranged in a horizontal direction or an upwardly-inclined direction toward the second feeding roller 120.

[0030] The first washing part 200 is provided to roughly wash the laundry fed from the feeding part 100. The first washing part 200 may include a soaking tank 220 in which the laundries fed from the feeding part 100 are received, a first washing nozzle 210 provided to inject the washing water toward the laundries which are being conveyed to the soaking tank 220, and a detergent tank 230.

[0031] The first washing nozzle 210 is a nozzle that discharges the washing water toward the laundries which are being conveyed from the feeding part 100 to the soaking tank 220. The first washing nozzle 210 may include one or more washing nozzles, and may be installed to be inclined in a conveyance direction of the laundries or in an opposite direction thereof, or installed in a direction perpendicular to the laundries to discharge the washing water. In this case, the laundries may be conveyed in a downwardly-inclined direction by a first conveyor. The first conveyor may be installed to connect the first washing part 200 and the second washing part 300. A description thereof will be described later.

[0032] The soaking tank 220 is a bath in which the laundries fed from the feeding part 100 is temporarily received. The washing water is stored in the soaking tank 220, and the laundries may be soaked in the washing water. A period of time during which the laundries are soaked in the soaking tank 220 depends on a conveyance operation of the first conveyor. The laundries may be soaked in the soaking tank 220 for a certain period of time as the first conveyor is ceased for some time. Further, the laundries may be soaked in the soaking tank 220 for a little when the first conveyor continuedly conveys the laundries.

[0033] The detergent tank 230 includes at least one tank for storing detergent to be supplied to the washing water. The detergent tank 230 may include tubes or pipes to supply the detergent of the detergent tank 230 to the washing water that is fed from the first washing nozzle 210, a second washing nozzle 320, and a third washing nozzle 410.

[0034] In addition, the detergent tank 230 may be provided for each type of detergent. In addition, the detergent tank 230 may be provided for each washing nozzle that supplies the detergent. As an example, different detergents may be applied to the first washing nozzle 210, the second washing nozzle 320, and the third washing nozzle 410. The detergent tank 230 may be provided common to the first washing part 200, the second washing part 300 and the third washing part 400.

[0035] The second washing part 300 is provided to perform a primary washing on the laundries passed through the first washing part 200. The second washing part 300 includes a sensor 310 provided to sense the laundries which are being conveyed from the soaking tank 220, at least one or more of the second washing nozzle 320 arranged to discharge the washing water containing the detergent toward the conveying laundries, and the detergent tank 230. As an example, the second washing nozzle 320 may include a 2-1st washing nozzle 321 and a 2-2nd washing nozzle 322 which are disposed to be inclined at about 5 to 45 degrees in the conveyance direction of the laundries, and a 2-3rd washing nozzle 323 which is disposed to be inclined at about 5 to 45 degrees in a direction opposite the conveyance direction. In this case, when the laundries are sensed by the sensor 310, the 2-1st washing nozzle 321 may be controlled to discharge the washing water after about 2 to 5 seconds.

[0036] In order to efficiently wash the laundries, the 2-1st washing nozzle 321, the 22nd washing nozzle 322 and the 2-3rd washing nozzle 323 may be arranged in various manners. For example, the 2-1st washing nozzle 321 and the 2-3rd washing nozzle 323 may be arranged to discharge the washing water in the same direction, and the 2-2nd washing nozzle 322 may be arranged to discharge the washing water in the reverse direction. In some embodiments, the 2-1st washing nozzle 321, the 2-2nd washing nozzle 322 and the 2-3rd washing nozzle 323 may be arranged to be similarly inclined at a certain angle in the conveyance direction of the laundries. In some embodiments, at least one of the washing nozzles may be arranged to be inclined at a certain angle in the reverse direction. In some embodiments, all the washing nozzles may be arranged perpendicular to the laundries. The arrangement and angle of the second washing nozzle 320 as described above is set to achieve the washing of the laundries and the flow of the laundries in an effective manner.

[0037] In the above, the detergent tank 230 has been described.

[0038] Hereinafter, the first conveyor through which the laundries pass from the first washing part 200 to the second washing part 300 will be described.

[0039] The first conveyor includes a plurality of rollers and a belt. As an example, the first conveyor includes a first roller 330 to a seventh roller 336, and a first belt 337. The first conveyor will be described with reference to a movement direction of the first belt 337, namely the conveyance direction of the laundries. Of course, the first belt 337 may be installed to endlessly rotate while being spanned over the first roller 330, the third roller 332, the fourth roller 333, the fifth roller 334, the sixth roller 335, and the seventh roller 336. In addition, an additional roller may be further installed to apply tension to the first belt 337.

[0040] The first roller 330 and the second roller 331 may be arranged in parallel in the vicinity of the second

feeding roller 120 of the feeding conveyer so that the laundries pass through the first roller 330 and the second roller 331 while being sandwiched therebetween.

[0041] Further, the laundries may stably enter the soaking tank 220 between a belt spanned over the first roller 330 and the second roller 331, and a belt by which the second roller 331 and the third roller 332 are driven in an independent interlock relationship with each other as indicated by a dotted line.

[0042] The third roller 332 may be installed inside the soaking tank 220 so that the laundries are completely soaked in the soaking tank 220 and then are taken out from the soaking tank 220. The third roller 332 may be provided to switch the travel direction of the first belt 337.

[0043] The fourth roller 333 may be arranged to switch the travel direction of the first belt 337 so that the laundries which pass through the third roller 332 and move quickly upward are conveyed in a horizontal direction or a gentle upward direction.

[0044] The fifth roller 334 may be arranged higher than the fourth roller 333 so that the laundries are conveyed in the horizontal direction or the gentle upward direction. Here, the second washing nozzle 320 including at least one nozzle for discharging the washing water toward the laundries that pass through the fourth roller 333 and the fifth roller 334 may be installed. The detergent tank 230 and a fabric softener tank 420 may be connected to the second washing nozzle 320.

[0045] The sixth roller 335 and the seventh roller 336 may be installed such that the first belt 337 returns to the first roller 330 to form an infinite trajectory. In this case, the sixth roller 335 may be located below the fifth roller 334 in the vicinity of the fifth roller 334. The seventh roller 336 may be disposed near the first roller 330 or near the third roller 332. Of course, the sixth roller 335 and the seventh roller 336 may be located at another position other than the aforementioned position as long as the first belt 337 spanned over the fifth roller 334 can return to the first roller 330 without any interference.

[0046] Further, the third washing part 400 is provided to perform a secondary washing on the laundries passed through the second washing part 300. The third washing part 400 includes a third washing nozzle 410, the detergent tank 230 and the fabric softener tank 420 which are connected to the third washing nozzle 410, and a second conveyor.

[0047] The third washing nozzle 410 is installed to discharge the washing water containing a detergent or fabric softener toward the laundries that are being conveyed from the second washing part 300 to the rinsing part 500. The third washing nozzle 410 includes at least one washing nozzle. As an example, the third washing nozzle 410 may include a 3-1st washing nozzle 411 and a 3-2nd washing nozzle 412 which are arranged to be inclined at an angle of about 5 to 45 degrees in the conveyance direction of the laundries, and a 3-3rd washing nozzle 413 arranged to be inclined at an angle of about 5 to 45 degrees in a direction opposite the conveyance direction of the laundries.

[0048] Here, as illustrated in FIG. 1, the conveyance direction of the laundries conveyed from the second washing part 300 and the conveyance direction of the laundries conveyed from the third washing part 400 are different from each other. Thus, the washing nozzles may be also arranged in different directions, and may be rearranged in consideration of the inclined direction. Of course, from the viewpoint of securing the effective washing of the laundries and the smooth flow of the laundries, the 3-1st washing nozzle 411, the 3-2nd washing nozzle 412 and the 3-3rd washing nozzle 413 may be arranged in various manners. As an example, the 3-1st washing nozzle 411 and the 3-3rd washing nozzle 413 may be arranged so as to discharge the washing water in the same direction, the 3-2nd washing nozzle 412 may be arranged to discharge the washing water in the reverse direction.

[0049] In some embodiments, the 3-1st washing nozzle 411, the 3-2nd washing nozzle 412 and the 3-3rd washing nozzle 413 may be arranged to be inclined similarly at a certain angle in the conveyance direction of the laundries. Alternatively, at least one washing nozzle may be arranged to be inclined at a certain angle in a direction opposite the conveyance direction. Alternatively, all washing nozzles may be arranged perpendicular to the laundries. As described above, by arranging each of the first washing nozzle 210, the second washing nozzle 320 and the third washing nozzle 410 at a certain angle, it is possible to more effectively wash the laundries than in the case where the washing nozzles are arranged at a single angle, and to facilitate the flow of the laundries.

[0050] The detergent tank 230 and the fabric softener tank 420 may include at least one tank. Tubes or pipes may be provided so that the detergent and the fabric softener in the detergent tank 230 and the fabric softener tank 420 are supplied to at least one nozzle of the 3-1st washing nozzle 411 to the 3-3rd washing nozzle 413. In some embodiments, the detergent tank 230 may be provided for each type of detergent, if necessary. In this case, the fiber detergent tank 230 may be provided to supply different detergents to respective nozzles.

[0051] The second conveyor is installed to convey the laundries passed through the second washing part 300 and the third washing part 400 toward the rinsing part 500. The second conveyor includes a plurality of rollers and a belt. As an example, the second conveyor include an eighth roller 430 to an 11th roller 433, and a second belt 434. The second conveyor will be described with reference to a movement direction of the second belt 434, namely, the conveyance direction of the laundries. Of course, the second belt 434 may be installed to endlessly rotate while being spanned over the eighth roller 430, the ninth roller 431, the tenth roller 432, and the 11th roller 433.

[0052] As shown in FIGS. 1 and 2, the eighth roller 430 is spanned by the second belt 434 and is installed below the fifth roller 334. The eighth roller 430 is arranged below

the fifth roller 334 in the vicinity of the fifth roller 334 to apply tension with respect to the first belt 337 spanned over the fifth roller 334. With such an arrangement, the laundries, that are being conveyed to the fifth roller 334 while being placed on the first belt 337, pass between the fifth roller 334 and the eighth roller 430, are naturally placed on the second belt 434, and ultimately, are conveyed along the second belt 434.

[0053] The ninth roller 431 is provided to apply tension to the second belt 434 spanned over the eighth roller 430. The ninth roller 431 may be disposed in the vicinity of the eighth roller 430, or may be disposed at any place between the eighth roller 430 and the tenth roller 432.

[0054] The tenth roller 432 may be disposed higher than the eighth roller 430 so that the laundries are conveyed in the horizontal direction or the gentle upward direction. Here, the third washing nozzle 410 including at least one nozzle configured to discharge the washing water toward the laundries passing between the eighth roller 430 and the tenth roller 432 may be installed.

[0055] The 11th roller 433 is disposed in the vicinity of the tenth roller 432. The 11th roller 433 may be installed so that the second belt 434 spanned over the tenth roller 432 returns to the eighth roller 430. Of course, the 11th roller 433 may be disposed at another position other than the above-described position as long as the second belt 434 can return to the eighth roller 430 through the tenth roller 432 without any interference.

[0056] The rinsing part 500 is installed to perform rinsing and dewatering on the laundries passed through the third washing part 400. The rinsing part 500 includes at least one rinsing nozzle 510, at least one rinsing roller 520, a lower support 530, and a third conveyor.

[0057] The rinsing nozzle 510 is installed to discharge the rinsing water toward the laundries which are being conveyed from the third washing part 400 to the dewatering part 600. One or more of the rinsing nozzles 510 may be installed at predetermined intervals. One of the rinsing nozzles 510 may be connected to the fabric softener tank 420.

[0058] The rinsing roller 520 and the lower support 530 is a dewatering member that can squeeze the rinsing water by pressing the laundries passed through the rinsing nozzle 510 from up and down. The rinsing roller 520 and the lower support 530 may be positioned at the front or rear side of the rinsing nozzle 510 in the conveyance direction of the laundries. The rinsing roller 520 and the lower support 530 may be provided for each rinsing nozzle 510. In one example, the rinsing roller 520 may be positioned above the third belt 545 and the lower support 530 may be positioned below the third belt 545. Accordingly, the rinsing roller 520 and the lower support 530 may be arranged to squeeze the rinsing water by pressing the laundries which are conveyed while being placed on the third belt 545 from up and down.

[0059] The third conveyor is installed to convey the laundries passed through the third washing part 400 to the dewatering part 600. The third conveyor includes a plurality of rollers and a belt. As an example, the third conveyor includes a 12th roller 540, a 13th roller 541, a 14th roller 542, a 15th roller 543, a 16th roller 544 and a third belt 545. The third conveyor will be described with reference to the movement direction of the third belt 545, namely the conveyance direction of the laundries. Of course, the third belt 545 may be installed to endlessly rotate while being spanned over the 12th roller 540, the 13th roller 541, the 14th roller 542, the 15th roller 543, and the 16th roller 544.

[0060] As shown in FIGS. 1 and 3, the 12th roller 540 is spanned with the third belt 545, and is installed below the 11th roller 433. The 12th roller 540 is located below the 11th roller 433 in the vicinity of the 11th roller 433. The 12th roller 540 may be arranged to apply tension to the third belt 545 spanned over the 12th roller 540. With this arrangement, the laundries that are being conveyed to the 11th roller 433 while being placed on the second belt 434 pass between the 11th roller 433 and the 12 roller 540, are naturally placed on the third belt 545 and are conveyed along the third belt 545.

[0061] The 13th roller 541 may be arranged higher than the 12th roller 540 so that the laundries are conveyed in the horizontal direction or the gentle upward direction. In an embodiment, at least one rinsing nozzle 510 may be installed to discharge the rinsing water toward the laundries passing between the 12th roller 540 and the 13th roller 541. The 13th roller 541 may be included as one of the components for dewatering the laundries together with the 14 roller 542. Details thereof will be described later.

[0062] The 14th roller 542 is disposed in the vicinity of the 13th roller 541. The 14th roller 542 may be installed such that the third belt 545 returns to the 12th roller 540 while spanning over the 14th roller 542. In this case, the 14th roller 542 may be disposed parallel to the 13th roller 541.

[0063] The 15th roller 543 and the 16th roller 544 are disposed in the vicinity of the 13th roller 541 and the 12th roller 540, respectively. The 15th roller 543 may be arranged to apply tension to the third belt 545 spanned over the 14th roller 542, and the 16th roller 544 may be arranged to apply tension to the third belt 545 returning to the 12th roller 540. In an embodiment, only one of the 15 roller 543 and the 16 roller 544 may be installed. The 15 roller 543 and the 16 roller 544 may be disposed anywhere between the 12th roller 540 and the 14 roller 542.

[0064] The dewatering part 600 is installed to compress and dewater the laundries passed through the rinsing part 500. The dewatering part 600 includes at least one dewatering roller 610.

[0065] As shown in FIG. 1, the dewatering roller 610 is positioned above the 13th roller 541 and/or the 14th roller 542. As an example, the dewatering roller 610 is disposed close to the 13 roller 541, and is provided so as to strongly squeeze the laundries passing therethrough while being placed on the third belt 545 from up and down, in cooperation with the 13th roller 541. The

dewatering roller 610 may be provided to be linked to the 14 roller 542. Dewatering rollers may be additionally provided so that the laundries pass above and below the third belt 545.

[0066] The discharging part 700 is provided with a discharge conveyor including a first discharge roller 710, a second discharge roller 720 and a discharge belt 730 to discharge the laundries passed through the dewatering part 600. For the sake of convenience in description, a roller positioned close to the rinsing part 500 will be referred to as the first discharge roller 710. In this case, the laundries may be conveyed from the first discharge roller 710 and the second discharge roller 720 which are arranged in a horizontal direction or in a downwardly-inclined direction.

[0067] On the other hand, the discharging part 700 may have an additional configuration for drying the laundries passed through the dewatering part 600. As an example, the discharging part 700 may further include a hot air blower provided to blow hot air toward the laundries passed through the dewatering part 600. Further, an additional drying part may be disposed between the dewatering part 600 and the discharging part 700. A drying apparatus including the hot air blower and the additional drying part may be provided.

[0068] Finally, the water collection tank includes a first water collection tank 800, a second water collection tank 810 and a third water collection tank 820. These water collection tanks may be connected to each other or may be installed to be in communication with at least one of the dewatering part 600, the rinsing part 500, the third washing part 400, the second washing part 300 and the first washing part 200.

[0069] The first water collection tank 800 is installed to collect the water discharged from the dewatering part 600. The collected water of the first water collection tank 800 may be used as the rinsing water of the rinsing part 500, or may be reused as the washing water of at least one of the third washing part 400, the second washing part 300 and the first washing part 200. To do this, the first water collection tank 800 may include at least one nozzle of the rinsing nozzle 510, the third washing nozzle 410, the second washing nozzle 320, the first washing nozzle 210 and the soaking tank 220, or additional tubes or pipes configured to supply the collected water of the first water collection tank 800.

[0070] The second water collection tank 810 is installed to collect water discharged from the rinsing part 500. The collected water of the second water collection tank 810 may be reused as the washing water of at least one of the third washing part 400, the second washing part 300 and the first washing part 200. To do this, the second water collection tank 810 may include at least one nozzle of the third washing nozzle 410, the second washing nozzle 320, the first washing nozzle 210 and the soaking tank 220, or additional tubes or pipes configured to supply the collected water of the second water collection tank 810.

[0071] The third water collection tank 820 is installed to collect water discharged from the third washing part 400 or the second washing part 300. The collected water of the third water collection tank 820 may be reused in the first washing part 200. To do this, the third water collection tank 820 may include additional tubes or pipes configured to supply the collected water to the first washing nozzle 210 and the soaking tank 220.

[0072] In one example, the water discharged from the dewatering part 600 is collected in the first water collection tank 800, and subsequently, is supplied to the rinsing nozzle 510 of the rinsing part 500. The water discharged from the rinsing part 500 is collected in the second water collection tank 810, and subsequently, is supplied to the third washing nozzle 410 of the third washing part 400 and the second washing nozzle 320 of the second washing part 300. The water discharged from the third washing part 400 and the second washing part 300 is collected in the third water collection tank 820, and subsequently, is supplied to the first washing nozzle 210 of the first washing part 200 and the soaking tank 220. Thereafter, the water may be treated as wastewater.

[0073] Therefore, according to the present disclosure, it is possible to reduce water consumption to approximately 50% or less by reusing the water discharged in each process, compared with the case of treating, as the wastewater, the water discharged in the washing, rinsing and dewatering processes as in the related art. More specifically, in the related art, in a case in which 120 bed sheets are washed by a washing machine having a capability of 100kg, all the water of 500L used in a washing step, the water of 500 L used in a rinsing step (repeated two or three times), and the water of 500L used in a dewatering step are treated as the wastewater. As a result, a total of 1.5 to 2 tons of water was consumed. On the other hand, in the case of using the apparatus of the present disclosure, the water is recycled during the washing, rinsing and dewatering steps, and the wastewater treatment is performed once. This makes it possible to save the water consumption to approximately 50% or less.

[0074] As described above, those of ordinary skill in the technical field belong to the present disclosure will readily appreciate that the present disclosure can be implemented in other specific forms without changing the technical spirit or essential features. Therefore, it should be noted that the embodiments disclosed herein are exemplary in all respects and are not restrictive. The scope of the present disclosure is shown by the following claims rather than the detailed description, and all changes or modifications derived from the meaning and scope of the accompanying claims and theirs equivalents are intended to fall within the scope of the present disclosure.

Claims

1. An integral type washing machine comprising:

a conveyor installed to convey a laundry placed thereon; and

a washing part including at least one washing nozzle configured to discharge a washing water toward the laundry which is being conveyed by the conveyor.

2. The integral type washing machine of Claim 1, further comprising: at least one of

a feeding part 100 including a feeding conveyor installed to convey the laundry to the washing part when the laundry is placed on the feeding conveyor while being unfolded;

a rinsing part 500 including at least one rinsing nozzle installed to discharge a rinsing water so as to rinse the laundry passed through the washing part;

a dewatering part 600 including rollers installed in a vertical relationship with each other to pass the laundry therethrough and to squeeze the laundry passed through the washing part or the rinsing part 500; and

a discharging part 700 installed to discharge the laundry passed through the washing part, the rinsing part 500 or the dewatering part 600,

wherein the laundry is conveyed to the washing part, the rinsing part 500, the dewatering part 600, or the discharging part 700 by the conveyor.

3. The integral type washing machine of Claim 2, wherein the washing part includes at least one of:

a first washing part 200 including a first washing nozzle 210 configured to discharge the washing water toward the laundry conveyed from the feeding part 100 and a soaking tank 220 configured to soak the laundry passed through the first washing nozzle 210 therein;

a second washing part 300 including a sensor 310 installed to sense the laundry discharged and conveyed from the soaking tank 220, and a second washing nozzle 320 installed to discharge the washing water toward the laundry sensed by the sensor 310; and

a third washing part 400 including a third washing nozzle 410 installed to discharge the washing water toward the laundry passed through the second washing part 300,

wherein a detergent or a fabric softener is contained in the washing water of the first washing part 200, the second washing part 300 or the third washing part 400.

4. The integral type washing machine of Claim 3, wherein the second washing nozzle 320 includes at least one of a 2-1st washing nozzle 321, a 2-2nd washing nozzle 322 and a 2-3rd washing nozzle 323, which are installed to discharge the washing water with respect to the laundry under conveyance, in a vertical direction, at an angle of 5 to 45 degrees in a conveyance direction of the laundry, or at an angle of 5 to 45 degrees in a direction opposite the conveyance direction.

5. The integral type washing machine of Claim 3 or 4, wherein the third washing nozzle 420 includes at least one of a 3-1st washing nozzle 411, a 3-2nd washing nozzle 412 and a 3-3rd washing nozzle 413, which are installed to discharge the washing water with respect to the laundry under conveyance, in the vertical direction, at the angle of 5 to 45 degrees in the conveyance direction of the laundry, or at the angle of 5 to 45 degrees in the direction opposite the conveyance direction.

6. The integral type washing machine of Claim 3, wherein the washing part further includes at least one of a detergent tank 230 and a fabric softener tank 420 which are installed to supply a detergent or a fabric softener to the washing water to be supplied to the first washing nozzle 210, the soaking tank 220, the second washing nozzle 320 or the third washing nozzle 410.

7. The integral type washing machine of Claim 3, wherein the conveyor further includes at least one of a first conveyor, a second conveyor and a third conveyor, the first conveyor including a plurality of rollers and a first belt 337 installed to span over the plurality of rollers so as to convey the laundry from the first washing part 200 to the second washing part 300, the second conveyor including a plurality of rollers and a second belt 434 installed to span over the plurality of rollers so as to convey the laundry from the third washing part 400 to the rinsing part 500, and the third conveyor including a plurality of rollers and a third belt 545 installed to span over the plurality of rollers so as to convey the laundry from the rinsing part 500 to the dewatering part 600.

8. The integral type washing machine of Claim 7, wherein the first conveyor further includes at least one of: a first roller 330 and a second roller 331 which are installed in parallel to pass therethrough the laundry conveyed from the feeding part 100, a third roller 332 installed inside the soaking tank 220 to soak the laundry passed through the first roller 330 and the second roller 331 in the soaking tank 220, a fourth roller 333 installed at a front side of the second washing nozzle 320 to switch the conveyance direction of the laundry discharged from the soaking tank 220, a fifth roller 334 installed at a rear side of the second washing nozzle 320 to switch the conveyance direction of the laundry discharged from the soaking tank 220, and a sixth roller 335 and a seventh roller 336

installed to return the first belt 337 spanned over the fifth roller 334 to the first roller 330.

9. The integral type washing machine of Claim 8, wherein the second conveyor further includes at least one of: an eighth roller 430 disposed above the first conveyor in the vicinity of the fifth roller 334 so as to apply a tension to the first belt 337 spanned over the fifth roller 334, a tenth roller 432 installed at a rear side of the third washing nozzle 410, a 11th roller installed to return the second belt 434 spanned over the tenth roller 432 to the eighth roller 430, a ninth roller 431 installed so as to apply a tension to the second belt 434 spanned over the first roller 330 and the 11th roller 433.

10. The integral type washing machine of Claim 9, wherein the third conveyor further includes at least one of: a 12th roller 430 disposed above the second conveyor in the vicinity of the 11th roller 433 so as to apply a tension to the second belt 434 spanned over the 11th roller 433, 13th and 14th rollers 541 and 542 installed at a rear side of the rinsing nozzle 510, a 15th roller 543 installed so as to apply a tension to the third belt 545 spanned over the 14th roller 542 and the 12th roller 540.

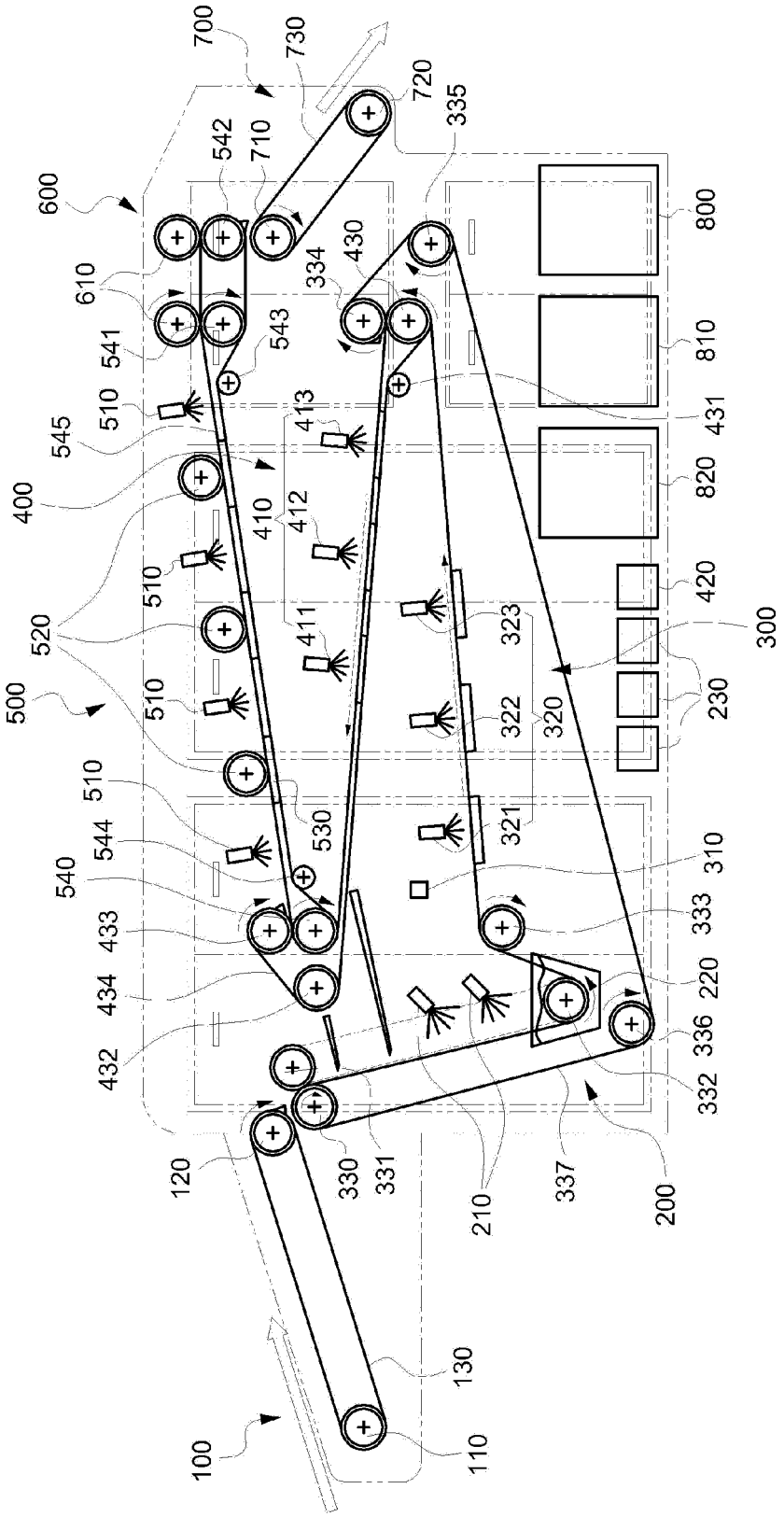
11. The integral type washing machine of Claim 10, wherein the first belt 337, the second belt 434 and the third belt 545 are general flat belts or belts having a net shape or a porous shape in which the washing water or the rinsing water passes.

12. The integral type washing machine of Claim 10, wherein the fabric softener tank 420 is configured to be connected to at least one of the rinsing nozzles 510 which have a dewatering function of removing the detergent.

13. The integral type washing machine of Claim 10, wherein the dewatering part 600 includes at least one dewatering roller 610 installed above the 13th roller 541 or the 14th roller 542 and configured to dewater the laundry which being conveyed through the third belt 545 by allowing the laundry to pass through the at least one dewatering roller 610.

14. The integral type washing machine of Claim 3, further comprising: at least one of a first water collection tank 800 installed to collect the water discharged from the dewatering part 600 and feed the collected water to the rinsing nozzle 510 of the rinsing part 500; a second water collection tank 810 installed to collect the water discharged from the rinsing part 500 and feed the collected water to the second washing nozzle 320 of the second washing part 300 and the third washing nozzle 410 of the third washing part 400; and a third water collection tank 820 installed to collect the water discharged from the second washing part 300 and the third washing part 400, and feed the collected water to the first washing nozzle 210 of the firth washing part 200 and the soaking tank 220.

[Fig. 1]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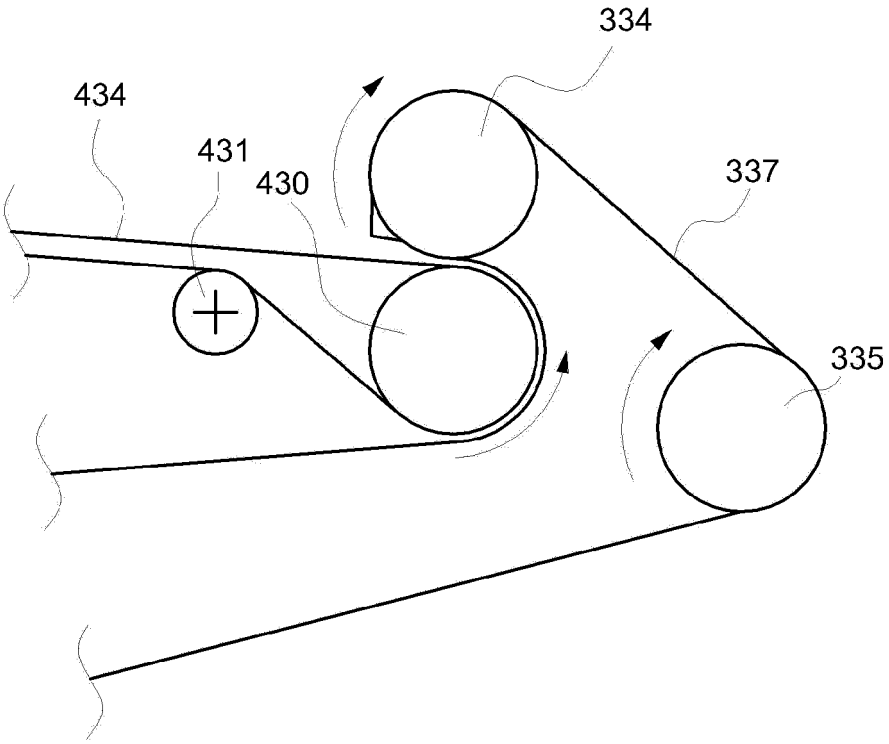
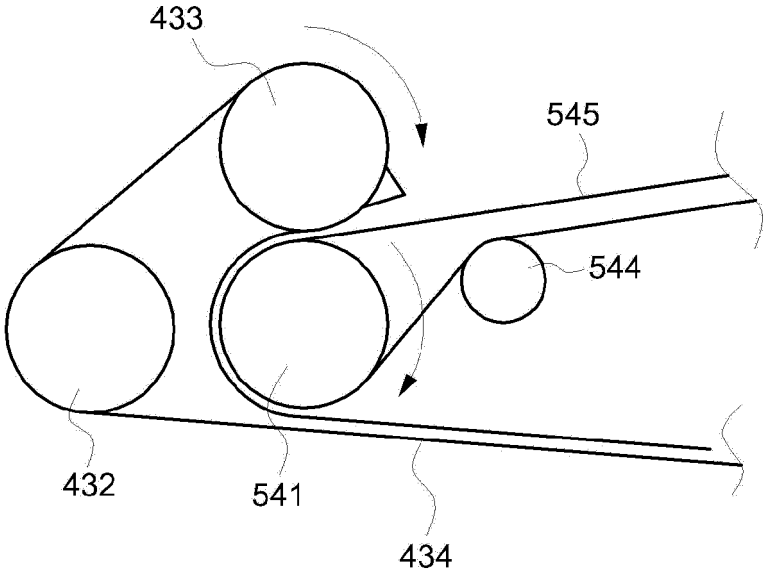
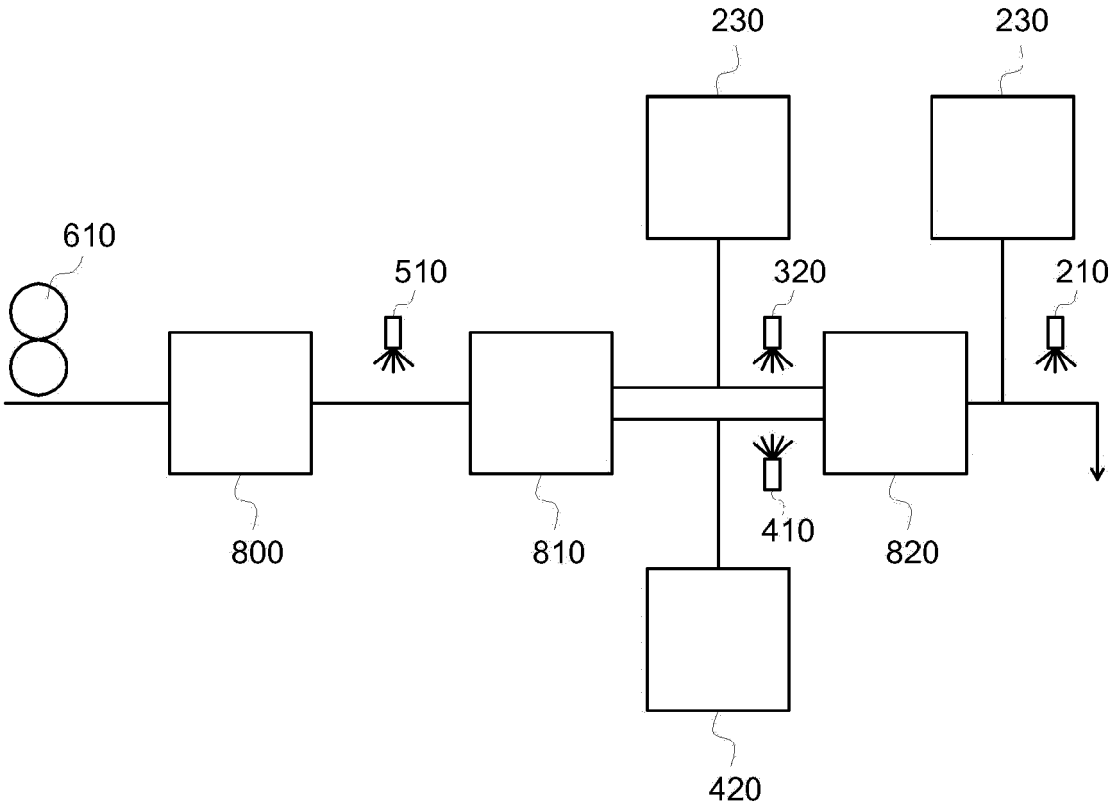
[Fig. 2]



[Fig. 3]



[Fig. 4]



INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR2018/005042

A. CLASSIFICATION OF SUBJECT MATTER

D06F 35/00(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
D06F 35/00; D06F 29/00; D06F 15/02; G01G 19/42; D06F 11/00; D06F 31/00; B08B 3/04; D06F 45/22

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
Korean Utility models and applications for Utility models: IPC as above
Japanese Utility models and applications for Utility models: IPC as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
eKOMPASS (KIPO internal) & Keywords: laundry, conveyor, transfer, wash water, rinsing water, washing part, washing nozzle

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5728977 A (JUDAY, Tomas W. et al.) 07 March 1998. See column 1, lines 39-42; column 2, line 28-column 3, line 18; and figure 1.	1-2
Y		3-14
Y	KR 10-2010-0118495 A (JOO, Sung Ki) 05 November 2010. See paragraphs [0019]-[0037]; claim 1; and figures 3, 5.	3-14
Y	KR 10-2009-0062559 A (LEE, Kwang Min) 17 June 2009. See paragraphs [0016]-[0035]; claims 3-5; and figures 1, 2a-2b, 3a-3b.	3-14
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X	KR 10-2000-0007315 A (LG ELECTRONICS INC.) 07 February 2000 See page 2, line 12-page 3, line 15; claims 1-2 and 4-5; and figures 1-2.	1-2
Y		3-14
A	JP 2002-282573 A (ITO, Yasushi) 02 October 2002. See paragraphs [0043]-[0055]; and figures 1-5.	1-14

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

* Special categories of cited documents:
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Date of the actual completion of the international search	Date of mailing of the international search report
08 AUGUST 2018 (08.08.2018)	**08 AUGUST 2018 (08.08.2018)**
Name and mailing address of the ISA/KR Korean Intellectual Property Office Government Complex-Daejeon, 189 Seonsa-ro, Daejeon 302-701, Republic of Korea Facsimile No. +82-42-481-8578	Authorized officer Telephone No.

Form PCT/ISA/210 (second sheet) (January 2015)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
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REFERENCES CITED IN THE DESCRIPTION

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- KR 100822644 **[0006]**