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(71) Applicant: **Kim, Moon Hwan**
Anseong-si, Gyeonggi-do 17578 (KR)

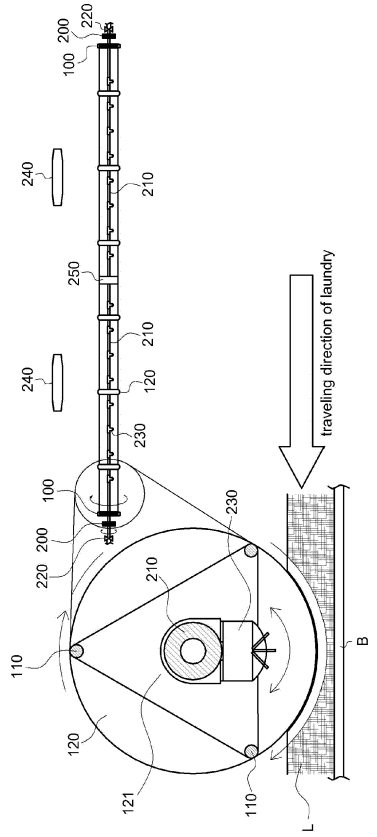
(72) Inventor: **Kim, Moon Hwan**
Anseong-si, Gyeonggi-do 17578 (KR)

(74) Representative: **dompatent von Kreisler Selting Werner -**
Partnerschaft von Patent- und Rechtsanwälten mbB
Deichmannhaus am Dom
Bahnhofsvorplatz 1
50667 Köln (DE)

(54) LAUNDRY CONVEYANCE APPARATUS PROVIDED WITH NOZZLES

(57) The present invention relates to a laundry conveyance apparatus provided with a nozzles and, in a washing machine configured to spray washing water, rinsing water or fabric softener to laundry, placed in an unfolded state on a support plate, comprises:.a conveyance means installed so as to convey the laundry in one direction; and nozzle means installed so as to spray the wash water, the rinsing water or the fabric softener to the laundry conveyed by the conveyance means.

[Fig. 1]



EP 3 620 566 A1

Description

[Technical Field]

[0001] The present invention relates to a transportation device capable of transporting a laundry in a washer, and more particularly, to a laundry transportation device with a nozzle which can transport the laundry in one direction by rotating in one direction while the laundry placed on a main body supporting part is pressed downward.

[Background Art]

[0002] In general, a variety of laundry occurs in everyday life, these laundry are periodically washed for a clean and hygienic life.

[0003] In ordinary homes, there are beddings such as blankets, bedclothes, and large laundry such as carpets, sofas, and curtains, since it is very difficult to wash these at home, the laundry is done in a laundry factory by requesting a specialized treatment shop. And also, the amount of laundry generated in multi-use facilities such as hotels, factories, dormitories, training centers and hospitals is very large, due to the relatively large proportion of laundry, it is mainly processed in specialized treatment shops and laundry plants.

[0004] On the other hand, when the laundry is washed by using a washing machine that washes the laundry by spraying the wash water while transporting the laundry on the conveyor, every time the washing process, the rinsing process and the dehydration process are finished, since the laundry is disturbed, the laundry must be unfolded before entering each process. Such works are done by hand, so the worker must be positioned where each process ends or each process begins, the hard work of standing and spreading the laundry for a long time is required, as a result, there occurs the problems that the washing time increases, as well as the cost increases.

[Summary of Invention]

[Technical Problem]

[0005] In order to overcome the above-described problems, an object of the present invention is to provide a laundry transporting device with a nozzle capable of transporting the unfolded laundry to the last process at a state of undisturbed by installing a transporting means provided with a fixing rod and a transporting roller so as to rotate in place while the laundry is pressed at a predetermined interval to the direction that the laundry is transported, and installing a nozzle means installed to spray the wash water, the rinsing water or the fabric softener to the laundry.

[Solution to Problem]

[0006] In order to achieve the aforementioned objects, a laundry transporting device with a nozzle in accordance with the present invention, in a washing machine manufactured to spray the wash water, the rinsing water or the fabric softener to the laundry placed on the supporting plate at an expanded state, includes a transporting means installed for transporting the laundry to one direction; and a nozzle means installed for spraying the wash water, the rinsing water or the fabric softener to the laundry transported by the transporting means.

[0007] Herein, the transporting means includes a first rotating member disposed respectively on left and right sides on a front and installed to rotate in place by a power source, a fixing rod fixed by connecting the compatible first rotating member and at least one transporting roller installed so as to transport to one direction by being in contact with the laundry while rotating in place by being mounted on the fixing rod at a predetermined interval.

[0008] And also, the transporting roller is in the form of a cavity with an inner space in a longitudinal direction and is installed to rotate in place together with the fixing rod by inserting the fixing rod into the inner space.

[0009] Meanwhile, the nozzle means includes a second rotating member disposed respectively on left and right sides on a front and installed to rotate in place by a power source, a supplying pipe installed to flow the wash water, the rinsing water or the fabric softener by being connected to a water tank, a valve mounted to control the flow of the wash water, the rinsing water or the fabric softener flowing to the supplying pipe, at least one nozzle installed to spray the wash water, the rinsing water or the fabric softener of the supplying pipe to the laundry, and at least one detecting sensor installed to detect the laundry entering and passing the nozzle.

[0010] At this time, the supplying pipe is installed by penetrating into the inner space of the transporting roller prepared in the longitudinal direction.

[0011] Herein, the nozzle means further includes at least one separating plate fixed to the fixing rod so as to ensure the in-situ rotation of the supplying pipe by being placed at the inner end of the opposite supplying pipe, if two supplying pipes are arranged parallel in front and valves are installed at the outer ends of these supplying pipes, respectively.

[0012] At this time, the detecting sensors are placed close to each supplying pipe, and one or two supplying pipes are installed to rotate depending on the presence or absence of detection.

[0013] And also, the nozzle reciprocates in the angle range of 5 to 45 degrees to the traveling direction of the laundry when the laundry enters, reciprocates in the angle range of 45 degrees on the left and right sides with reference to the downward vertical line while the laundry passes, and reciprocates in the angle range of 5 to 45 degrees in the reverse direction to the traveling direction of the laundry after the laundry passes.

[0014] On the other hands, a method for operating the laundry transporting device in accordance with the present invention includes: a step S10 of detecting the

laundry entering with being placed on the supporting plate by the detecting sensor; a step S20 of spraying the wash water, the rinsing water or the fabric softener while the nozzle reciprocates in the angle range of 5 to 45 degrees to the traveling direction of the laundry when the detecting sensor detects the laundry; a step S30 of spraying the wash water, the rinsing water or the fabric softener while the nozzle reciprocates in the angle range of 45 degrees on the left and right sides with reference to the downward vertical line while the laundry passes; a step S40 of spraying the wash water, the rinsing water or the fabric softener while the nozzle reciprocates in the angle range of 5 to 45 degrees in the reverse direction to the traveling direction of the laundry L on the sides when the detecting sensor recognizes the rear end of the laundry L; and a step S50 of returning to the step S20 when the detecting sensor detects the next laundry L and stopping the operation if not detected.

[0015] And, in the step S10, at least one detecting sensor installed on both sides on the front detects the laundry, one or two valves are open depending on the presence or absence of detecting the laundry in the detecting sensor, and the wash water, the rinsing water or the fabric softener are supplied to one or two supplying pipe to spray through the nozzle.

[Advantageous Effects of Invention]

[0016] According to the present invention as described above, there are effects capable of transporting the expanded laundry to the last process at the state of undisturbed by transporting the expanded and loaded laundry as it is by the transporting means provided with a transporting roller for rotating the expanded and loaded laundry in place.

[0017] In addition, there are effects capable of performing the wash and the rinsing smoothly and effectively while the laundry maintains the expanded state by spraying the wash water, the rinsing water or the fabric softener to the laundry while the nozzle reciprocates within different ranges of angle, respectively, when it enters and passes the expanded and transported laundry and after passes.

[Brief Description of Drawings]

[0018] The following drawings attached in this specification illustrate preferred embodiments of the present invention, and together with the detailed description thereof serve to further understand the technical spirit of the present invention; and therefore, the present invention should not be interpreted as being limited only to the matters described in the drawings.

Fig. 1 is a side view schematically showing a laundry transportation device with a nozzle according to the present invention;

Fig. 2 is a flow chart schematically showing the laundry transportation device with the nozzle shown in Fig. 1; and

Fig. 3 is a view showing a laundry pressing trajectory due to a transporting roller and a fixing rod.

<Descriptions of reference numerals>

[0019]

100: a first rotating member
110: a fixing rod
120: a transporting roller
121: an inner space
200: a second rotating member
210: a supplying pipe
220: a valve
230: a nozzle
240: a detecting sensor
250: a separating plate
300: a first trajectory
400: a second trajectory
B: a supporting plate
L: a laundry

[Description of Embodiment]

[0020] 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>

[0021] A laundry transportation device with a nozzle according to the present invention is installed on a washing machine by spraying wash water while the laundry is transported with being placed on a conveyor or a supporting plate. The laundry transportation device is configured to transport the laundry in one direction by being rotated in place with pressing the laundry placed on the conveyor or the supporting plate downward and to spray wash water, rinse water or fabric softener towards the laundry.

[0022] Hereinafter, a laundry transportation device with a nozzle according to the preferred embodiments of the present invention will be described in detail with reference to Fig. 1.

[0023] The laundry transportation device with the nozzle according to the present invention includes a transporting device and a nozzle device as shown in Fig. 1.

[0024] The transporting device includes a first rotating member 100, a fixing rod 110 and a transporting roller 120.

[0025] Herein, the first rotating member 100 is installed to rotate in place by a separately installed power source. The first rotation member 100 may be a gear or a pulley respectively disposed on the left and right sides on the front, and may be a conventional member capable of rotating in place by a power source. In one example, the first rotating member 100 on both sides of the fixing rod 110 may be rotated by a power source, respectively. As another example, the first rotating member 100 on one side may be a driving member that rotates by a power source, the first rotating member 100 on the other side may be installed to be a driven member. Definitely, since the first rotating member 100 on one side and the first rotating member 100 on the other side are connected by the fixing rod 110, it is natural to rotate both of them at the same time.

[0026] And also, the fixing rod 110 is a member installed by connecting the compatible first rotating member 100. The fixing rod 110 may be fixed to one or more transporting rollers 120 arranged at a predetermined interval. For example, as shown in Fig. 1, the fixing rods 110 may be arranged to form three triangles on the side approximately. In addition, two or four or more fixing rods 110 may be installed.

[0027] And the transporting roller 120 is mounted on the fixing rod 110 to press the laundry L downward, and is a roller for transferring the laundry L in one direction with rotating in place together with the fixing rod 110. The transporting roller 120 is a form which the inner space 121 is processed in the longitudinal direction. In addition, the transporting roller 120 may be made of a smooth material with a slight elasticity or impact absorption properties including rubber or synthetic resin to facilitate the transfer due to the high grip force with minimize the damage to the surface of the laundry L when the laundry L is pressured downward. Therefore, the supplying pipe 210 of the nozzle device may be installed through the inner space 121 of the transporting roller 120.

[0028] And, the transporting roller 120 may be mounted, for example, when three fixing rods 110 are approximately arranged in a triangular shape as shown in Fig. 1, in such a way that the inner space 121 is approximately fabricated into a triangular shape on the side and the fixing rod 110 is hang on the edge. In addition, even if two or four or more fixing rods 110 are fixed to the fixing rods 110 and may be inserted to be penetrated in the longitudinal direction to be rotated together or to be hang on the edge of the inner space 121, the inner space 121 may also be provided in various forms so that the supplying pipe 210 passes.

[0029] The transporting device configured as described above, when the first rotating member 100 rotates in place, is rotated in place together with the fixing rod 110 and the transporting roller 120, the transporting roller 120 may be configured to press the laundry L downward to transfer in one direction. Here, the laundry L is in the state mounted on the support plate B. At this time, the top surface of the support plate B may be manufactured in a smooth plate shape, for example, the loaded laundry L can be transferred by the rotation of the transporting roller 120, to be fixed. As another example, the support plate B may be a belt of a conveyor rotating in a caterpillar, at this time, the belt may move as the same or similar speed as the rotational speed of the transporting roller 120. The belt may be in the usual flat form or may be in the form of a mesh.

[0030] Meanwhile, the nozzle device includes a second rotating member 200, a supplying pipe 210, a valve 220, one or more nozzles 230, and one or more detecting sensors 240.

[0031] First, the second rotating member 200 is a member for rotating the supplying pipe 210 within a predetermined range of angles. The second rotating member 200 is disposed on both the left and right sides of the supplying pipe 210 on the front, respectively; and, more particularly, it is positioned so as not to interfere with the first rotating member 100. The second rotating member 200 may be installed to rotate by a separate power source. For example, it may be installed in such a way that the second rotating member 200 on any one side is a driving member that rotates by a power source and the second rotating member 200 in the other side is a driven member. As another example, both of the second rotating member 200 are driving members rotated by the power source, and in any case, only one of the second rotating member 200 may be rotated, and the description thereof will be described hereinafter in detail. The second rotating member 200 is installed to reciprocate in the forward or reverse direction with respect to the direction of travel of the laundry L, and it is to allow the supplying pipe 210 and the nozzle 230 to reciprocate at the same angle as well as the second rotating member 200.

[0032] Next, the supplying pipe 210 is a pipe for supplying wash water, rinsing water, or fabric softener to the plurality of nozzles 230. It may be connected to tanks containing wash water, rinsing water or fabric softeners outside the supply pipe 219, and may be installed to supply wash water, rinsing water or fabric softeners supplied from the tanks to the nozzle 230. Here, the supplying pipe 210 may be one installed by connecting the compatible second rotating member 200, or may be two mounted on both sides of the second rotating member 200 toward the center on the front. At this time, when the supplying pipe 210 is two, the second rotating members 200 on both sides are installed to rotate by different power sources, in consideration of the size of the laundry L passing from below or the situation in which the laundry L is moved to one side, it may be controlled to rotate only the second rotating member 200 of any one side. To this end, a plurality of separating plates 250 may be further installed on both sides of the fixing rod 110 on the front side. That is, the end portion of the supplying pipe 210 opposite to the second rotating member 200 and the separating plates 250 may be fastened, and the mounting structure may be rotated in place of the supplying pipe 210 by the second rotating member 200.

[0033] Next, the valve 220 is installed to block or flow the wash water, rinsing water or the softener flowing into the supplying pipe 210. The valve 220 may be installed near the compatible second rotating member 200, respectively, or may be installed in the supplying pipe 210, or it may be installed in a separate pipe connecting the supplying pipe 210 and a plurality of tanks containing wash water, rinsing water or fabric softener. The valve 220 is opened and closed by a signal from the detecting sensor 240, and can operate to open one or both of each supplying pipe 210. Of course, the valve 220 may adjust the flow rate as well as opening and closing of the wash water, rinsing water or the fabric softener. The valve 220 may be a conventional valve including a solenoid valve to open and close wash water, rinsing water, or fabric softener.

[0034] Next, the nozzle 230 is mounted to the supplying pipe 210 to spray the wash water, rinsing water or fabric softener to the laundry L. The nozzle 230 may be installed at a predetermined interval in plural at the longitudinal direction of the supplying piper 210. At this time, the nozzle 230 may rotate together with the supplying pipe 210 that rotates within a predetermined range of angle by the second rotating member 200. For this reason, the wash water, rinsing water, or fabric softener sprayed to the laundry L through the nozzle 230 may be sprayed within a range or angles. The description thereof will be described hereinafter in detail.

[0035] Finally, a plurality of detecting sensors 240 are installed to detect the laundry L entering and passing through the nozzle 230. The detecting sensor 240 may be installed to detect the laundry L prior to the injection of the wash water, rinsing water or the fabric softener or the nozzle 230. The detecting sensor 240 mounted on the support plate B detects the entering laundry L and the size thereof, and supplies the signal to spray the wash water, rinsing water or fabric softener from the nozzle 230 according to the area of laundry L and to stop the wash water, rinsing water or fabric softener sprayed from the nozzle 230 when the laundry L passes. In addition, the signal of the detecting sensor 240 may be open and close the valve 220 to control the flow of wash water, rinsing water or fabric softener, and may control the operation of the power source for rotating the second rotating member 200.

[0036] In addition, the signal of the detecting sensor 240 may control the in-situ rotation of the transporting roller 120 by controlling the operation of the power source for rotating the first rotating member 100. For example, the signal of the detecting sensor 240 may be directly transmitted to the valve 220, the power source of the second rotating member 200, and the power source of the first rotating member 100. As another example, a signal of the detecting sensor 240 may be transmitted to a controller installed separately, and then the controller may generate a control signal for controlling the power source of the valve 220 and the second rotating member 200.

<The operation of nozzle>

[0037] First, the detecting sensor 240 detects the laundry L entering with being placed on the supporting plate B S10. At this time, the plurality of detecting sensors 240 installed on both sides on the front side detect the laundry L; and, when the plurality of detecting sensors 240 detect the laundry L, wash water, rinsing water or fabric softener may be supplied to the supplying piper 210 by opening both sides of the valve 220. In addition, when only some of the detecting sensors 240 detects the laundry L, the wash water, rinsing water or fabric softener can be supplied only to one side supplying pipe 210 by opening only one side of the valve 220 in which the laundry L is detected.

[0038] Next, when the detecting sensor 240 detects the laundry L, the nozzle 230 sprays the wash water, the rinsing water or the fabric softener while the nozzle 230 reciprocates in an angle of range of 5 to 45 degrees in the traveling direction of the laundry L S20. That is, when the detecting sensor 240 detects the laundry L entering the nozzle 230, the nozzle 230 can spray the wash water, the rinsing water or the fabric softener while it has an angle range of 5 to 45 degrees in the traveling direction of the laundry L on the side with respect to the downward vertical line. This is to allow the laundry L to enter smoothly without falling from the supporting plate B.

[0039] Next, while the laundry L passes, the nozzle 230 sprays the wash water, the rinsing water or the fabric softener with reciprocating in the angular range of 45 degrees on the left and right sides with reference to the downward vertical line S30. This allows efficient washing or rinsing and can proceed with the laundry fixed.

[0040] Next, when the detecting sensor 240 recognizes the rear end of the laundry L, the nozzle 230 sprays the washing water, the rinsing water or the fabric softener while reciprocating in the angle range of 5 to 45 degrees in the reverse direction to the traveling direction of the laundry L on the side with respect to the vertical line S40. This is to allow the laundry L to proceed to the next step in the unfolded state as much as possible without disturbing the progress of the laundry L passing therethrough. Of course, the laundry L can be maintained in an unfolded state by the plurality of transporting rollers 120.

[0041] Finally, if the detecting sensor 240 detects the next laundry L, the process returns to the step S20, and if not detected, the operation is stopped.

[0042] As described above, washing and rinsing are carried out by maintaining the state in which the laundry L is unfolded by the plurality of transporting rollers 120 and the fixing rods 110 as it is, in this case, how the laundry is actually fixed will be described with reference to Fig. 3.

[0043] As Fig. 3 is a view showing the laundry L pressing trajectory by the transporting roller 120 and the fixing rod 110, the unfolded laundry L is to be transported to the last washing process without being disturbed by

transporting the laundry L laid out on the transporting device by the transporting the laundry L spread over the transporting device by the transporting roller 120 and the fixing rod 110 to rotate the laundry L in place when the laundry L enters by the first trajectory 300 pressed by the fixing rod 110 and the second trajectory 400 pressed by the transporting roller 120.

[0044] As described above, although the preferable embodiment of the present invention have been shown and described. It will be appreciated by those skilled in the art that various substitutions, modifications and variations may be made in these embodiments without departing from the principles and spirit of the general inventive concept, the scope of which is defined in the appended claims and their equivalents.

Claims

1. A laundry transporting device with a nozzle in a washer configured to spray wash water, rinsing water or fabric softener to a laundry L loaded on a supporting plate B at a state of unfolded comprising:

   a transporting means installed for transporting the laundry L to one direction; and
   a nozzle means installed for spraying the wash water, the rinsing water or the fabric softener to the laundry L transported by the transporting means,
   wherein the transporting means includes a first rotating member 100 disposed respectively on left and right sides on a front and installed to rotate in place by a power source, a fixing rod 110 fixed by connecting the compatible first rotating member 100 and at least one transporting roller 120 installed so as to transport to one direction by being in contact with the laundry L while rotating in place by being mounted on the fixing rod 110 at a predetermined interval.

2. The laundry transporting device with a nozzle according to claim 1, wherein the transporting roller 120 is in the form of a cavity with an inner space 121 in a longitudinal direction; and
   is installed to rotate in place together with the fixing rod 110 by inserting the fixing rod 110 into the inner space.

3. The laundry transporting device with a nozzle according to claim 1 or 2, wherein the nozzle means includes a second rotating member 200 disposed respectively on left and right sides on a front and installed to rotate in place by a power source, a supplying pipe 210 installed to flow the wash water, the rinsing water or the fabric softener by being connected to a water tank, a valve 220 mounted to control the flow of the wash water, the rinsing water or the fabric softener flowing to the supplying pipe 210, at least one nozzle 230 installed to spray the wash water, the rinsing water or the fabric softener of the supplying pipe 210 to the laundry L, and at least one detecting sensor 240 installed to detect the laundry L entering and passing the nozzle 230.

4. The laundry transporting device with a nozzle according to claim 3, wherein the supplying pipe 210 is installed by penetrating into the inner space of the transporting roller 120 prepared in the longitudinal direction.

5. The laundry transporting device with a nozzle according to claim 4, wherein the nozzle means further includes at least one separating plate 250 fixed to the fixing rod 110 so as to ensure the in-situ rotation of the supplying pipe 210 by being placed at the inner end of the opposite supplying pipe 210, if two supplying pipes 210 are arranged parallel in front and valves 220 are installed at the outer ends of these supplying pipes 210, respectively; and
   the detecting sensors 240 are placed close to each supplying pipe 210, and one or two supplying pipes 210 are installed to rotate depending on the presence or absence of detection.

6. The laundry transporting device with a nozzle according to claim 5, wherein the nozzle 230 reciprocates in the angle range of 5 to 45 degrees to the traveling direction of the laundry L when the laundry L enters, reciprocates in the angle range of 45 degrees on the left and right sides with reference to the downward vertical line while the laundry L passes, and reciprocates in the angle range of 5 to 45 degrees in the reverse direction to the traveling direction of the laundry L after the laundry L passes.

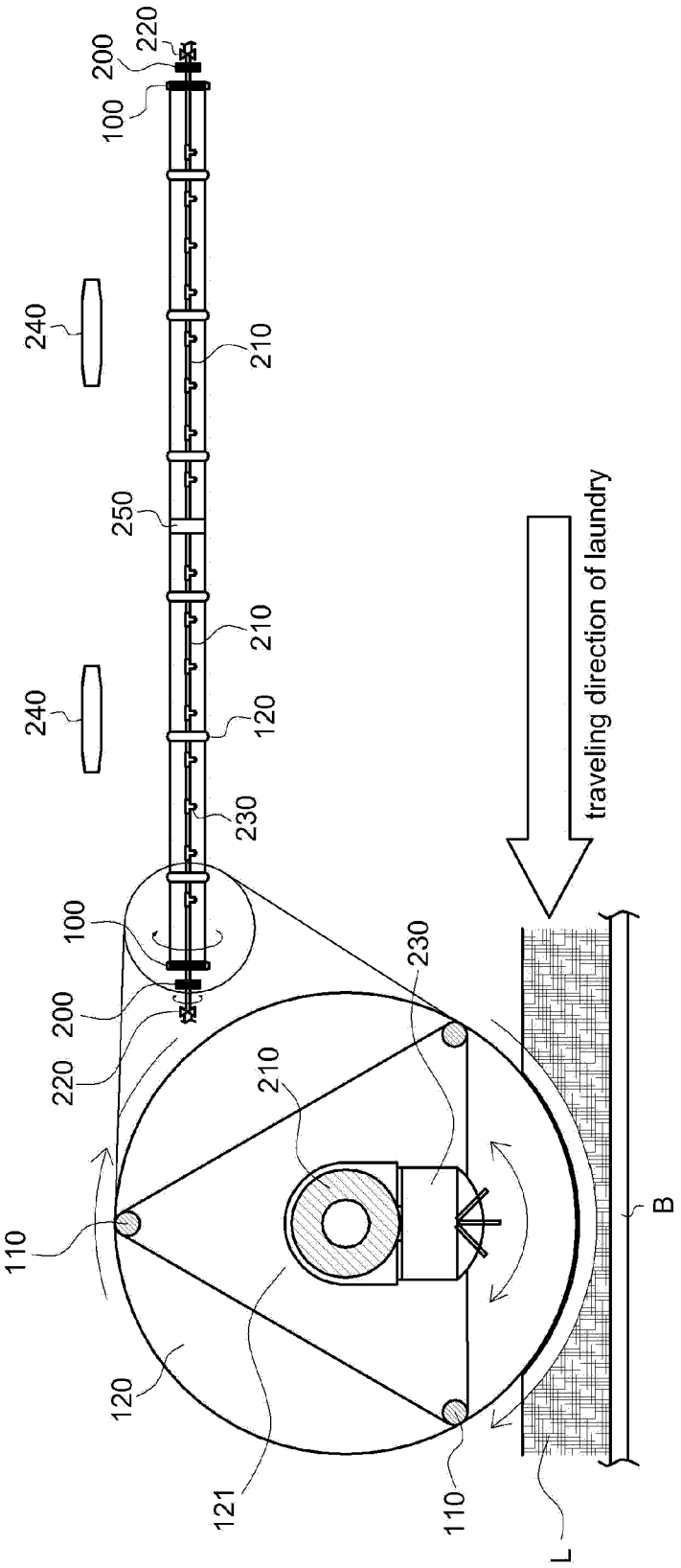
7. A method for operating the laundry transporting device of claim 6, comprising:

   a step S10 of detecting the laundry L entering with being placed on the supporting plate by the detecting sensor 240;
   a step S20 of spraying the wash water, the rinsing water or the fabric softener while the nozzle 230 reciprocates in the angle range of 5 to 45 degrees to the traveling direction of the laundry L when the detecting sensor 240 detects the laundry L;
   a step S30 of spraying the wash water, the rinsing water or the fabric softener while the nozzle 230 reciprocates in the angle range of 45 degrees on the left and right sides with reference to the downward vertical line while the laundry L passes;
   a step S40 of spraying the wash water, the rinsing water or the fabric softener while the nozzle

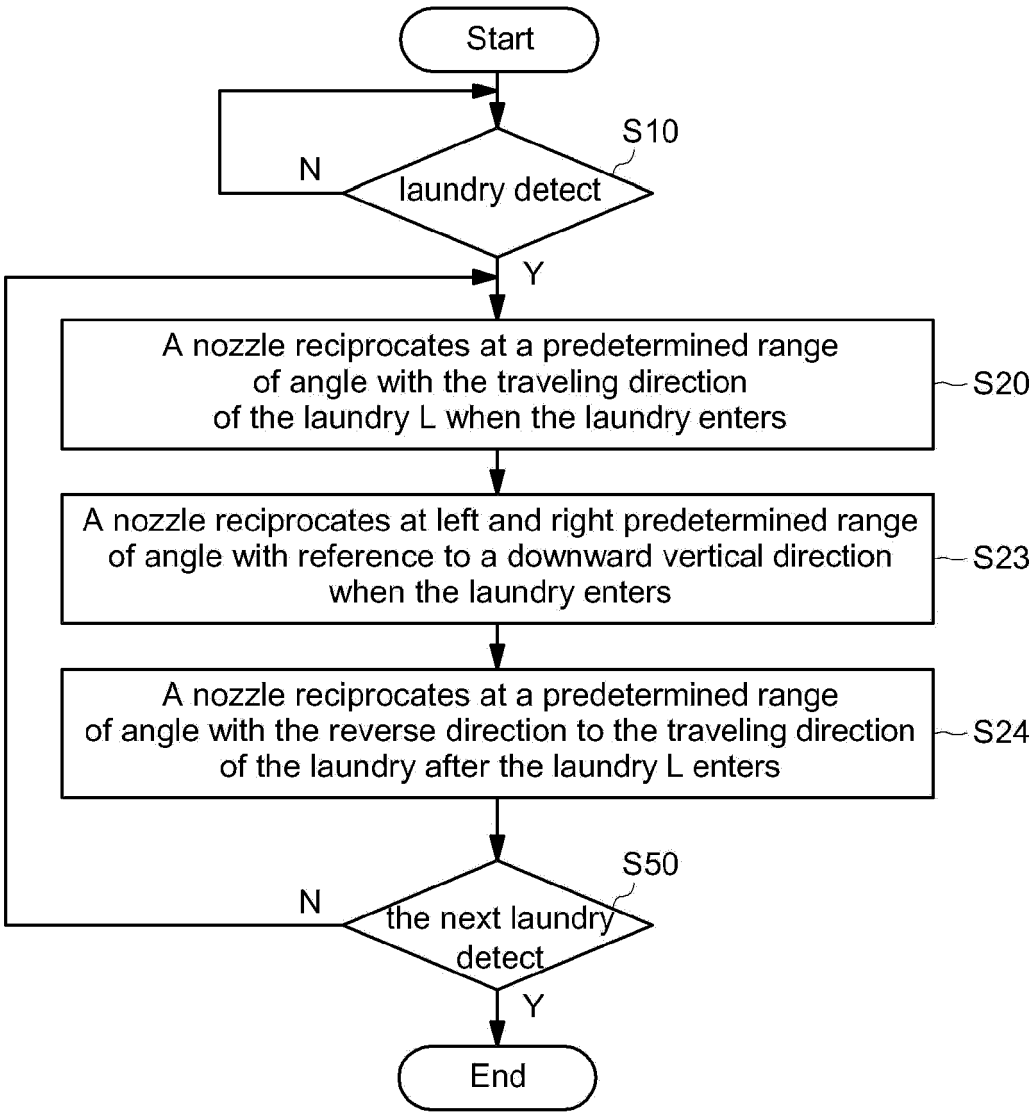
230 reciprocates in the angle range of 5 to 45 degrees in the reverse direction to the traveling direction of the laundry L on the sides when the detecting sensor 240 recognizes the rear end of the laundry L; and
a step S50 of returning to the step S20 when the detecting sensor 240 detects the next laundry L and stopping the operation if not detected.

8. The method according to claim 7, wherein, in the step S10, at least one detecting sensor 240 installed on both sides on the front detects the laundry L, one or two valves 220 are open depending on the presence or absence of detecting the laundry L in the detecting sensor 240, and the wash water, the rinsing water or the fabric softener are supplied to one or two supplying pipe 210 to spray through the nozzle 230.

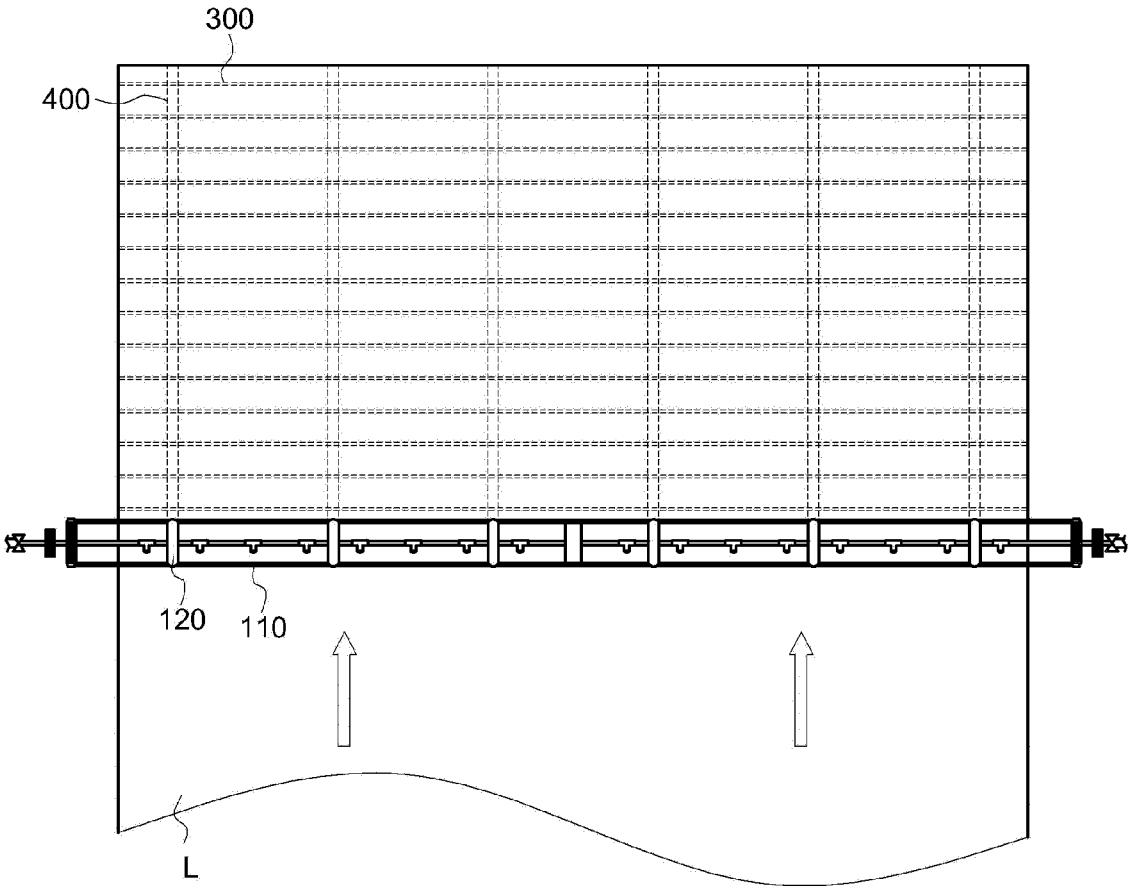
[Fig. 1]


220
200
100
240
210
250
210
240
120
230
100
200
220
210
230
110
120
121
110
L
B
traveling direction of laundry

[Fig. 2]


Start
S10
N
laundry detect
Y
A nozzle reciprocates at a predetermined range of angle with the traveling direction of the laundry L when the laundry enters
S20
A nozzle reciprocates at left and right predetermined range of angle with reference to a downward vertical direction when the laundry enters
S23
A nozzle reciprocates at a predetermined range of angle with the reverse direction to the traveling direction of the laundry after the laundry L enters
S24
S50
N
the next laundry detect
Y
End

[Fig. 3]


300
400
120
110
L

INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR2018/005043

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; A61L 2/04; D06F 15/02; D06F 31/00; A61L 2/12; D06F 27/00

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, wash water, rinsing water, fabric softener, nozzle, transfer roller, rotation

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	KR 10-2009-0062559 A (LEE, Kwang Min) 17 June 2009 See paragraphs [0016], [0021], [0026], [0033]; claims 1, 4; and figure 2a.	1-2
Y		3-4
A		5-8
Y	KR 10-0822644 B1 (FUSSO SPECIAL PURPOSE VEHICLE CO., LTD.) 16 April 2008 See paragraphs [0042]-[0053]; claim 1; and figure 3.	3-4
A	KR 10-2013-0016527 A (DO, Jeong-Ae) 18 February 2013 See paragraphs [0025]-[0051]; and figures 1-4.	1-8
A	JP 2002-282573 A (ITO, Yasushi) 02 October 2002 See paragraphs [0043]-[0055]; and figures 1-3.	1-8
A	KR 10-2000-0007315 A (LG ELECTRONICS INC.) 07 February 2000 See claims 1-5; and figures 1-2.	1-8

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

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
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Date of the actual completion of the international search	Date of mailing of the international search report
29 AUGUST 2018 (29.08.2018)	**29 AUGUST 2018 (29.08.2018)**
Name and mailing address of the ISA/KR Korean Intellectual Property Office Government Complex Daejeon Building 4, 189, Cheongsa-ro, Seo-gu, Daejeon, 35208, 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.
PCT/KR2018/005043

Patent document cited in search report	Publication date	Patent family member	Publication date
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