



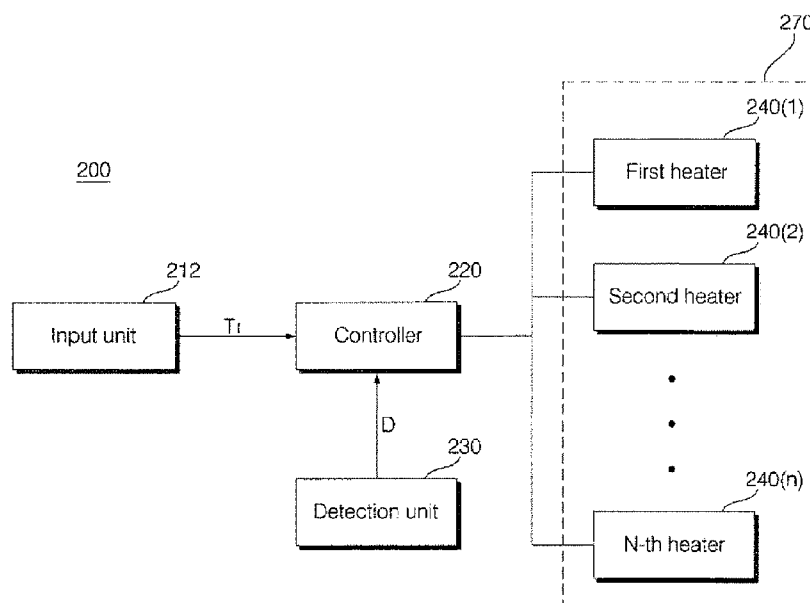
- (51) **International Patent Classification:**
D06F 58/28 (2006.01) *D06F 33/02* (2006.01)
- (21) **International Application Number:**
PCT/KR2016/001048
- (22) **International Filing Date:**
30 January 2016 (30.01.2016)
- (25) **Filing Language:** English
- (26) **Publication Language:** English
- (30) **Priority Data:**
10-2015-0015242 30 January 2015 (30.01.2015) KR
- (71) **Applicant:** LG ELECTRONICS INC. [KR/KR]; 128, Yeoui-daero, Yeongdeungpo-gu, Seoul 07336 (KR).
- (72) **Inventor:** BAE, Suncheol; 51 Gasan digital 1 ro, Geumchun-gu, Seoul 08592 (KR).
- (74) **Agent:** PARK, Byung Chang; 2F Dongju Bldg. Teheran-ro 8gil 8, Kangnam-gu, Seoul 06233 (KR).
- (81) **Designated States** (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM,

DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KN, KP, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

- (84) **Designated States** (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Published:

- with international search report (Art. 21(3))
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))

(54) **Title:** WASHING AND DRYING SYSTEM

(57) **Abstract:** A washing and drying system is disclosed. The system includes a washing machine that has a washing function. The system further includes a dryer that has a drying function. The dryer includes a drying unit that is configured to increase a temperature within a drying chamber that is configured to receive clothing. The dryer further includes a controller that is configured to set a capacity of the drying unit according to an operation termination time of the washing machine based on operation of the washing machine, and operate the drying unit according to the set capacity.

Description

Title of Invention: WASHING AND DRYING SYSTEM

Technical Field

- [1] The present disclosure relates to a washing and drying system.

Background Art

- [2] In general, a laundry processing device processes laundry through several operations such as washing, dehydration, and/or dry. Such a laundry processing device includes a washing machine that washes laundry such as clothing or bedding using an emulsification operation of detergent, a water flow operation occurring by a rotation of a washing tank or a washing blade, and a mechanical force in which the washing blade applies, a dryer that dries the laundry by applying hot wind or cold wind, and a refresher that smooths a crease of clothing by applying steam and further includes a device that complexly provides several functions such as a dryer combined washing machine.

Disclosure of Invention

Technical Problem

- [3] According to an innovative aspect of the subject matter described in this application a washing and drying system includes a washing machine that has a washing function; and a dryer that has a drying function and that includes a drying unit that is configured to increase a temperature within a drying chamber that is configured to receive clothing; and a controller that is configured to set a capacity of the drying unit according to an operation termination time of the washing machine based on operation of the washing machine, and operate the drying unit according to the set capacity.

Solution to Problem

- [4] The washing and drying machine may include one or more of the following optional features. The controller is configured to set the capacity of the drying unit set to a value that is inversely related to the operation termination time of the washing machine. The drying unit includes a plurality of heaters. The controller is further configured to set a number of the plurality of heaters to operate according to the operation termination time, and operate the number of the plurality of heaters. The dryer further includes a recording medium that is configured to store the number of the plurality of heaters to operate, each number of the plurality of heaters corresponding to a respective range of operation termination times. The action of setting the number of the plurality of heaters to operate includes identifying the respective range of operation termination times to which the operation termination time belongs. The drying unit includes a heat pump that is configured to increase a temperature within the drying

chamber. The controller is further configured to set a capacity of the heat pump according to the operation termination time.

- [5] The dryer further includes an input unit that is configured to receive, from a user, an input of the operation termination time. The washing machine includes a first communication unit that is configured to transmit, to a wired or wireless network, the operation termination time. The dryer further includes a second communication unit that is configured to receive, through the wired or wireless network, the operation termination time. The controller is configured to set a number of heaters to operate according to the operation termination time. The drying unit is further configured to detect an amount of clothing received. The controller is configured to determine a number of heaters to operate based on the amount of clothing received. The dryer further includes a detection unit that is configured to detect a drying rate of the clothing. The detection unit reduces a number of heaters operating based on the drying rate satisfying a threshold rate. The dryer further includes a detection unit that is configured to detect a drying rate of the clothing. The detection unit increases a number of heaters operating based on the drying rate not satisfying a threshold rate.
- [6] According to another innovative aspect of the subject matter described in this application a method of controlling a laundry processing system including a washing machine that has a washing function, and a dryer that has a drying function and that is configured to receive clothing includes the actions of providing, by the washing machine and to the dryer, an operation termination time of the washing machine; based on the operation termination time, setting a capacity of a drying unit that is configured to increase a temperature within a drying chamber of the dryer; and operating the drying unit according to the set capacity.
- [7] The method of controlling a laundry processing system may include one or more of the following optional features. The action of setting the capacity of the drying unit includes setting the capacity of the drying unit to a value that is inversely related to the operations termination time of the washing machine. The drying unit includes a plurality of heaters. The action of setting a capacity of a drying unit includes setting a number of the plurality of heaters to operate according to the operation termination time. The action of operating of the drying unit includes operating the number of the plurality of heaters. The actions further include storing the number of the plurality of heaters to operate, each number of the plurality of heaters corresponding to a respective range of operation termination times. The action of setting the number of the plurality of heaters to operate includes identifying the respective range of operation termination times to which the operation termination time belongs. The drying unit further includes a heat pump that is configured to increase a temperature within the drying chamber.

- [8] The action of setting a capacity of the drying unit includes setting a capacity of the heat pump according to the operation termination time. The action of providing an operation termination time of the washing machine includes receiving, from a user through an input unit located in the dryer the operation termination time. The action of providing an operation termination time of the washing machine includes transmitting, by the washing machine and through a wired or wireless network, the operation termination time; and receiving, by the dryer and through the wired or wireless network, the operation termination time. The actions further include detecting an amount of clothing received; and operating a number of heaters based on the amount of clothing received. The actions further include detecting a drying rate of the clothing; and reducing a number of heaters operating based on the drying rate satisfying a threshold rate. The actions further include detecting a drying rate of the clothing; and increasing a number of heaters operating based on the drying rate not satisfying a threshold rate.

Advantageous Effects of Invention

- [9] The present disclosure describes a washing and drying system and a method of controlling the same in which an operation termination time point of a dryer is set according to an operation termination time point of a washing machine, when simultaneously operating the washing machine and the dryer.
- [10] In a washing and drying system and a method of controlling the same, because a dryer and a washing machine can be simultaneously terminated, when the washing machine and the dryer are together operated, user convenience is improved.
- [11] Further, even if the dryer and the washing machine are together terminated, a non-dry or excessive dry phenomenon of clothing can be prevented from occurring.
- [12] Further, by adjusting a capacity of the dry unit of the dryer according to a termination time of the washing machine, a dry level of clothing and power consumption can be optimized.

Brief Description of Drawings

- [13] FIG. 1 is a diagram of an example washing and drying system.
- [14] FIGS. 2 and 3 are a block diagrams of example configurations of example dryers.
- [15] FIGS. 4 and 5 are a block diagrams of example configurations of example washing and drying systems.
- [16] FIG. 6 is a flowchart of an example method of controlling a washing and drying system.

Mode for the Invention

- [17] FIG. 1 illustrates an example washing and drying system.
- [18] Referring to FIG. 1, a washing and drying system 1 includes a washing machine 100 having a washing function of laundry and a dryer 200 having a dry function of laundry.

- [19] The washing machine 100 may include a water tank that stores water, a washing tank that houses laundry and rotatably provided within the water tank, a motor that rotates the washing tank, a water supply device that supplies water into the water tank or the washing tank, and a drainage device that discharges water within the water tank. However, the washing machine 100 may perform functions in addition to washing and may be, for example, a dryer combined washing machine that together provides a washing function and a dry function. Further, nowadays, a laundry processing device (e.g., a refresher) that removes contaminants of clothing by ejecting steam to the clothing disposed within a fixed space is used without a washing tank, and such a device also corresponds to the washing machine 100.
- [20] In such a washing machine 100, various elements such as a water tank, a washing tank, and a motor are disposed within a casing (or a main body) that forms an external appearance, and in the casing, a control panel 110 that provides an input unit 112 that receives an input of various setting for an operation control of the washing machine 100 from a user and a display unit 114 that displays an operation state of the washing machine 100 is provided.
- [21] The dryer 200 may include a drum that houses wet clothing, a motor that rotates the drum, and an air blowing device that sends hot wind or cold wind into the drum. Such elements are provided in a general washing machine and become more readily apparent to those skilled in the art and therefore a detailed description thereof will be omitted. However, the dryer 200 may perform functions in addition to drying and may be a dryer combined washing machine, and a laundry processing device such as a refresher that dries clothing by sending hot wind or cold wind to the clothing disposed within a fixed space without a drum also corresponds to the dryer 200.
- [22] In such a dryer 200, various elements such as a drum and a motor are disposed within a casing (or a main body) that forms an external appearance, and in the casing, a control panel 210 that provides an input unit 212 that receives an input of various setting for an operation control of the dryer 200 from the user and a display unit 214 that displays an operation state of the dryer 200 is provided.
- [23] In a home, the washing machine 100 and the dryer 200 are generally provided in a washing room separate from a living space in which the user generally activates, and the washing machine 100 and the dryer 200 may be normally installed at one location or may be respectively installed at separated rooms according to a situation. Hereinafter, it is defined that the washing and drying system 1 includes the washing machine 100 and the dryer 200 spatially located within a predetermined range. In some implementations, the washing machine 100 and the dryer 200 each are disposed at separated rooms within a constant range of a user residence.
- [24] FIG. 2 illustrates an example configuration of a dryer 200. FIG. 3 illustrates an

example configuration of a dryer. Hereinafter, to distinguish elements provided in the washing machine 100 and the dryer 200, 'first' is given in front of a name of elements provided in the washing machine 100, and 'second' is given in front of a name of elements provided in the dryer 200.

- [25] The dryer 200 includes a dry unit 270 that increases a temperature within a dry chamber into which clothing is injected and a controller 220 that sets a capacity of the dry unit 270 according to an operation termination time T_f of the washing machine while the washing machine 100 operates, and that operates the dry unit 270 according to a preset capacity.
- [26] The operation termination time T_f is a time consumed until operation of the washing machine 100 is terminated and may be calculated by the first controller 120 according to setting input through the first input unit 112 or may be a time in which the user directly inputs through the first input unit 112.
- [27] When the operation termination time T_f decreases, the second controller 220 sets the dry unit 270 to operate with a larger capacity. When the operation termination time T_f decreases, in order to more quickly dry clothing, by increasing a capacity of the dryer 200, when the washing machine 100 and the dryer 200 are simultaneously terminated with a lapse of the operation termination time T_f , a phenomenon in which clothing is not dried can be prevented from occurring.
- [28] In contrast, when the operation termination time T_f increases, the second controller 220 sets the dry unit 270 to operate with a smaller capacity, and when the washing machine 100 and the dryer 200 are simultaneously terminated with a lapse of the operation termination time T_f , a phenomenon in which clothing is excessively dried can be prevented from occurring.
- [29] The dry unit 270 may include a plurality of heaters 240 that increase a temperature within a dry chamber (e.g., drum) into which clothing is injected. In some implementations, the second controller 220 may set the number of heaters to operate among a plurality of heaters according to the operation termination time T_f of the washing machine 100 and operate the preset number of heaters.
- [30] In some implementations, the dry unit 270 may include a heat pump 250 having a refrigerant circulation cycle instead of the heater 240 or may together include a heater 240 and a heat pump 250 (see FIG. 3). In some implementations, the second controller 220 may set a capacity of the heat pump 250 according to the operation termination time T_f and operate the heat pump 250 according to a preset capacity.
- [31] The heat pump 250 may include a compressor that circulates refrigerant through a closed flow channel, and a capacity of the heat pump 250 may be determined according to a driving frequency of the compressor. Hereinafter, it is described that the dry unit 270 includes at least one of the heater 240 or the heat pump 250. In some im-

plementations, the dry unit 270 includes an exothermic means using a Peltier element and an exothermic means using a gas.

- [32] When a processing of laundry injected into the washing machine 100 is complete, a user takes out the laundry from the washing machine 100 and moves the laundry to the dryer 200, injects again other laundry into the washing machine 100, inputs various setting through the first input unit 112, and operates the washing machine 100. A remaining time until operation of the washing machine 100 is terminated may be displayed through the first display unit 114. In some implementations, a remaining time displayed in the first display unit 114 may be an operation termination time T_f , the user checked the operation termination time T_f may input the operation termination time T_f through the second input unit 212 provided in the dryer 200. The second controller 220 sets the number of heaters 240 to be operated while operating the dryer 200 according to the operation termination time T_f input in this way. That is, the number of heaters 240 to be operated may be changed according to the operation termination time T_f . Table 1 illustrates the number of heaters 240 and a capacity of the heat pump 250 operating according to the operation termination time T_f when the n number of heaters 240(1) to 240(n) and the heat pump 250 are provided in the dryer 200 (see FIG. 3).

- [33] Table 1
[Table 1]

Segment	Operation termination time T_f	Capacity of dry unit	
		The number of operation heater	Capacity of heat pump ($a_{n-1} > a_n$, $n=1,2,3...$)
1	$T_0 \leq T_f < T_1$	n	100%
2	$T_2 \leq T_f < T_3$	$n-1$	$a_1\%$
3	$T_3 \leq T_f < T_4$	$n-2$	$a_2\%$
..		...	...
n	$T_n \leq T_f < T_{n+1}$	1	10%

- [34] As shown in Table 1, because the number of operating heaters is previously determined according to a segment to which the operation termination time T_f belongs, the number of heaters may be stored at a recording medium such as a memory, and the second controller 220 may control to operate heaters of the number corresponding to a segment to which the operation termination time T_f input through the second input unit 212 belongs.
- [35] It can be seen that the number of the heaters 240 operating while the dryer 200

operates reduces, as the operation termination time T_f increases, and when an operation time of the dryer 200 is long, laundry may be dried for an enough time and thus the laundry may be fully dried even with a small number of heaters. That is, when an operation time of the dryer 200 is long, by reducing the number of operating heaters, clothing is prevented from being excessively dried, and in contrast, when the dryer 200 is operated, by increasing the number of operating heaters, clothing may be fully dried.

[36] Further, as shown in Table 1, the second controller 220 may control to set a capacity of the heat pump 250 according to the operation termination time T_f and to operate the heat pump 250 according to a preset capacity while the dryer 200 operates.

[37] A user may select an amount of clothing injected into the dryer 200 through the second input unit 212, and in some implementations, the number of heaters corresponding to each segment may be increased or decreased according to the selected clothing amount. For example, when an amount of clothing selected through the second input unit 212 is a large amount, if it is assumed that the operation number of heaters according to division of Table 1 is applied, when an amount of clothing selected through the second input unit 212 is a small amount, the smaller number of heaters may be changed to be set to the same segment, compared with a large amount of clothing (e.g., a heater operating at a second segment is set to $n-2$). In some implementations, an amount of clothing may be automatically detected, and the second controller 220 may increase or decrease the number of operation heaters corresponding to each segment according to the detected clothing amount.

[38] The dryer 200 may include a detection unit 230 that detects a dry level D of clothing. In some implementations, the second input unit 212 may include an input means that receives an input of a dry level D_{set} in which the user requests. For example, as shown in Table 2, the number of heaters 240 to be operated according to the operation termination time T_f and a dry level D_{set} may be previously determined and stored at a recording medium.

[39] Table 2

[Table 2]

Segment	Operation termination time T_f	Dry level Dset	Capacity of dry unit	
			The number of operation heater	Capacity of heat pump ($b_{n-1} > b_n$, $n=1,2,3,\dots$)
1	$T_{10} \leq T_f < T_{11}$	$70\% \leq Dset < 80\%$	n-2	b2
		$80\% \leq Dset < 90\%$	n-1	b1
		$90\% \leq Dset < 100\%$	n	100
2	$T_{11} \leq T_f < T_{12}$	$70\% \leq Dset < 80\%$	n-3	b3
		$80\% \leq Dset < 90\%$	n-2	b2
		$90\% \leq Dset < 100\%$	n-1	b1
...	...	...	...	...
n	$T_n \leq T_f < T_{n+1}$	$70\% \leq Dset < 80\%$	1	b_{n-2}
		$80\% \leq Dset < 90\%$	2	b_{n-1}
		$90\% \leq Dset < 100\%$	3	b_n

[40] As shown in Table 2, even within the same segment to which the operation termination time T_f belongs, the number of heaters 240 to be operated according to a dry level Dset again input through the second input unit 212 may be changed. That is, the second controller 220 may again change the number of heaters corresponding to each segment according to a dry level Dset, and in some implementations, as the dry level Dset increases, the number of heaters 240 to be operated is more largely set.

[41] FIG. 4 illustrates an example configuration of a washing and drying system.

[42] Referring to FIG. 4, the washing machine 100 and the dryer 200 may include a first communication unit 160 and a second communication unit 260, respectively, connected by a predetermined network to communicate. The network may be a wire or wireless network.

[43] The first controller 120 transmits an operation termination time T_f of the washing machine to the network through the first communication unit 160, and the operation termination time T_f transmitted in this way is received through the second communication unit 260. The second controller 220 may set a capacity of the dry unit 270 according to the operation termination time T_f received through the second communication unit 260.

[44] Particularly, when the first communication unit 160 and the second communication unit 260 communicate through a wireless network, even if the washing machine 100

and the dryer 200 each are disposed at separated rooms, the operation termination time T_f may be notified, and thus in order for the user locating at a room in which the dryer 200 is disposed to determine the operation termination time T_f of the washing machine 100, it is unnecessary for the user to go to a room in which the washing machine 100 is disposed and thus user convenience is provided.

[45] FIG. 5 illustrates an example configuration of a washing and drying system.

[46] Referring to FIG. 5, the input unit 212 provided in the dryer 200 may include an input means that receives an input of a simultaneous termination instruction from a user. In some implementations, when a simultaneous termination instruction is input through the input unit 212, the controller 220 sets a capacity of the dry unit 270 according to an operation termination time T_f received through the communication unit 260. That is, only when a simultaneous termination instruction is input through the input unit 212, a capacity of the dry unit 270 is adjusted to simultaneously terminate the dryer 200 and the washing machine 100.

[47] FIG. 6 illustrates an example method of controlling a washing and drying system.

[48] Referring to FIG. 6, a method of controlling a washing and drying system includes step (S11) of notifying the dryer 200 of an operation termination time T_f of the washing machine 100, step (S12) of setting a capacity of the dry unit 270 that increases a temperature within a dry chamber of the dryer 200 into which clothing is injected according to the operation termination time T_f notified to the dryer 200, and step (S13) of operating the dry unit 270 according to a capacity set at step S12. A method of setting a capacity of the dry unit 270 according to the operation termination time T_f may be similar to the methods described above.

[49] As the dry unit 270 operates according to a capacity set at step S12, while clothing is dried, the detection unit 230 may continue to detect a dry level D of clothing (S14). The second controller 220 determines whether a dry level D detected by the detection unit 230 arrives at a predetermined reference value D_{set} (S15). If a dry level D detected by the detection unit 230 arrives at a predetermined reference value D_{set} , the second controller 220 may terminate operation of the dry unit 270 (S17), and if a dry level D does not arrive at a predetermined reference value D_{set} , the dry unit 270 may continue to operate (S13). Such a process may be continued until an operation time T of the dry unit 270 arrives at an operation termination time T_f (S16). Here, the reference value D_{set} may be a value in which the user inputs through the second input unit 212.

[50] The second controller 220 may change the number of operating heaters 240 according to a trend in which a dry level D detected by the detection unit 230 approaches a reference value D_{set} . For example, if the dry level D increases more rapidly than a predetermined rising slope, the second controller 220 may reduce the number of

the operation heater 240, and if the dry level D increases more smoothly than a predetermined rising slope, the second controller 220 may increase the number of the operation heater 240.

Claims

- [Claim 1] A washing and drying system comprising:
a washing machine that has a washing function; and
a dryer that has a drying function and that comprises:
a drying unit that is configured to increase a temperature within a drying chamber that is configured to receive clothing; and
a controller that is configured to:
set a capacity of the drying unit according to an operation termination time of the washing machine based on operation of the washing machine, and
operate the drying unit according to the set capacity.
- [Claim 2] The washing and drying system of claim 1, wherein the controller is configured to set the capacity of the drying unit set to a value that is inversely related to the operation termination time of the washing machine.
- [Claim 3] The washing and drying system of claim 1, wherein the drying unit comprises a plurality of heaters,
wherein the controller is further configured to:
set a number of the plurality of heaters to operate according to the operation termination time, and
operate the number of the plurality of heaters.
- [Claim 4] The washing and drying system of claim 3, wherein the dryer further comprises a recording medium that is configured to store the number of the plurality of heaters to operate, each number of the plurality of heaters corresponding to a respective range of operation termination times,
wherein setting the number of the plurality of heaters to operate comprises identifying the respective range of operation termination times to which the operation termination time belongs.
- [Claim 5] The washing and drying system of claim 2, wherein the drying unit comprises a heat pump that is configured to increase a temperature within the drying chamber,
wherein the controller is further configured to set a capacity of the heat pump according to the operation termination time.
- [Claim 6] The washing and drying system of claim 1, wherein the dryer further comprises an input unit that is configured to receive, from a user, an input of the operation termination time.

- [Claim 7] The washing and drying system of claim 1, wherein the washing machine comprises a first communication unit that is configured to transmit, to a wired or wireless network, the operation termination time, wherein the dryer further comprises a second communication unit that is configured to receive, through the wired or wireless network, the operation termination time, and wherein the controller is configured to set a number of heaters to operate according to the operation termination time.
- [Claim 8] The washing and drying system of claim 1, wherein the drying unit is further configured to detect an amount of clothing received, wherein the controller is configured to determine a number of heaters to operate based on the amount of clothing received.
- [Claim 9] The washing and drying system of claim 1, wherein the dryer further comprises a detection unit that is configured to detect a drying rate of the clothing, wherein the detection unit reduces a number of heaters operating based on the drying rate satisfying a threshold rate.
- [Claim 10] The washing and drying system of claim 1, wherein the dryer further comprises a detection unit that is configured to detect a drying rate of the clothing, wherein the detection unit increases a number of heaters operating based on the drying rate not satisfying a threshold rate.
- [Claim 11] A method of controlling a laundry processing system comprising a washing machine that has a washing function, and a dryer that has a drying function and that is configured to receive clothing, the method comprising:
providing, by the washing machine and to the dryer, an operation termination time of the washing machine;
based on the operation termination time, setting a capacity of a drying unit that is configured to increase a temperature within a drying chamber of the dryer; and
operating the drying unit according to the set capacity.
- [Claim 12] The method of claim 11, wherein setting the capacity of the drying unit comprises setting the capacity of the drying unit to a value that is inversely related to the operations termination time of the washing machine.
- [Claim 13] The method of claim 12, wherein the drying unit comprises a plurality of heaters,

wherein setting a capacity of a drying unit comprises setting a number of the plurality of heaters to operate according to the operation termination time, and

wherein operating of the drying unit comprises operating the number of the plurality of heaters.

[Claim 14] The method of claim 13, comprising:
storing the number of the plurality of heaters to operate, each number of the plurality of heaters corresponding to a respective range of operation termination times,
wherein setting the number of the plurality of heaters to operate comprises identifying the respective range of operation termination times to which the operation termination time belongs.

[Claim 15] The method of claim 12, wherein the drying unit further comprises a heat pump that is configured to increase a temperature within the drying chamber, and
wherein setting a capacity of the drying unit comprises setting a capacity of the heat pump according to the operation termination time.

[Claim 16] The method of claim 11, wherein providing an operation termination time of the washing machine comprises receiving, from a user through an input unit located in the dryer the operation termination time.

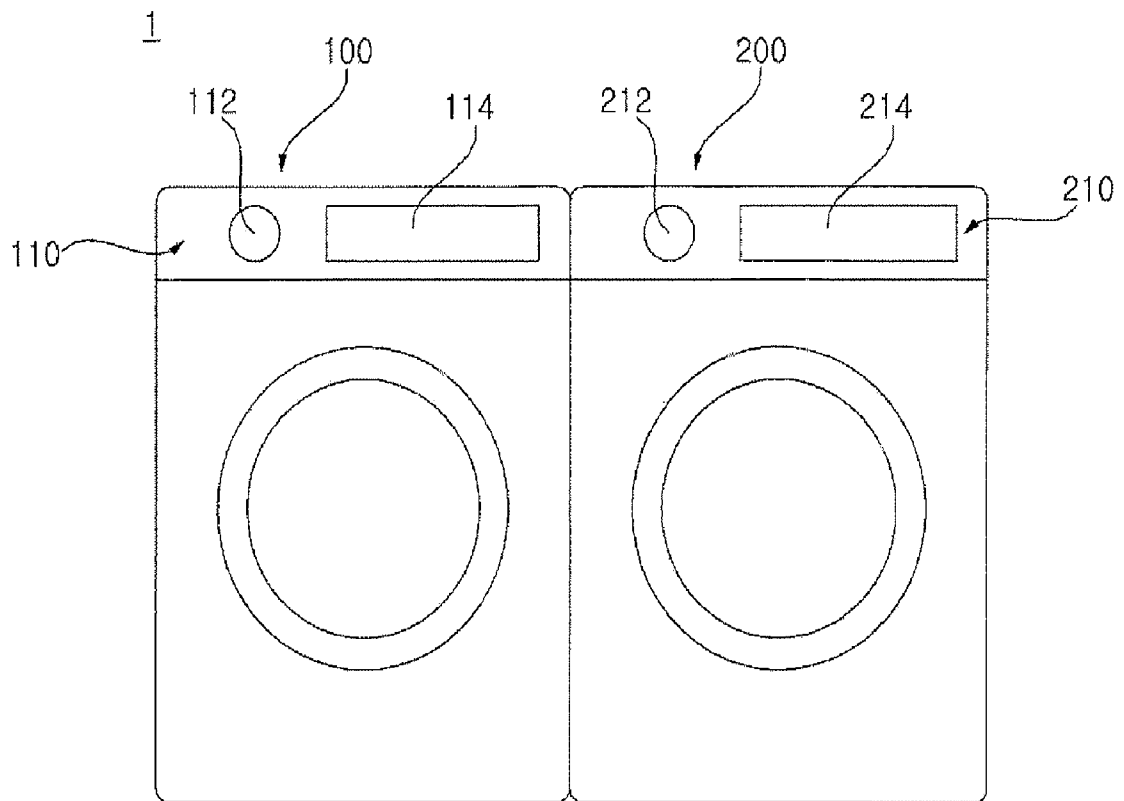
[Claim 17] The method of claim 11, wherein providing an operation termination time of the washing machine comprises:
transmitting, by the washing machine and through a wired or wireless network, the operation termination time; and
receiving, by the dryer and through the wired or wireless network, the operation termination time.

[Claim 18] The method of claim 11, comprising:
detecting an amount of clothing received; and
operating a number of heaters based on the amount of clothing received.

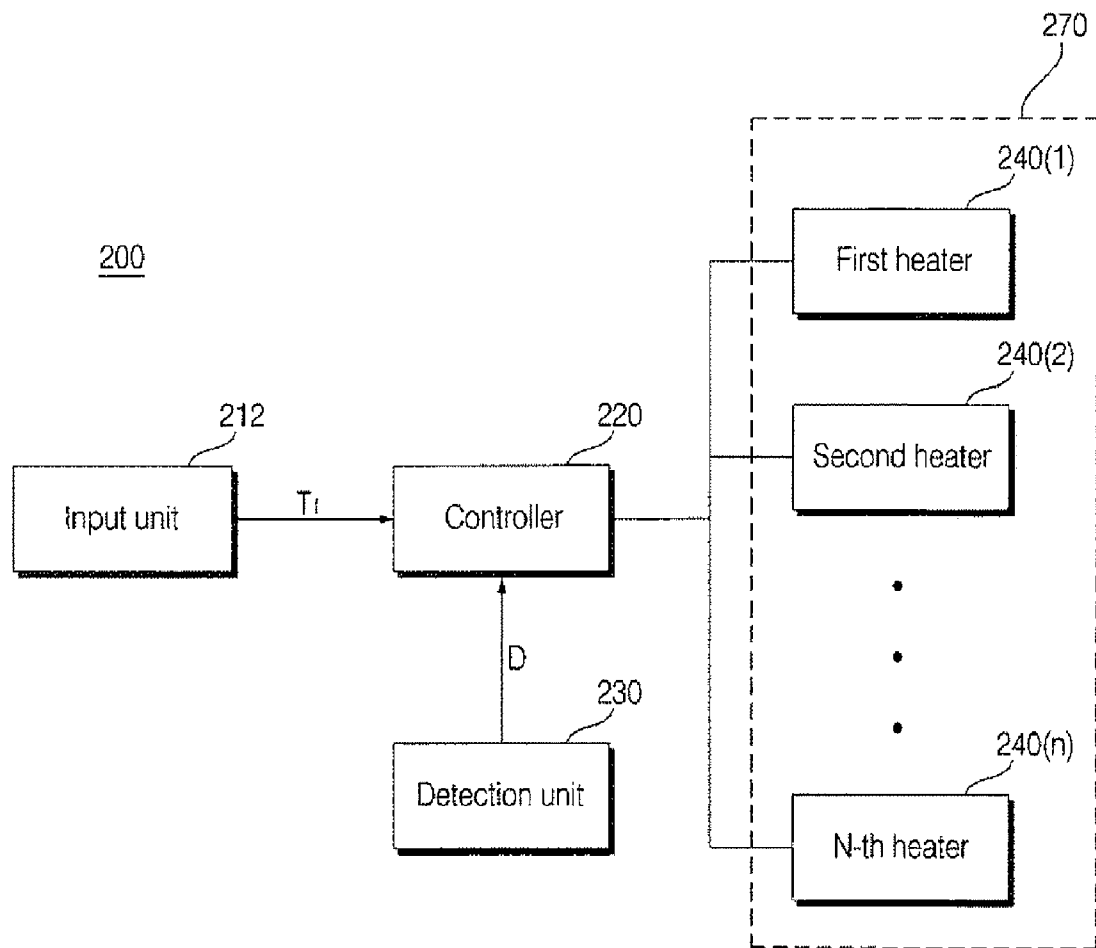
[Claim 19] The method of claim 11, comprising:
detecting a drying rate of the clothing; and
reducing a number of heaters operating based on the drying rate satisfying a threshold rate.

[Claim 20] The method of claim 11, comprising:
detecting a drying rate of the clothing; and
increasing a number of heaters operating based on the drying rate not satisfying a threshold rate.

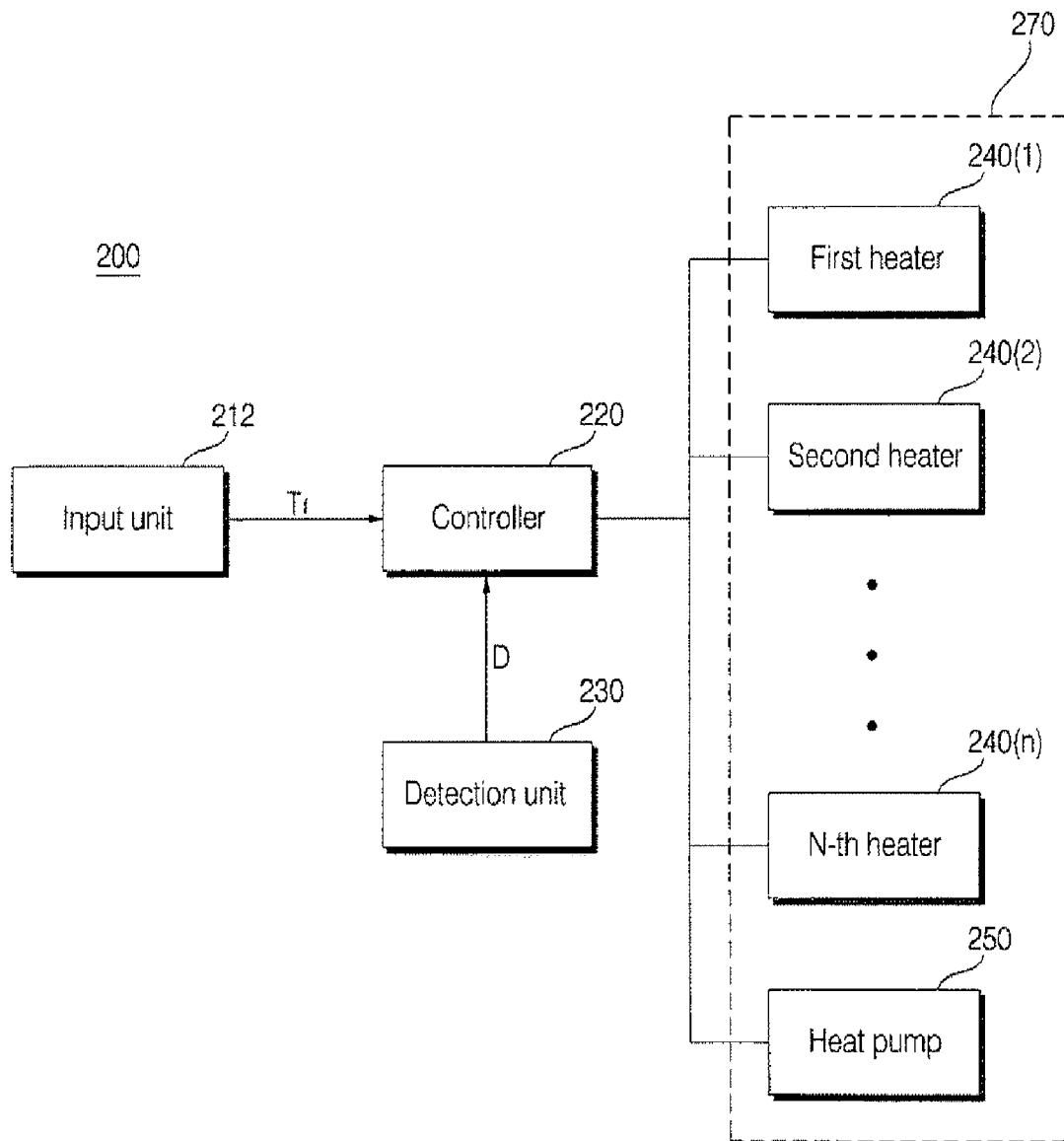
[Fig. 1]



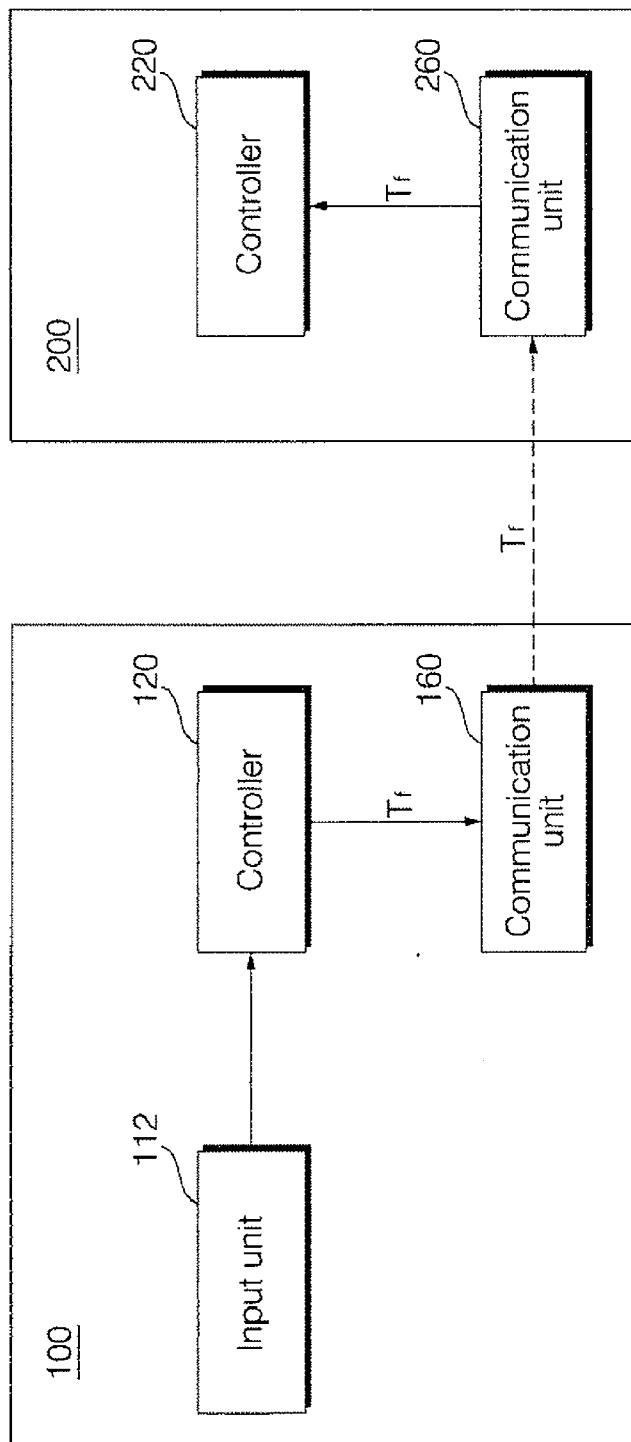
[Fig. 2]



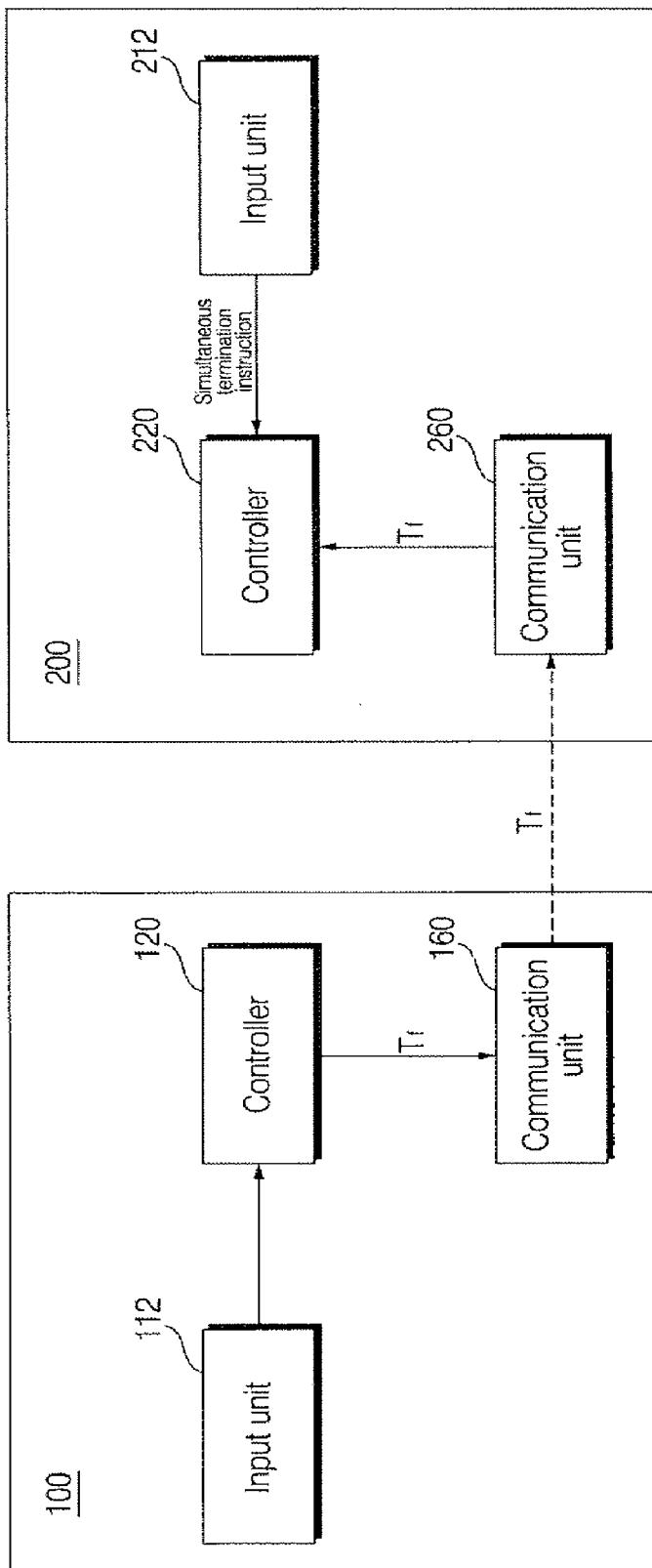
[Fig. 3]



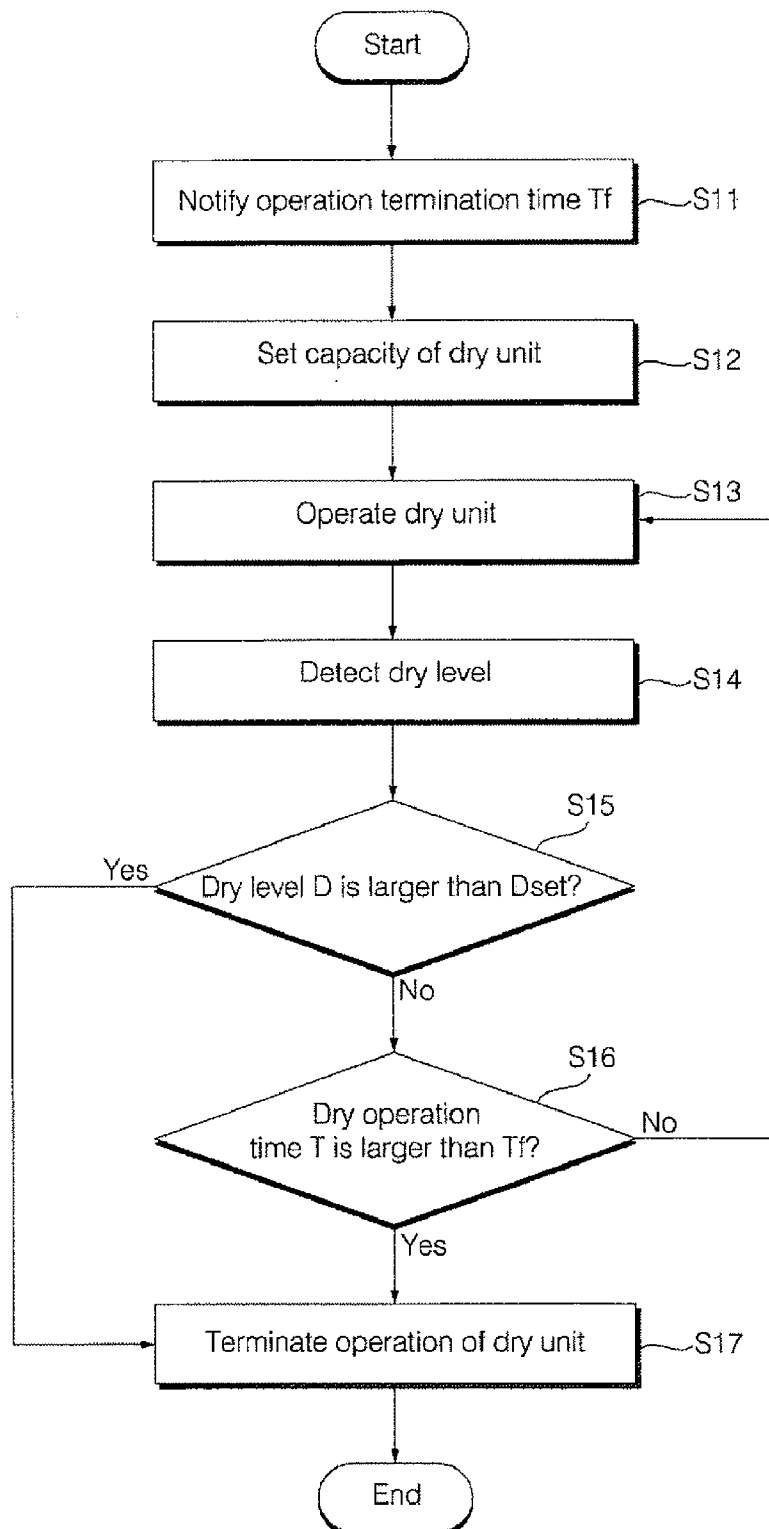
[Fig. 4]



[Fig. 5]



[Fig. 6]



A. CLASSIFICATION OF SUBJECT MATTER**D06F 58/28(2006.01)i, D06F 33/02(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 58/28; D06F 58/02; F26B 23/00; D06F 31/00; D06F 33/00; D06F 33/02

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

Japanese utility models and applications for utility models

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS(KIPO internal) & Keywords: washing, drying, temperature, controller, capacity of a drying unit, operation termination time, heater, heat pump**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2010-0269266 A1 (LEE, SANG UP et al.) 28 October 2010 See abstract; claims 1, 5; and paragraphs [0045], [0049], [0056].	1-20
Y	KR 10-2007-0015291 A (LG ELECTRONICS INC.) 02 February 2007 See claims 3, 6; and page 5, lines 13-14.	1-20
Y	US 2013-0167398 A1 (SAMSUNG ELECTRONICS CO., LTD.) 04 July 2013 See paragraph [0084].	4, 14
Y	KR 10-2013-0101914 A (LG ELECTRONICS INC.) 16 September 2013 See claim 1; and paragraph [0154].	5, 6, 8-10, 15, 16 , 18-20
Y	KR 10-2005-0066534 A (LG ELECTRONICS INC.) 30 June 2005 See claim 1.	7, 17



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

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

17 June 2016 (17.06.2016)

Date of mailing of the international search report

20 June 2016 (20.06.2016)

Name and mailing address of the ISA/KR

International Application Division

Korean Intellectual Property Office

189 Cheongsa-ro, Seo-gu, Daejeon, 35208, Republic of Korea

Facsimile No. +82-42-481-8578

Authorized officer

CHO, Han Sol

Telephone No. +82-42-481-5580



INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/KR2016/001048

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2010-0269266 A1	28/10/2010	CN 101876133 A CN 101876133 B KR 10-1599859 B1 KR 10-2010-0118227 A US 8434180 B2	03/11/2010 23/04/2014 08/03/2016 05/11/2010 07/05/2013
KR 10-2007-0015291 A	02/02/2007	KR 10-1234067 B1	15/02/2013
US 2013-0167398 A1	04/07/2013	CN 103184673 A EP 2610402 A2 KR 10-2013-0078818 A US 9285167 B2	03/07/2013 03/07/2013 10/07/2013 15/03/2016
KR 10-2013-0101914 A	16/09/2013	None	
KR 10-2005-0066534 A	30/06/2005	AU 2004242547 A1 AU 2004242547 B2 CN 100465371 C CN 1648320 A EP 1548174 A1 KR 10-0607273 B1 KR 10-0607278 B1 KR 10-0607279 B1 KR 10-0717458 B1 US 2005-0138835 A1 US 2006-0225301 A1 US 2006-0225302 A1 US 7096601 B2 US 7373737 B2 US 7383644 B2	14/07/2005 12/08/2010 04/03/2009 03/08/2005 29/06/2005 28/07/2006 28/07/2006 28/07/2006 14/05/2007 30/06/2005 12/10/2006 12/10/2006 29/08/2006 20/05/2008 10/06/2008