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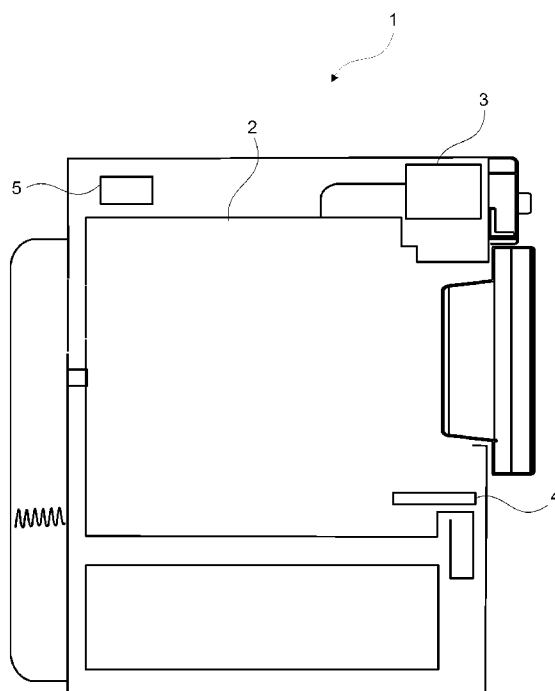
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(54) Title: A DRYER COMPRISING AN OZONE GENERATOR

Figure 1



(57) Abstract: The present invention relates to a dryer (1) comprising a drum (2) wherein the drying process is performed, an ozone generator (3) that produces the ozone gas (03) and delivers the ozone gas into the drum (2) by means of an opening disposed on the drum (2), and a humidity sensor (4) disposed in the drum (2), measuring the humidity level inside the drum (2).



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Description**A DRYER COMPRISING AN OZONE GENERATOR**

- [0001] The present invention relates to a dryer wherein ozone gas is used in the drying process.
- [0002] In dryers, for example heat pump dryers performing low temperature drying process, sufficient amount of hygienic effect cannot be provided. Similarly, in dryers, the effectiveness of providing hygiene on the laundry is low, since low temperature air circulation is applied in programs performed for refreshing purposes. In the state of the art, the hygienic effectiveness is increased by delivering ozone gas having disinfectant and dirt removal effects into the drum in order to solve this problem.
- [0003] In state of art embodiments, wherein ozone gas is delivered into the dryer drum, the ozone gas is delivered either during the whole drying process or in a certain period of drying process with respect to time. Delivering ozone gas during the whole drying process both causes a decrease in lifespan of the ozone generator due to the unnecessary operation of the ozone generator and hence energy loss, and the problem of emitting ozone gas more than needed occurs. Therefore, additional processes are required at the end of the program in order that the ozone gas emitted excessively does not disturb the user. In embodiments, wherein the ozone gas is delivered into the drum in a time controlled manner, problems of not providing sufficient hygiene or using the ozone gas unnecessarily occur, since the ozone gas is independent from the amount of laundry and the washing process applied before drying.
- [0004] In state of the art Patent Application No KR20030067345, an apparatus comprising a dehumidifying unit and a sterilization unit which are used to dry and sterilize the underwear, is described. The control unit controls the operation of the dehumidifying unit and the sterilization unit, and provides the laundry to be sterilized according to the sterilization mode among the parameter chosen by the user by delivering the ozone gas onto the laundry.
- [0005] The aim of the present invention is the realization of a dryer comprising the control unit that provides the ozone gas to be delivered into the drum

during the drying process in a controlled manner.

- [0006] The dryer realized in order to attain the aim of the present invention, explicated in the first claim and the respective claims thereof, comprises a humidity sensor measuring the humidity inside the drum, an ozone generator providing the ozone gas to be delivered into the drum by producing the ozone gas, and a control unit controlling the operation of the ozone generator according to the data received from the humidity sensor. The operating range of the ozone generator is determined according to humidity levels transmitted to the control unit from the humidity sensor. Since the hygienic effect of the ozone gas is more intensive in humid environment, the ozone gas is provided to be delivered into the drum at proper conditions of humidity by operating the ozone generator according to the humidity levels measured by the humidity sensor. Thus, the hygiene level of both the drum and the laundry loaded into the drum are increased.
- [0007] In an embodiment of the present invention, the control unit provides the ozone gas to be delivered into the drum by operating the ozone generator, if the humidity level measured by the humidity sensor is equal to the first reference humidity level predetermined by the producer. The ozone generator continues operating until the humidity level detected by the humidity sensor is equal to the second reference humidity level predetermined by the producer, and the ozone gas is delivered into the drum. When the humidity level measured by the humidity sensor is equal to the second reference humidity level, the control unit stops the ozone generator and the flow of ozone gas into the drum is interrupted. Since the ozone gas is provided to penetrate into the laundry more effectively in humid environment, the hygiene performance of the dryer is increased by the ozone gas being delivered into the dryer at a proper humidity level range.
- [0008] In another embodiment of the present invention, the dryer comprises a humidity generator providing the humidity level measured by the humidity sensor to be increased by delivering humidity into the drum, if the humidity level in the drum is lower than the first reference humidity level. The operation of the humidity generator is controlled by the control unit

according to the data transmitted by the humidity sensor to the control unit. The humidity generator humidifies the interior of the drum until the humidity level measured by the humidity sensor is equal to the first reference humidity level. Thus, the interior of the drum is brought to the humidity level where the ozone gas provides effective hygiene.

- [0009] In various versions of this embodiment, by means of the humidity generator, when the laundry is dry or the drum hygiene is desired to be provided without loading the laundry into the drum, the hygienic effect on the laundry and/or the drum is increased by humidifying the drum and/or the laundry.
- [0010] By means of the present invention, a dryer is obtained, the hygienic effect of which is increased by ozone gas being delivered into the drum according to the humidity level inside the drum.
- [0011] The dryer realized in order to attain the aim of the present invention is illustrated in the attached figures, where:
- [0012] Figure 1 – is the schematic view of a dryer.
- [0013] Figure 2 – is the schematic view of the washing machine related to an embodiment of the present invention.
- [0014] The elements illustrated in the figures are numbered as follows:
1. Dryer
 2. Drum
 3. Ozone generator
 4. Humidity sensor
 5. Control unit
 6. Humidity generator
- [0015] The dryer (1) comprises a drum (2) wherein the drying process is performed, and an ozone generator (3) that produces the ozone gas (O_3) and delivers the ozone gas into the drum (2) by means of an opening disposed on the drum (2).
- [0016] The dryer (1) of the present invention furthermore comprises a humidity sensor (4) disposed in the drum (2), measuring the humidity level inside the drum (2) and a control unit (5) controlling the operation of the ozone generator (3) according to the data transmitted by the humidity sensor (4).

Since the ozone gas provides hygiene more effectively in humid environment, the hygiene effectiveness provided by the dryer (1) is increased by ozone gas being delivered into the drum (2) according to the humidity levels measured by the humidity sensor (4).

[0017] In an embodiment of the present invention, the control unit (5) provides ozone gas to be delivered into the drum (2) by operating the ozone generator (3) when the humidity level measured by the humidity sensor (4) reaches the first reference humidity level determined by the producer, and stops the ozone generator (3), when the humidity level measured by the humidity sensor (4) reaches the second reference humidity level determined by the producer.

[0018] The humidity level in the drum (2) is instantaneously measured by the humidity sensor (4). The humidity level measured by the humidity sensor (4) is transmitted to the control unit (5). The control unit (5) compares the humidity levels measured by the humidity sensor (4) instantaneously with the reference humidity levels recorded by the producer in its memory. When the humidity level measured by the humidity sensor (4) is equal to the first reference humidity level, the control unit (5) provides the ozone generator (3) to be operated and hence ozone gas is delivered into the drum (2). The humidity level changes depending on the amount of the laundry loaded into the drum (2), the type of the fabric and the washing program according to which the laundry is washed before drying. The control unit (5) provides the ozone generator (3) to be operated and hence ozone gas to be delivered into the drum (2), until the humidity level measured by the humidity sensor (4) is equal to the second reference humidity level. The first reference humidity level and the second reference humidity level are the range of the humidity level determined as a result of experimental studies undertaken by the producer, where the hygienic effect is maximum. The hygienic effect provided on the laundry by delivering ozone gas into the drum (2) in the range of the first reference humidity level and the second reference humidity level is increased. Furthermore, the emission of ozone gas more than necessary is prevented by the ozone generator (3) being operated only within the range of

humidity level where it provides the maximum benefit. Thus, the user is prevented from being disturbed by delivering the ozone gas into the drum (2) excessively. Furthermore, the lifespan of the ozone generator (3) is extended by the ozone generator (3) being prevented from operating for a long time unnecessarily.

- [0019] In another embodiment of the present invention, the dryer (1) comprises a humidity generator (6) providing the laundry inside the drum (2) to be humidified by generating humidity. The control unit (5) operates the humidity generator (6) when the humidity level measured by the humidity sensor (4) is lower than the first reference humidity level, and stops the humidity generator (6), when the humidity level measured by the humidity sensor (4) is equal to or greater than the first reference humidity level. Thus, increase in the humidity level inside the drum (2) is provided, when the humidity level measured by the humidity sensor (4) disposed in the drum (2) is insufficient. The humidity level inside the drum (2) is increased upto the first reference humidity level where the ozone gas provides effective hygiene by the humidity generator (6) being operated. When the humidity level measured by the humidity sensor (4) is at least equal to the first reference humidity level, the control unit (5) provides the ozone generator (3) to be operated, by stopping the humidity generator (6). The ozone generator (3) is operated until the humidity level measured by the humidity sensor (4) is equal to the second reference humidity level.
- [0020] In a version of this embodiment, the dry laundry loaded into the drum (2) for the purpose of refreshing are humidified by the humidity generator (6) being operated by the control unit (5). Since the ozone gas provides hygiene more effectively in humid environment, the dry laundry is provided to be cleaned from the unpleasant odors and to be refreshed.
- [0021] In a version of this embodiment, the ultrasonic nebulizer is used as the humidity generator (6). Thus, the humidity generator (6) is provided not to occupy much space in the dryer (1) due to its compact structure.
- [0022] By means of the present invention, a dryer (1) providing the laundry to be dried in a more hygienic manner is obtained.
- [0023] It is to be understood that the present invention is not limited to the

embodiments disclosed above and a person skilled in the art can easily introduce different embodiments. These should be considered within the scope of the protection postulated by the claims of the present invention.

Claims

1. A dryer (1) **comprising** a drum (2) wherein the drying process is performed, and an ozone generator (3) an ozone generator (3) that produces the ozone gas (O_3) and delivers the ozone gas into the drum (2) by means of an opening disposed on the drum (2),
characterized by a humidity sensor (4) disposed in the drum (2), measuring the humidity level inside the drum (2) and a control unit (5) controlling the operation of the ozone generator (3) according to the data transmitted by the humidity sensor (4).
2. A dryer (1) as in Claim 1, **characterized by** the control unit (5) that provides ozone gas to be delivered into the drum (2) by operating the ozone generator (3) when the humidity level measured by the humidity sensor (4) reaches the first reference humidity level determined by the producer, and stops the ozone generator (3), when the humidity level measured by the humidity sensor (4) reaches the second reference humidity level determined by the producer.
3. A dryer (1) as in Claim 2, **characterized by** a humidity generator (6) providing the laundry inside the drum (2) to be humidified by generating humidity and the control unit (5) that starts the operation of the humidity generator (6) when the humidity level measured by the humidity sensor (4) is lower than the first reference humidity level, and stops the humidity generator (6), when the humidity level measured by the humidity sensor (4) is equal to or greater than the first reference humidity level.
4. A dryer (1) as in Claim 3, **characterized by** the humidity generator (6) which is an ultrasonic nebulizer.

Figure 1

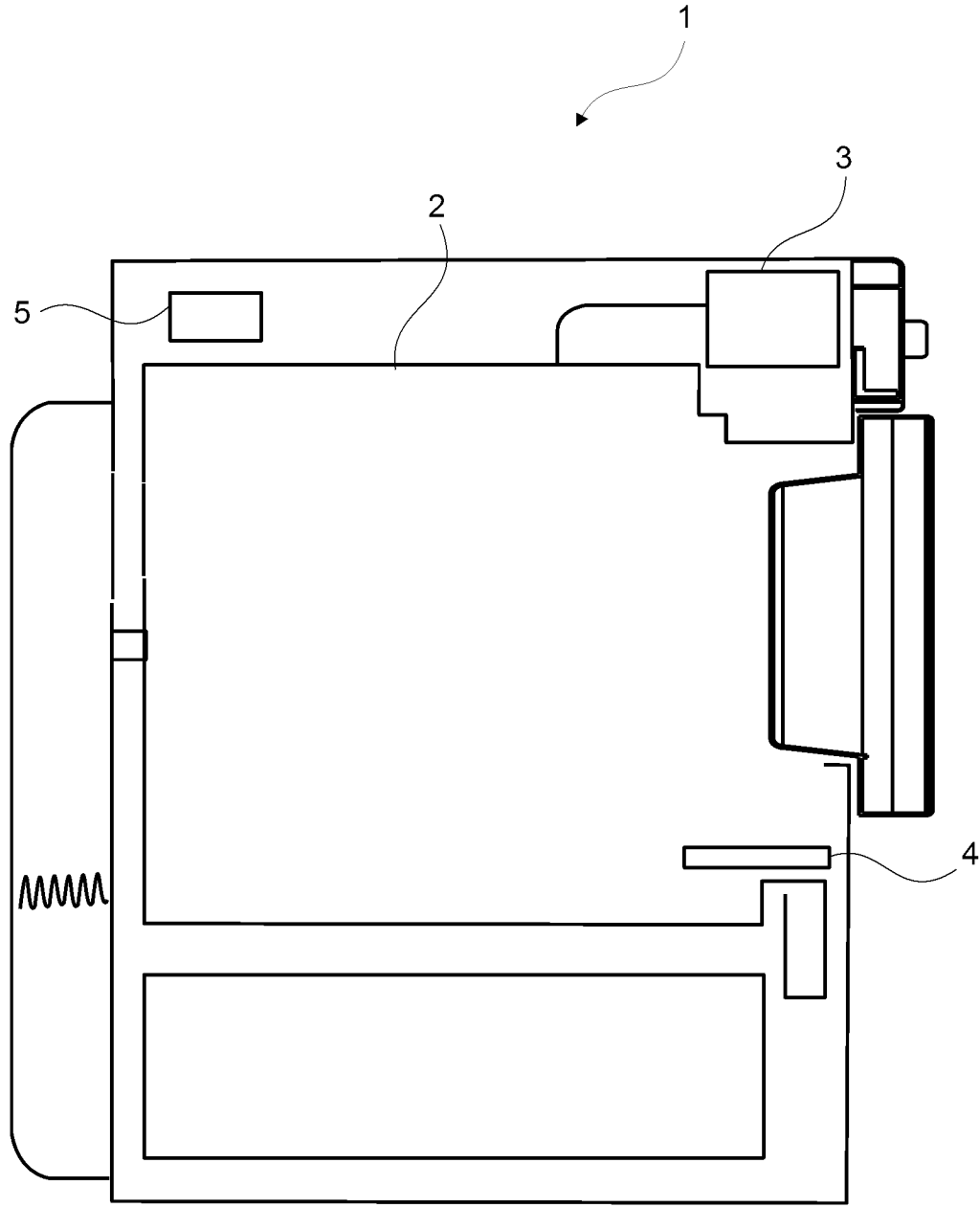


Figure 2

