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(54) **Lighting apparatus for laundry machines**

(57) A laundry machine (100) for treating laundry items is proposed. The laundry machine (100) comprises an outer casing (105), which rotatably houses a drum (130) for accommodating the items to be treated, and a lighting system (165,310) for enlightening the inside of the drum (130). The lighting system includes a light-emitting element (165) provided on a stationary portion (110a) of the laundry machine (100), for emitting a light radiation towards a drum wall (130a). In the solution according to an embodiment of the present invention, the drum comprises at least one light-permeable portion (202) formed in the drum wall (130a). Moreover, the lighting system further comprises a transparent element (310) mounted inside the drum (130) in correspondence of said light-permeable portion (202), adapted to allow the light radiation emitted by said light-emitting element (165), and crossing said light-permeable portion (202), to reach the inside of the drum (130).

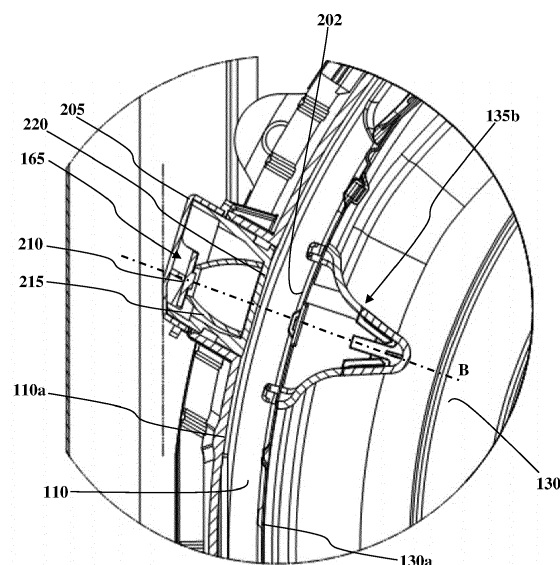


FIG.2

Description

[0001] The present invention relates to laundry machines, such as washing machines, washing/drying machines and drying machines, both for domestic and professional use. More particularly, the present invention relates to drum lighting for such laundry machines.

[0002] Each household and professional laundry machine - such as washing machine, washing/drying machines and drying machines - typically comprises, among other components, an inner compartment accessible by a user (e.g., through a proper access door and/or lid) for loading/unloading the laundry; in the case of a washing machine or washing/drying machine the inner compartment includes a washing tub housing a rotatable drum in which the laundry can be loaded/unloaded, while in the case of a drying machine the inner compartment includes a rotatable drum in which the laundry can be loaded/unloaded.

[0003] As known, in such machines, whether of the front-loading type or of the top-loading type, the inside of the drum is scarcely enlightened by external environment especially when the user accesses the drum during the loading/unloading of the laundry.

[0004] Therefore, laundry loading/unloading operations become difficult and uncomfortable for the user.

[0005] In order to solve this drawback, some laundry machines are provided with a lighting system, which substantially comprises one or more lightning device - incandescent light lamps, fluorescent light lamps, discharge light lamps or solid-state lighting devices (e.g., high power LEDs) - acting as corresponding light-emitting elements for illuminating the drum.

[0006] According to a first known solution, the lighting system may be arranged inside the drum (e.g., in drum walls and/or in lifters inside the drum). Nevertheless, the Applicant has recognized that the approach providing a light-emitting element within the drum is intrinsically difficult to implement - substantially due to the fact that the light-emitting element, which is arranged on a portion of the machine (i.e., the drum) adapted to rotate with respect to the casing of the machine, has to be electrically connected with the supply electric assembly, which is instead stationary with respect to the casing.

[0007] Moreover, it may occur that laundry items stored inside the drum cover the light-emitting element, thus impeding a functional enlightenment of the drum.

[0008] According to a second known solution, the light-emitting element is provided in a frame or hopper provided in correspondence of the loading/unloading opening of the casing and encompassing the loading/unloading opening. The Applicant has found that this solution implies several drawbacks, too. For example, properly installing the light-emitting element within the frame/hopper is a difficult and time-consuming task. Furthermore, the frame/hopper robustness may be lowered by the insertion of the light-emitting element. Moreover, it is difficult to effectively direct the light radiation emitted by

the light-emitting element towards the inside of the drum.

[0009] Other known solutions provide a light-emitting element within the washing tub. For example, DE 4026547 discloses a washing machine that incorporates a horizontally rotating perforated laundry drum contained inside a washing solution container. The washing solution container jacket features a detergent and/or fresh water supply opening and/or vent opening with an associated supply line. An illuminating body is built into the supply line in such a way that its light discharge face is directed at the drum jacket. The machine provides for the possibility of illuminating the inner space of the drum through the drum perforation. The illuminating body requires no special fastening as it is integrated in the supply line.

[0010] The Applicant has found that enlightening the inside of the drum through bores of the same has a low efficiency. Indeed, the bores in the drum have usually a small diameter, this lead to a scarce enlightening of the inside of the drum, since the light radiation permeating the inside of the drum results scattered and has a low intensity.

[0011] The drawbacks of the known solutions are exacerbated by the fact that, in order to meet users requirements, the drum of most of modern machines has increased size for ensuring the required high laundry-capacity, which has repercussions on energy consumption, reliability and complexity aspects of the lighting system.

[0012] The Applicant has handled the problem of devising a satisfactory solution able to provide a satisfactory enlightenment of the inside of the drum, thus facilitating inspection thereof and laundry loading/unloading tasks, at the same time, overcoming the above-discussed drawbacks.

[0013] Such solution is achieved by providing a lighting system having a light-emitting element provided in a stationary part of the laundry machine (for example, in the case of a washing machine or a washing/drying machines, the stationary part may advantageously be the washing tub, which is stationary with respect to the rotating drum, or, in the case of a drying machines, which typically is not provided with a tub, the stationary part may be the casing or the frame of the machine, which is stationary with respect to the rotating drum), a light permeable portion on the drum arranged in such a way that a light-radiation emitted by the light-emitting element is able to enter the drum via such a light-permeable portion, and a transparent element mounted inside the drum in correspondence of the light-permeable portion, adapted to allow the light radiation emitted by the light-emitting element, and crossing the light-permeable portion, to reach and thoroughly enlightening the inside of the drum.

[0014] One aspect of the present invention proposes a laundry machine for treating laundry items. The laundry machine comprises an outer casing, which rotatably houses a drum for accommodating the items to be treated, and a lighting system for enlightening the inside of the drum. The lighting system includes a light-emitting

element provided on a stationary portion of the laundry machine, for emitting a light radiation towards a drum wall. In the solution according to an embodiment of the present invention, the drum comprises at least one light-permeable portion formed in the drum wall. Moreover, the lighting system further comprises a transparent element mounted inside the drum in correspondence of said light-permeable portion, adapted to allow the light radiation emitted by said light-emitting element, and crossing said light-permeable portion, to reach the inside of the drum.

[0015] Preferred features of the present invention are set in the dependent claims.

[0016] In an embodiment of the invention, the drum may be adapted to be rotated in a predetermined position in which said light-permeable portion and said transparent element are axially aligned with the light-emitting element.

[0017] In an embodiment of the invention, the transparent element may be adapted to direct the light radiation towards a central portion inside the drum.

[0018] In an embodiment of the invention, the transparent element may be adapted to uniformly diffuse the light radiation.

[0019] In an embodiment of the invention, the laundry machine may further comprise a cover element having a hollow main body and comprising said transparent element, said cover element being mounted on the drum wall over said light-permeable portion.

[0020] In an embodiment of the invention, the transparent element may be provided on a top edge portion of the hollow main body.

[0021] In an embodiment of the invention, the hollow main body may comprise an open base surface opposite to the top edge portion, said open base surface encompassing the light-permeable portion.

[0022] In an embodiment of the invention, the transparent element may engage the hollow main body of the cover element by means of a snap-fit engagement.

[0023] In an embodiment of the invention, the cover element may be a lifter adapted to improve the tumbling of items during the laundry machine operation.

[0024] In an embodiment of the invention, the laundry machine may further comprise a holder in the stationary portion of the laundry machine for housing the light-emitting element.

[0025] In an embodiment of the invention, the laundry machine may further comprise a light focuser, coupled with the light-emitting element adapted to focus the light radiation generated by said light-emitting element towards the drum wall.

[0026] In an embodiment of the invention, the laundry machine may further comprise a transparent cap adapted to close the holder, for sealing the light-emitting element away from liquids and/or moisture comprised in the stationary portion of the laundry machine.

[0027] These, and others, features and advantages of the solution according to the present invention will be

better understood by reading the following detailed description of an embodiment thereof, provided merely by way of exemplary and non-limitative example, to be read in conjunction with the attached drawings, wherein:

Figure 1 schematically shows a cross-sectional side view of a top-loading laundry machine according to an embodiment of the present invention;

Figure 2 schematically shows cross-sectional view of an enlarged portion of the laundry machine of **Figure 1**, with a lighting system according an embodiment of the present invention; and

Figure 3A and **Figure 3B** schematically show an isometric view and an isometric exploded view, respectively, of a lifter according to an embodiment of the present invention.

[0028] Considering **Figure 1** and **Figure 2** together, there are shown a cross-sectional and enlarged side views, respectively, of a laundry machine **100** according to an embodiment of the present invention.

[0029] The laundry machine **100** is a machine for treating laundry (such has a laundry washing machine, a laundry washing/drying machine, a laundry drying machine *etc.*) of the top-loading type. Anyway, it should be apparent from the following description that also laundry machines of the front-loading type may also benefit from the solution according to the present invention.

[0030] In the example at issue, the laundry machine **100** comprises a substantially parallelepiped-shaped casing **105** that, preferably, although not necessarily, encloses a substantially cylindrical-shaped tub **110** (it is underlined that the tub is advantageously provided in the case of a washing machine or a washing/drying machine, while the tub is not provided in case of a drying machine), wherein the laundry is treated, along with any other component of the laundry machine **100** necessary for the operation (e.g., hydraulic, electronic and electromechanical apparatuses well known in the art and, therefore, not herein described for sake of conciseness).

[0031] With reference to enclosed Figures 1 and 2, which represent the case of a top-loading washing machine, which therefore comprises a tub, the tub **110** is preferably fixed to a frame **115** (which substantially supports the casing **105** and any other component comprised in the laundry machine **100**), preferably by supporting elastic coils (one of which visible in **Figure 1**, therein identified with the numeral **120**), and shock (and vibration) absorber elements, such as two shock absorbers **125** (which absorb jolts of the tub during operation).

[0032] Furthermore, the tub **110** houses a substantially cylindrical-shaped rotating drum **130**, which, in operation, rotates about an axis A in order to tumble the laundry to be washed. Preferably, although not necessarily, one or more baffles or lifters **135a** and **135b** (two shown in the figures) are mounted on a drum wall **130a** (parallel to a drum rotation axis A) in the inside of the drum **130** for enhancing the tumbling action on laundry performed

in operation by the same.

[0033] Conversely, in some laundry machines (for example, in dryer-type laundry machines), no tub is provided and the drum may advantageously be enclosed by the casing of the laundry machine; for example, in the case of a drying machine, the drum is preferably rotatably supported by a number of wheels provided in the base of the machine, inside the casing.

[0034] In the example of **Figures 1** and **2**, in order to allow a user to access the tub **110**, an opening **140** is advantageously provided on the top of the washing machine **100**. The opening **140** is closable by a lid (removed in the **Figure 1**), which is preferably, although not necessarily, hingeably connected to the casing **105** by means of a hinge (not shown in the figure). The lid is adapted to pivot from a closed position - wherein the lid closes the opening **140**, impeding the access to the tub **110** - to an open position - wherein the lid is pivoted to an angle, preferably, equal to, or greater than, 90° with respect to the closed position, allowing the access to the tub **110**.

[0035] Similarly, in order to allow a user to access the inside of the drum **130** (for loading/unloading the laundry), a drum opening is provided in the drum wall **130a** and a door **145** is provided for closing the same during operation. Preferably, although not limitatively, the door **145** comprises a first door leaf **145a** and a second door leaf **145b**.

[0036] In the example illustrated in the enclosed figures, the first door leaf **145a** is advantageously hinged to the drum **130** by a first leaf hinge **150a**, while the second door leaf **145b** is hinged to the drum **130** by a second leaf hinge **150b**. Preferably, in a closed position, interlocking elements (not shown in the figure) block the first and the second door leaves **145a** and **145b** to one another, thus impeding any unwanted (and harmful) opening of the door **145** during operation (*i.e.*, when the drum rotates).

[0037] Clearly, in a further embodiment, not illustrated, the door may comprise a single door leaf; the following description refers to a door comprising two door leaves, but it can as well be applied to a door comprising a single door leaf (for example when, in the following, reference is made to the "first door leaf", it can be read also as "single door leaf" in case the door comprises only a single door leaf).

[0038] In order to have the door **145** in an open position (shown in the **Figure 1**), the laundry machine **100**, at the end of the operation, preferably aligns the door **145** with the opening **140** - alternatively or in addition, the user may align the door **145** with the opening **140** manually -; then the interlocking elements have to be unlocked, and the first and second door leaves **140a** and **140b** are preferably automatically rotated (preferably by elastic devices provided preferably in their hinges) until they abuts against - or reach a predetermined minimum distance from - a bellows **155** connecting the tub **110** to the border of the opening **140**, or, if the bellows is not provided,

abuts directly against the border of the opening **140**.

[0039] Having the machine lid (not illustrated in enclosed drawings) and the drum door **145** both in the open position, the inside of the drum **130** is accessible (through the drum opening) by the user for loading/unloading the laundry stored therein.

[0040] In addition, preferably, although not limitatively, a user interface **160**, for the selection of laundry treatment parameters (*e.g.*, a temperature of a treatment fluid, a maximum rotation speed of the drum **130**, *etc.*), is provided, preferably on the top of the casing **105**.

[0041] In the laundry machine according to the present invention, a lighting system is provided for enlightening the inside of the drum.

[0042] Preferably, in the solution according to the present invention, the lighting system comprises at least a light-emitting element **165** provided on a stationary portion of the machine (*i.e.*, any suitable part of the laundry machine for supporting the light-emitting element that does not rotates with the drum in operation; *e.g.*, the tub, the casing the frame *etc.*), adapted to enlighten the inside of the drum. Advantageously, the light-emitting element **165** is arranged in the stationary portion of the machine in such a way that a light-radiation emitted by such a light-emitting element **165** reaches the drum **130**, directly, or via a light permeable and/or conductive element, for example a light-guide, not illustrated.

[0043] Moreover, a light-permeable portion (*e.g.*, an aperture **202** in the drum wall, or a transparent insert fixed in any suitable manner - *e.g.* by over-molding - on the drum wall **130a** or constructed in a single piece with the same) is provided in the drum wall **130a**, which light-permeable portion is arranged in such a way that a light radiation emitted by the light-emitting element **165** and reaching the drum wall **130a** can enter the drum **130** by the light-permeable portion, thus allowing a thoroughly enlightenment of the inside of the drum **130**,

[0044] In an advantageous embodiment the light-permeable portion of the drum wall **130a** and the light emitting element **165** are arranged in such a way that when the drum **130** is in a predetermined angular position (for example, in the case of a top-loading washing machine, is in the position allowing the opening of the door **145**) the light emitting element **165** faces and is aligned with the light-permeable portion of the drum wall **130a**, so that light enters the drum **130** and illuminates the inside of the latter. Advantageously, a cover element may be provided over the light permeable portion of the drum wall **130a**, such cover element preferably comprising a transparent element for allowing the light radiation to enter inside the drum **130**.

[0045] In the example at issue, a light-emitting element **165** may advantageously be provided on a wall **110a** of the tub **110**. Conversely, in laundry machine of the dryer type a light-emitting element **165** may be provided on an internal surface of the casing, on the frame of the laundry machine or on an electronic board comprised in the laundry machine (*e.g.*, the electronic board comprising an

electronic control unit of the laundry machine), and positioned/arranged in such a way that a light radiation emitted by the light-emitting element **165** is able to enter the drum **130** via such the light-permeable portion of the wall **130a** of the latter.

[0046] As already mentioned, a light-permeable portion, such as an aperture **202** is preferably provided on the drum wall **130a**. It should be noted that the light-permeable portion may advantageously be formed by a glass or a transparent polymer insert fixed in the drum wall **130a** in any suitable manner, or monolithically formed with the same (e.g. by over-molding); for example, in the case of a drying machine, the light-permeable portion may advantageously be monolithically formed with the drum wall, thus maintaining the inside of the drum sealed from the rest of the laundry machine.

[0047] In the advantageous embodiment illustrated in enclosed figures, at a predetermined position of the drum **130** (as will be described in the following), an axial alignment (i.e., both the light-emitting element **165** and the light-permeable portion - e.g. the aperture **202** - share a same symmetry axis B) between the light-emitting element **165** and the light-permeable portion - e.g. the aperture **202** - is possible (as will be described in greater detail in the following), since the tub wall **110a** and the drum wall **130a** are parallel one another.

[0048] The light-emitting element **165** is preferably mounted in a holder **205**, for example a recess in the tub wall. Advantageously, the light-emitting element **165** may comprise any suitable lighting device **210**, such as an incandescent light lamp, a fluorescent light lamp, a discharge light lamp or a solid-state lighting device (e.g., a LED - Light Emitting Diode). It should be noted that the lightning device **210** might comprise more than just one of the lighting devices listed above (e.g., the lightning device **210** may comprise a plurality of LEDs in a strip or a ring arrangement) in order to obtain a desired illumination intensity (i.e., able to grant a satisfactory enlightenment of the drum **130**).

[0049] Similarly, in laundry machines without the tub, the light-emitting element may be enclosed in a box-like holder affixed, for example, to a casing or a frame portion of the laundry machine.

[0050] The lightning device **210** may advantageously be supplied with electric power in any known way; for example, the lightning device **210** may be supplied by a power circuit comprised in the laundry machine **100**, a selective connection with the mains or a battery arrangement (not shown in the figures).

[0051] It is underlined that, in the present application, expression "light-emitting element" has not to be interpreted only as a lamp or a similar "light-generating" device, but it refers to any device adapted to emit light radiation, for example the edge of an optical fiber, or of a light-guide (e.g., the free edge of a cylinder made of transparent plastics or glass). For example, such device may be adapted to guide light radiation - generated by a lightning device placed elsewhere in the laundry machine -

towards the drum.

[0052] Advantageously, a light focuser **215** may be coupled with the light-emitting element **165**, designed to focus a light radiation generated by the lightning device **210** preferably towards the drum wall **130a**. For example, the light focuser **215** may have a shape of a truncated elliptic paraboloid with the light-emitting device **165** placed at a truncated opened end and with the opposite opened end facing the drum **130**.

[0053] Preferably, although not necessarily, a cap **220** made of a transparent material, may be provided for closing the holder recess **205**. In this way, the light-emitting element **165** may be advantageously sealed in the holder **205**, thus, protected from treating liquids and/or moisture comprised in the tub **110** (at least during the operation of the laundry machine **100**).

[0054] The holder **205** - and, therefore, the light-emitting element **165** - may advantageously be provided in such a way to prevent a user (looking inside the drum **130**) from being directly hit by the light radiation emitted by the light-emitting element **165**, thus preventing glare and dazzling effects. For example, the light-emitting element **165** may be provided in a top portion of the tub wall **110a** (thus, also the probability of the light radiation resulting hindered by laundry inside the tub is substantially nullified).

[0055] The light-permeable portion, - e.g. the aperture **202**, in the drum wall **130a** may have any suitable shape (i.e., ranging from rectangular to circular) and, preferably, has a size adapted to let pass the whole light radiation emitted by the light-emitting element **165** into the drum **130**.

[0056] A cover element, such as the lifter **135b** may be advantageously mounted on the drum wall **130a** (facing the inside of the drum **130**) in correspondence of the light-permeable portion (e.g., the aperture **202**) provided in the drum wall **130a**.

[0057] The lifter **135b** may be mounted in any known way, such as by means of screws, glue or a snap-fit arrangement. It should be noted that, the lifter **135b**, being mounted over the light-permeable portion (e.g., the aperture **202**), prevents laundry in the drum from obstructing such the light-permeable portion (e.g., the aperture **202**), and/or if the light-permeable portion comprises the aperture **202**, also prevents laundry from falling in the tub **110** via the aperture **202** (possibly, provoking malfunctions of the laundry machine **100** in operation and/or damaging the laundry itself).

[0058] Considering now **Figure 3A** and **Figure 3B**, there are schematically shown an isometric view and an isometric exploded view, respectively, of the lifter **135b** according to an embodiment of the present invention.

[0059] The lifter **135b** advantageously comprises a hollow main body **305** being substantially triangular prism-shaped with an opened base surface. In addition, the lifter comprises a transparent portion, such as a transparent element **310** adapted to be engaged with the main body **305**. For example, the engagement between the

transparent element **310** and the main body **305** may be provided by a snap-fit arrangement **315**.

[0060] The main body **305** and the transparent element **310** may advantageously be made of any suitable material, such as a polymer for the former and a transparent polymer for the latter.

[0061] Preferably, although not limitatively, the transparent element **310** may be provided on a top edge portion **320** of the main body **305** opposed to an open base surface **325** thereof, in order to transmit the light radiation (incoming from the light-emitting element **165**, as will be described in following) through the light-permeable portion (e.g., the aperture **202**) into the drum **130**.

[0062] Advantageously, the transparent element **310** may range in length, from a minimum extension - allowing the transmission of light radiation with a sufficient intensity inside the drum **130** -, to a maximum extension, substantially equal to a length of the top edge portion **320** - for the transmission of light radiation with the highest intensity achievable (in this embodiment of the present invention).

[0063] Advantageously, the transparent element **310** may be shaped with a curvature adapted to direct the light radiation towards a central portion (corresponding to the rotation axis A) inside the drum **130** in order to enlightening the same with a high intensity. This central portion inside the drum **130** results to be preeminently used by the user during the laundry loading/unloading operations; thus, proper enlightenment of such central portion inside the drum **130** is crucial for the user.

[0064] Alternatively, the transparent element **310** may be shaped with a curvature adapted to uniformly diffuse the light radiation (i.e., diffusing the light radiation substantially in an isotropic manner) in the inside of the drum **130**. In this way, the inside of the drum **130** results substantially completely and evenly enlightened.

[0065] In a further embodiment (not shown) according to the present invention, the transparent element may be formed integral (e.g. by over-molding or co-molding) with the lifter.

[0066] In other embodiments (not shown) according to the present invention, the lifter may be completely made of a transparent material, thus being adapted to transmit the light radiation with any of its parts. In this case, the lifter advantageously comprises only a transparent main body, itself acting as the transparent element previously described.

[0067] Having described the structure of the laundry machine **100**, the operation of the lightning system according to an embodiment of the present invention will now be described, referring to all the accompanying figures together.

[0068] Preferably, although not necessarily, the light-emitting element **165** may be forced to emit a light radiation only when the laundry treatment is not in action (i.e., when the drum is not rotating). Even more preferably, the light-emitting element **165** may be forced to emit the light radiation only when the drum **130** is in a prede-

termined position (e.g., by means of a electromechanical switch, not shown, that closes when the drum **130** is rotated in the predetermined position); for example, when the drum **130** is in a position allowing the drum door **145** to be opened (i.e., with both the door leaves **145a** and **145b** in the open position).

[0069] In some embodiments, the lightning device may, advantageously, be adapted to emit a light radiation automatically when the lid (or a door in front-loading type laundry machines) is in the open position.

[0070] Alternatively or in addition, a pushbutton (not shown) may be provided in the user interface **160** allowing a user to selectively force the light radiation emission by the light-emitting element **165**.

[0071] Advantageously, the lifter **135b** is mounted on the drum **130** (covering the light-permeable portion -e.g. the drum aperture **202**-) in such a way that, when the drum **130** is in the predetermined position, also the lifter **135b** results axially aligned with the light-emitting element **165** (as shown in **Figure 1** and **Figure 2**). In this way, by passing trough the light-permeable portion (e.g. the aperture **202**) in the drum wall **130a** and trough the transparent element **310** of the lifter **135b** the light radiation emitted by the light emitting source **165** is able to reach into the drum **130** with a sufficient intensity in order to thoroughly enlighten the same.

[0072] It should be noted that the lifter **135b**, along with transmitting the light radiation into the drum **130** thanks to the transparent element **310**, also enhances the tumbling action, as do the lifters known in the art during the laundry machine **100** operation.

[0073] In other embodiments according to the present invention, the lifter **135b** may be omitted, and a transparent panel (acting as light-permeable element) may be provided in a single-piece construction (single-body) with the drum. In this way, the light radiation can pass through such transparent panel, while laundry in the drum is prevented from falling in the tub (possibly, provoking malfunctions in laundry machine operation and/or damaging the laundry itself). Similarly, in laundry machines with no tub (such as dryer-type laundry machine), the transparent panel grants a proper sealing of the inside of the drum from the rest of the laundry machine (thus preventing any unwanted moisture and/or steam - present in the drum during operation - dispersion inside the casing and/or in the environment).

[0074] The lightning system according to the present invention is able to provide a satisfactory enlightenment of the inside of the drum, thus facilitating inspection thereof and laundry loading/unloading tasks. At the same time, the lightning system according to the present invention overcomes the above-discussed drawbacks with a robust and cost-effective solution.

Claims

1. A laundry machine (**100**) for treating laundry items,

comprising:

an outer casing **(105)**, which rotatably houses a drum **(130)** for accommodating the items to be treated, and
 a lighting system **(165,310)** for enlightening the inside of the drum **(130)**, the lighting system including a light-emitting element **(165)** provided on a stationary portion **(110a)** of the laundry machine **(100)**, for emitting a light radiation towards a drum wall **(130a)**,
characterized in that
 the drum comprises at least one light-permeable portion **(202)** formed in the drum wall **(130a)**, and the lighting system further comprises a transparent element **(310)** mounted inside the drum **(130)** in correspondence of said light-permeable portion **(202)**, adapted to allow the light radiation emitted by said light-emitting element **(165)**, and crossing said light-permeable portion **(202)**, to reach the inside of the drum **(130)**.

2. The laundry machine **(100)** according to claim 1, wherein the drum **(130)** is adapted to be rotated in a predetermined position in which said light-permeable portion **(202)** and said transparent element **(310)** are axially-aligned with the light-emitting element **(165)**. 25
3. The laundry machine **(100)** according to claim 1 or 2, wherein the transparent element **(310)** is adapted to direct the light radiation towards a central portion inside the drum **(130)**. 30
4. The laundry machine **(100)** according to claim 1 or 2, wherein the transparent element **(310)** is adapted to uniformly diffuse the light radiation. 35
5. The laundry machine **(100)** according to any one of the preceding claims, further comprising a cover element **(135b)** having a hollow main body **(305)** and comprising said transparent element **(310)**, said cover element **(135b)** being mounted on the drum wall **(130a)** over said light-permeable portion **(202)**. 40
6. The laundry machine **(100)** according to claim 5, wherein the transparent element **(310)** is provided on a top edge portion **(320)** of the hollow main body **(305)**. 45
7. The laundry machine **(100)** according to claim 5 or 6, wherein the hollow main body **(305)** comprises an open base surface **(325)** opposite to the top edge portion **(320)**, said open base surface **(325)** encompassing the light-permeable portion **(202)**. 50
8. The laundry machine **(100)** according to any claim 5-7, wherein the transparent element **(310)** engages 55

the hollow main body **(305)** of the cover element **(135b)** by means of a snap-fit engagement **(315)**.

9. The laundry machine **(100)** according to any claim 5-8, wherein the cover element **(135b)** is a lifter **(135b)** adapted to improve the tumbling of items during the laundry machine **(100)** operation.
10. The laundry machine **(100)** according to any one of the preceding claims, further comprising a holder **(205)** in the stationary portion **(110a)** of the laundry machine **(100)** for housing the light-emitting element **(165)**.
11. The laundry machine **(100)** according to any one of the preceding claims, further comprising a light focuser **(215)**, coupled with the light-emitting element **(165)** adapted to focus the light radiation generated by said light-emitting element **(165)** towards the drum wall **(130a)**.
12. The laundry machine **(100)** according to claim 10 or 11, further comprising a transparent cap **(220)** adapted to close the holder **(205)**, for sealing the light-emitting element **(165)** away from liquids and/or moisture comprised in the stationary portion **(110a)** of the laundry machine **(100)**.

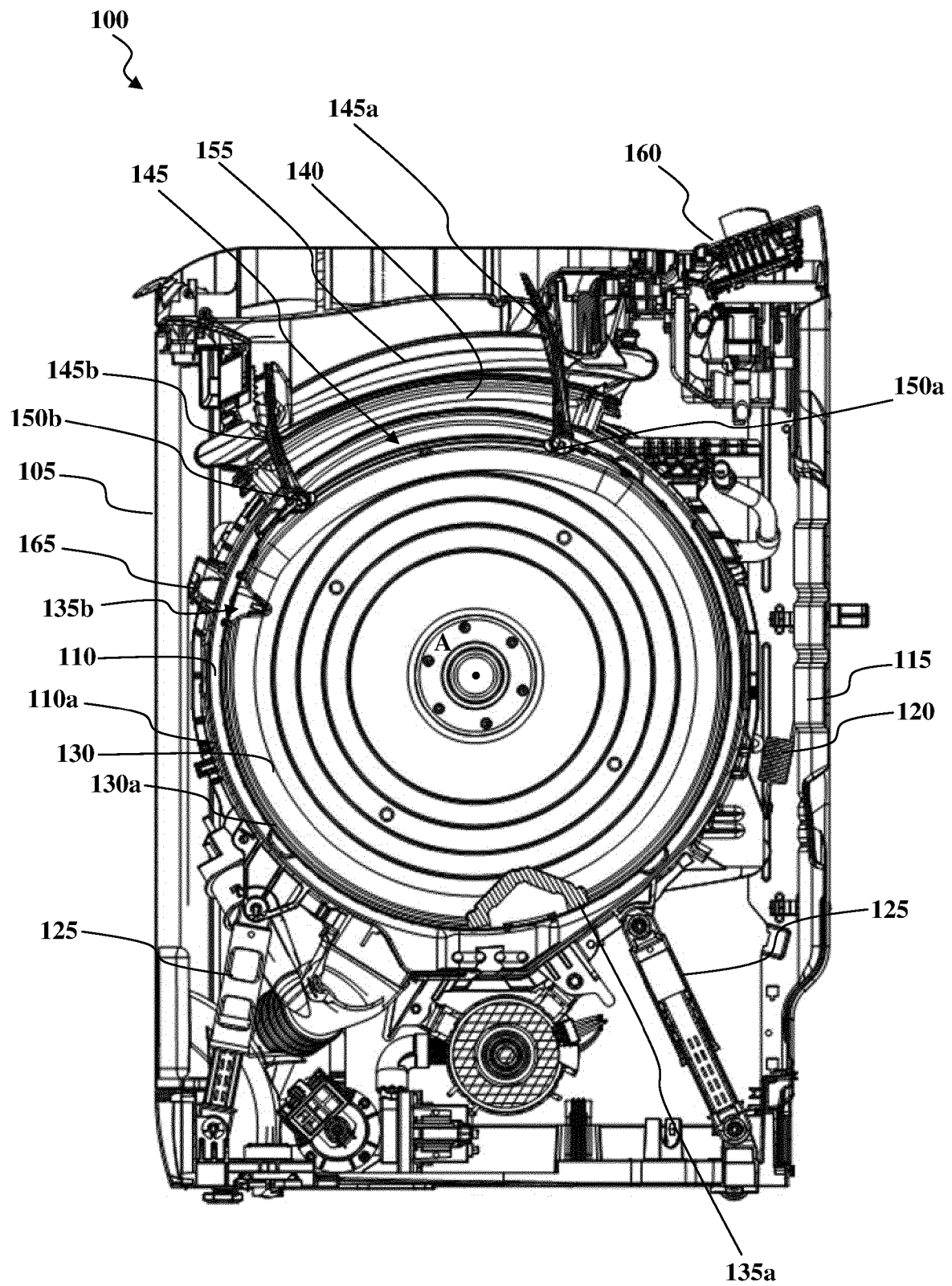


FIG.1

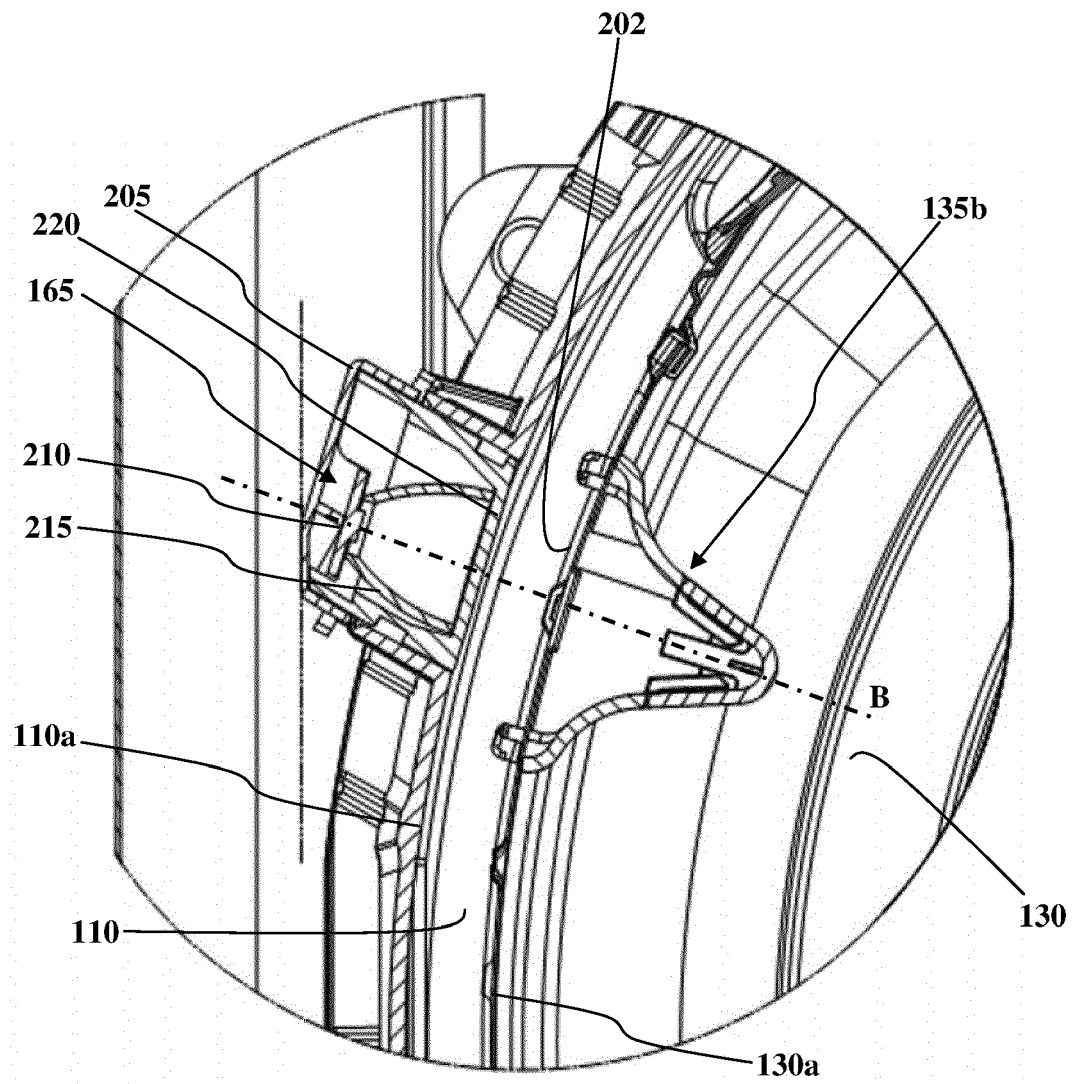


FIG.2

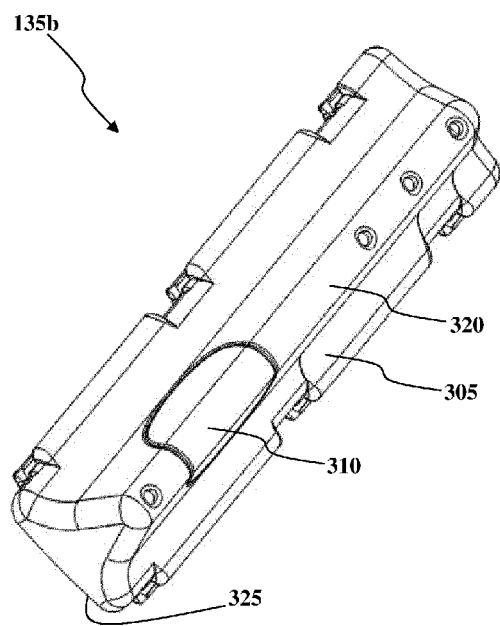


FIG.3A

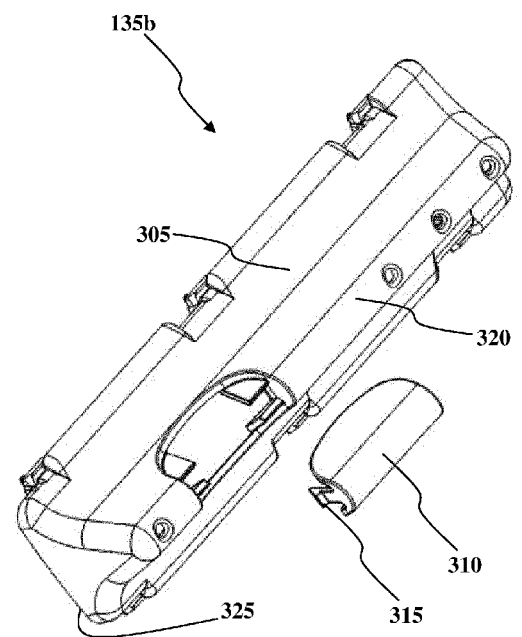


FIG.3B



EUROPEAN SEARCH REPORT

Application Number
EP 11 19 3993

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Place of search Munich		Date of completion of the search 21 June 2012	Examiner Kising, Axel
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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EPO FORM 1503 03.82 (P04C01)

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21-06-2012

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