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(54) Apparatus and method for determining a load amount in a laundry treating appliance during loading and providing indications regarding the same

(57) An apparatus and method for operating a laundry treating appliance includes determining an amount of laundry load during loading of the laundry treating appliance and provides indications to a user regarding the monitored amount.

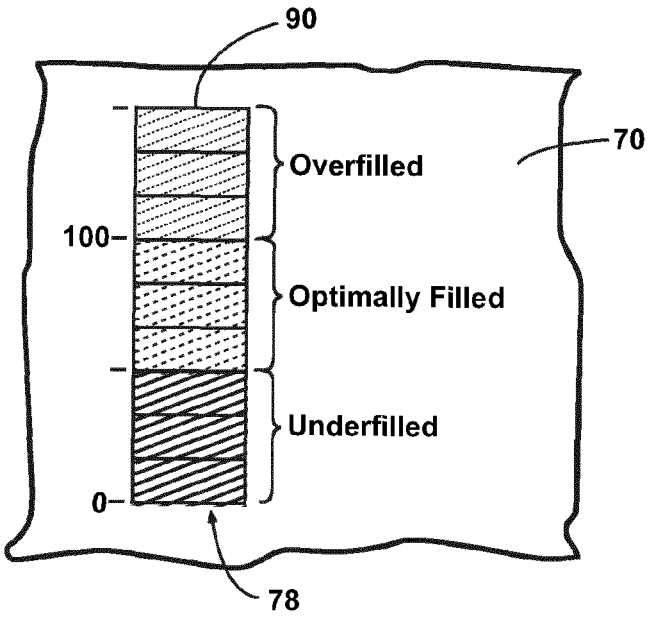

Fig. 5

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Description

BACKGROUND OF THE INVENTION

[0001] Laundry treating appliances, such as a washing machine in which a drum defines a treating chamber for receiving a laundry load, may implement cycles of operation, which may vary according to the size of the laundry load in the drum. The size of the laundry load may be manually input by the user through a user interface or may be automatically determined by the washing machine during the cycle of operation. For manual input by the user, the user may oftentimes overestimate or underestimate the load size, thereby resulting in a less than optimal treating performance. Many methods are known for the washing machine to automatically determine the load size during the cycle of operation, such as by employing an output of the motor that drives the drum.

SUMMARY OF THE INVENTION

[0002] According to one aspect of the invention a method of operating a laundry treating appliance includes monitoring the amount of laundry placed in the treating chamber during loading, comparing the monitored amount to a predetermined threshold, determining at least one selectable cycle of operation when the monitored amount satisfies the predetermined threshold, and indicating the at least one selectable cycle of operation on the user interface of the laundry treating appliance.

BRIEF DESCRIPTION OF THE DRAWINGS

[0003] In the drawings:

[0004] Figure 1 is a sectional view of a laundry treating appliance according to one embodiment of the invention.

[0005] Figure 2 is a schematic view of a controller of the laundry treating appliance of Figure 1.

[0006] Figures 3-8 are partial front views of embodiments of exemplary user interfaces of the laundry treating appliance of Figure 1.

[0007] Figure 9 is a flow chart of a method for determining selectable cycles of operation based on a determined load size in the laundry treating appliance of Figure 1 and indicating the same to a user according to a second embodiment of the invention.

[0008] Figure 10 is a flow chart of a method for determining a filled condition for a selected cycle of operation of the treating appliance of Figure 1 and indicating the same to a user according to a third embodiment of the invention.

DESCRIPTION OF AN EMBODIMENT OF THE INVENTION

[0009] Figure 1 illustrates a laundry treating appliance in the form of a washing machine 10 according to one embodiment of the invention. The laundry treating appliance may be any machine that treats articles such as clothing or fabrics. Non-limiting examples of the laundry treating appliance may include a vertical washing machine; a combination washing machine and dryer; and a refreshing/revitalizing machine. The washing machine 10 described herein shares many features of a traditional automatic washing machine, which will not be described in detail except as necessary for a complete understanding of the invention.

[0010] Washing machines are typically categorized as either a vertical axis washing machine or a horizontal axis washing machine. As used herein, the "vertical axis" washing machine refers to a washing machine having a rotatable drum, perforate or imperforate, that holds fabric items and a fabric moving element, such as an agitator, impeller, nutator, and the like, that induces movement of the fabric items to impart mechanical energy to the fabric articles for cleaning action. In some vertical axis washing machines, the drum rotates about a vertical axis generally perpendicular to a surface that supports the washing machine. However, the rotational axis need not be vertical. The drum may rotate about an axis inclined relative to the vertical axis. As used herein, the "horizontal axis" washing machine refers to a washing machine having a rotatable drum, perforated or imperforate, that holds fabric items and washes the fabric items by the fabric items rubbing against one another as the drum rotates. In horizontal axis washing machines, the clothes are lifted by the rotating drum and then fall in response to gravity to form a tumbling action that imparts the mechanical energy to the fabric articles. In some horizontal axis washing machines, the drum rotates about a horizontal axis generally parallel to a surface that supports the washing machine. However, the rotational axis need not be horizontal. The drum may rotate about an axis inclined relative to the horizontal axis. Vertical axis and horizontal axis machines are best differentiated by the manner in which they impart mechanical energy to the fabric articles. In vertical axis machines, a clothes mover, such as an agitator, auger, impeller, to name a few, moves within a drum to impart mechanical energy directly to the clothes or indirectly through wash liquid in the drum. The clothes mover may typically be moved in a reciprocating rotational movement. The illustrated exemplary washing machine of Figure 1 is a horizontal axis washing machine.

[0011] The washing machine 10 may include a housing 12, which may be a cabinet or a frame to which decorative panels are mounted. A rotatable drum 18 may be disposed within an interior of the housing 12 and may at least partially define a treating chamber 20 for treating laundry. The rotatable drum 18 may be mounted within an imperforate tub 22, which may be suspended within the housing 12 by a resilient suspension system 24. Both the tub 22 and the drum 18 may be selectively closed by a door 25. A bellows 26 couples an open face of the tub 22 with the housing 12, and the door 25 seals against the bellows 26 when the door 25 closes the tub 22. The drum 18 may include a plurality of perforations 27, such

that liquid may flow between the tub 22 and the drum 18 through the perforations 27. The drum 18 may further include a plurality of baffles 28 disposed on an inner surface of the drum 18 to lift fabric items forming a laundry load contained in the laundry treating chamber 20 while the drum 18 rotates. A motor 30 may be coupled to the drum 18 through a drive shaft 32 for selective rotation of the treating chamber 20 during a cycle of operation. It may also be within the scope of the invention for the motor 30 to be coupled with the drive shaft 32 through a drive belt for selective rotation of the treating chamber 20. The motor 30 may rotate the drum 18 at multiple or variable speeds in either rotational direction.

[0012] While the illustrated washing machine 10 includes both the tub 22 and the drum 18, with the drum 18 defining the laundry treating chamber 20, it is within the scope of the invention for the washing machine 10 to include only one receptacle, with the receptacle defining the laundry treating chamber for receiving a laundry load to be treated.

[0013] A liquid supply and recirculation system 40 may also be included in the washing machine 10. Liquid, such as water, may be supplied to the washing machine 10 from a water supply 42, such as a household water supply. A supply conduit 44 may fluidly couple the water supply 42 to the tub 22 and a treating chemistry dispenser 46. The supply conduit 44 may be provided with an inlet valve 48 for controlling the flow of liquid from the water supply 42 through the supply conduit 44 to the treating chemistry dispenser 46. The treating chemistry dispenser 46 may be a single-use dispenser, that stores and dispenses a single dose of treating chemistry and must be refilled for each cycle of operation, or a multiple-use dispenser, also referred to as a bulk dispenser, that stores and dispenses multiple doses of treating chemistry over multiple executions of a cycle of operation.

[0014] A liquid conduit 50 may fluidly couple the treating chemistry dispenser 46 with the tub 22. The liquid conduit 50 may couple with the tub 22 at any suitable location on the tub 22 and is shown as being coupled to a front wall of the tub 22 for exemplary purposes. The liquid that flows from the treating chemistry dispenser 46 through the liquid conduit 50 to the tub 22 typically enters a space between the tub 22 and the drum 18 and may flow by gravity to a sump 52 formed in part by a lower portion of the tub 22. The sump 52 may also be formed by a sump conduit 54 that may fluidly couple the lower portion of the tub 22 to a pump 56. The pump 56 may direct fluid to a drain conduit 58, which may drain the liquid from the washing machine 10, or to a recirculation conduit 60, which may terminate at a recirculation inlet 62. The recirculation inlet 62 may direct the liquid from the recirculation conduit 60 into the drum 18. The recirculation inlet 62 may introduce the liquid into the drum 18 in any suitable manner, such as by spraying, dripping, or providing a steady flow of the liquid. While the recirculation inlet 62 is illustrated as being located at a lower portion of the tub 22 it is contemplated that it may be located in alternative locations including an upper portion of tub 22.

[0015] Additionally, the liquid supply and recirculation system 40 may differ from the configuration shown in Figure 1, such as by inclusion of other valves, conduits, wash aid dispensers, heaters, sensors, such as water level sensors and temperature sensors, and the like, to control the flow of treating liquid through the washing machine 10 and for the introduction of more than one type of detergent/wash aid. Further, the liquid supply and recirculation system 40 need not include the recirculation portion of the system or may include other types of recirculation systems.

[0016] A heater, such as sump heater 63 or steam generator 65, may be provided for heating the liquid and/or the laundry load. The sump heater 63 is illustrated as a resistive heating element. The sump heater 63 may be used alone or in combination with the steam generator 65 to heat the liquid and/or the laundry load.

[0017] One or more sensors 66 may also be included in the washing machine 10 and may be positioned in any suitable location for detecting the amount of laundry placed in the treating chamber 20. By way of non-limiting example, it is contemplated that the amount of laundry in the treating chamber may be determined based on the weight of the laundry and/or the volume of laundry in the treating chamber. Thus, the one or more sensors 66 may output a signal indicative of either the weight of the laundry load in the treating chamber 20 or the volume of the laundry load in the treating chamber 20. The one or more sensors 66 may be any suitable type of sensor capable of measuring the weight or volume of laundry in the treating chamber 20. Non-limiting examples of sensors 66 for measuring the weight of the laundry may include load volume, pressure, or force transducers which may include, for example, load cells and strain gauges. It has been contemplated that the one or more such sensors 66 may be operably coupled to the suspension system 24 to sense the weight borne by the suspension system 24. The weight borne by the suspension system 24 correlates to the weight of the laundry loaded into the treating chamber 20 such that the sensor 66 may indicate the weight of the laundry loaded in the treating chamber 20. In the case of a suitable sensor 66 for determining volume it is contemplated that an IR or optical based sensor may be used to determine the volume of laundry located in the treating chamber 20

[0018] Alternatively, it has been contemplated that the washing machine 10 may have one or more pairs of feet 67 extending from the housing 12 and supporting the housing 12 on the floor and that a weight sensor (not shown) may be operably coupled to at least one of the feet 67 to sense the weight borne by that foot 67, which correlates to the weight of the laundry loaded into the treating chamber 20. Such a weight sensor may be operably coupled to each of the feet 67 to obtain a more accurate indication of the weight of the laundry loaded into the treating chamber 20. Thus, it is contemplated

that the one or more weight sensors may be applied in either tension or compression to measure the weight of the laundry in the treating chamber 20.

[0019] A controller 68 may be located within the housing 12 for controlling the operation of the washing machine 10 to implement one or more cycles of operation, which may be stored in a memory of the controller 68. Examples, without limitation, of cycles of operation include: wash, heavy duty wash, delicate wash, quick wash, refresh, rinse only, and timed wash. A user interface 70 may also be included on the housing 12 and may include one or more knobs, switches, displays, and the like for communicating with the user, such as to receive input and provide output.

[0020] As illustrated in Figure 2, the controller 68 may be provided with a memory 72 and a central processing unit (CPU) 74. The memory 72 may be used for storing the control software in the form executable instructions that may be executed by the CPU 74 in executing one or more cycles of operation using the washing machine 10 and any additional software. The memory 72 may also be used to store information, such as a database or table, and to store data received from one or more components of the washing machine 10 that may be communicably coupled with the controller 68 as needed to execute the cycle of operation.

[0021] The controller 68 may be operably coupled with one or more components of the washing machine 10 for communicating with and controlling the operation of the component to complete a cycle of operation. For example, the controller 68 may be coupled with the one or more sensors 66 for receiving the output of the sensors 66 indicative of the amount of laundry, the motor 30 for controlling the direction and speed of rotation of the drum 18, and the pump 56 for draining and recirculating wash water in the sump 52. The controller 68 may also be operably coupled to the inlet valve 48, the steam generator 65, the sump heater 63, and the treatment dispenser 46 to control operation of the component for implementing the cycle of operation. The controller 68 may also receive input from one or more sensors 76, which are known in the art. Non-limiting examples of sensors that may be communicably coupled with the controller 68 include: a treating chamber temperature sensor, a moisture sensor, a drum position sensor, a motor torque sensor, a motor speed sensor, a level sensor, etc. By way of non-limiting example, a level sensor 76 may output a signal indicative of a levelness of the laundry treating appliance and/or the treating chamber to the controller 68. Such a level sensor may include any suitable type of sensor including a bubble sensor, which may use a leveling bubble to indicate the levelness of the laundry treating appliance and/or the treating chamber to the controller 68. The controller 68 may also be operably coupled with the user interface 70 for receiving user selected inputs and communicating information with the user.

[0022] The user interface 70 has been schematically illustrated as including an indicator 78. The indicator 78 may indicate to a user when laundry in the treating chamber 20 satisfies a predetermined amount threshold correlating to an optimally filled treating chamber 20 for a specific selected cycle. The indicator 78 may allow the user to see how much laundry may be needed to optimally fill the washing machine 10 for a selected cycle so that optimal cleaning of the load may be obtained. It has been contemplated that the indicator 78 may alternatively indicate to a user which cycles are selectable based on the laundry loaded in the treating chamber 20. It has also been contemplated that the indicator 78 may alternatively be located elsewhere on the washing machine 10. By way of non-limiting examples such alternative locations may include on the housing 12 near the door 25, on the bellows 26, or on the door 25. It is also contemplated that the controller 68 may be capable of sending wireless signals to a portable device such that the user may receive indications through the device. By way of non-limiting example, the washing machine 10 may be linked to a smartphone, which may act as the indicator and may indicate information to a user as described with respect to the indicator 78 above. Thus, as the amount of laundry in the washing machine 10 changes the display on the smartphone or portable device may change. The smartphone or portable device may also send wireless signals to the washing machine 10 such that it may act as the user interface for the washing machine 10. By way of non-limiting example, the user may select an option on the smartphone and the washing machine 10 may receive such selections and be operated accordingly. However, the remainder of this description will describe the indicator 78 as being located on the user interface 70.

[0023] Figure 3 illustrates a first exemplary portion of a user interface 70 having an indicator 78 in the form of a laundry fill indicator. It is illustrated that the indicator 78 may have a simple system which indicates only two different conditions of optimally loaded/filled or overfilled for the cycle of operation selected by the user. More specifically, the indicator 78 has been illustrated as a single light emitting diode (LED) 80 which may turn off or on to signify the two conditions. Alternatively, the LED 80 may change color to signify a particular status. For example, led 80 may be illuminated with a first color, such as green, to inform a user that the treating chamber 20 is optimally filled for the selected cycle, and may be illuminated with a second color, such as red, to inform a user that the treating chamber is overfilled for the selected cycle. The LED 80 may remain unlit if the amount of the laundry load in the treating chamber 20 is underfilled and has not reached the optimally filled range for the selected cycle. It has been contemplated that an audible noise may be combined with the LED 80 to additionally alert the user that the treating chamber 20 is overfilled.

[0024] Figure 4 illustrates that, alternatively, multiple LEDS 82, 83 and indicia 84 may be used to indicate the two different conditions of optimally loaded or overfilled for the cycle of operation selected by the user. For example, LED 82 may be illuminated with a color such as

green to inform a user that the treating chamber 20 may be in an optimally filled range for the selected cycle. If the load amount is below such an optimally filled threshold the LED 82 may remain unlit to indicate that the optimal load amount has not yet been reached. Further, LED 83 may be illuminated with the same color or with a second color, such as red, to inform the user that the treating chamber 20 is overfilled for the selected cycle. It has been contemplated that an audible noise may be combined with the led to additionally alert the user that the treating chamber 20 is overfilled.

[0025] Figure 5 illustrates that the indicator 78 may be a range indicator or graduated scale 90 illustrating the filled condition. The scale 90 begins at zero, "0", but need not. It has also been illustrated as including a range beyond or greater than the filled condition, which may indicate to a user an overfilled condition for the selected cycle. The middle of the scale may indicate a filled threshold or expected optimal cleaning limit. If the user fills past this point, the display may extend beyond the threshold to the overfilled condition and perhaps turn red indicating that overfilling has occurred and cleaning performance will decrease. The scale 90 may give the user continuous feedback as the machine is filled.

[0026] Figure 6 illustrates that the user interface 70 may include a message provider 92 in addition to the indicator 78. The message provider 92 may provide a status message based on a first status indicator, and may then enhance the status message based on a second status indicator. For example, message provider 92 may provide a status message based on data regarding the amount of laundry in the treating chamber 20 such as the chamber is underfilled, optimally filled or under filled for the selected cycle. An additional message provider may then enhance the status message and indicate to the user estimated energy or water usage or usage savings of having a load that size. Alternatively, it has been contemplated that the LCD display may also be capable of indicating the filled or overfilled condition of the treating chamber, and thus may be used as the indicator and a separate indicator may be unnecessary.

[0027] Figure 7 illustrates a message provider 94 in the form of an array of LEDs. One or more of the LEDs may be illuminated, possibly with one or more different colors, in order to convey a message to the user regarding the selected cycle or the laundry loaded within the treating chamber 20. It has been contemplated that such an array of LEDS may be used as the single indicator to inform a user that the treating chamber 20 is in an optimally filled range.

[0028] Figure 8 illustrates that it has also been contemplated that the indicator 78 may include various LEDs 96 to indicate to a user which cycles are selectable based on the laundry loaded in the treating chamber 20. More specifically, the indicator 78 may include an LED 96 located next to indicia 97 indicating each of the cycles of operation. By way of non-limiting example, LEDs 96 have been shown next to indicia 97 indicating wash, heavy duty wash, whitest whites, delicate wash, quick wash, refresh, rinse only, and timed wash cycles. The indicator 78 may visually communicate, through the LEDs 96, to the user when one or more of the cycles of operation are available for selection by the user based on the laundry loaded in the treating chamber 20. Each LED 96 may be illuminated as a first color if the cycle is available, as a second color if the cycle is not available, and a third color if the cycle is selected by a user. The different illumination colors may be achieved by use of a multi-color LED. In addition to or in place of different colors, different illumination intensities may be used to indicate the status. Alternatively, each LED 96 may be illuminated if the cycle is available for selection and remain un-illuminated if the cycle is not available for selection. The user may select a corresponding selection button 98 located beside the LED 96, which indicates an available cycle, so that the illuminated cycle may be selected. When a start button 99 is depressed, the LEDs 96 for the other available cycles may be turned off.

[0029] The previously described washing machine 10 may be used to implement one or more embodiments of a method of the invention. Referring now to Figure 9, a flow chart of a method 100 for determining and indicating selectable cycles of operation based on a monitored load amount loaded into the laundry treating appliance according to a second embodiment of the invention is illustrated. The method 100 assumes that no fabrics have been loaded into the treating chamber 20 and that no user-selection of a cycle of operation has occurred prior to the start of the method 100. The method 100 may be initiated automatically when the door 25 is opened or when the user begins to place items within the treating chamber 20.

[0030] The method 100 begins at 102 where the controller 68 monitors the amount of fabric items or a laundry load within the treating chamber 20 when items are being loaded into the treating chamber 20. It is contemplated that the amount monitored in the method 100 may be either a weight of the laundry loaded into the treating chamber 20 or a volume of the laundry loaded into the treating chamber 20. The controller 68 may monitor the amount by repeatedly sensing the amount of the laundry loaded into the treating chamber 20 during loading. More specifically, the controller 68 may receive a repeatedly output signal indicative of the amount of the laundry loaded in the treating chamber 20 from the one or more amount sensors 66. Alternatively, the controller 68 may repeatedly sense the amount by sensing the change in amount of the treating chamber 20 during loading as determined from the output signal from the one or more amount sensors 66.

[0031] At 104, the controller 68 may determine if the monitored amount satisfies a predetermined amount threshold. The controller 68 may accomplish this by comparing the monitored amount to a predetermined weigh threshold to see if the monitored amount satisfies the predetermined threshold. To do this, the controller 68

may compare the monitored amount, either continuously or at set time intervals, to the predetermined threshold value. The term "satisfies" the threshold is used herein to mean that the amount of the laundry within the treating chamber 20 satisfies the predetermined threshold, such as being equal to or greater than the threshold value. It will be understood that such a determination may easily be altered to be satisfied by a positive/negative comparison or a true/false comparison.

[0032] The predetermined threshold value may be determined experimentally and stored in the memory 72 of the controller 68. It has been contemplated that the predetermined amount threshold value may be a predetermined amount range and that the predetermined amount threshold may be satisfied when the monitored amount falls within the predetermined amount range. It has been contemplated that there may be multiple predetermined amount threshold values and that during the comparison it may be determined which of the multiple values is satisfied.

[0033] Thus, at 102 the controller 68 repeatedly receives the output from the amount sensor 66, which indicates the amount of the laundry loaded within the treating chamber 20, and at 104 compares it with a predetermined amount threshold stored in the memory 72 to determine when the amount of the laundry loaded into the treating chamber 20 satisfies the amount threshold. If the monitored amount does not satisfy the predetermined threshold, then the controller 68 returns to 102 where the controller 68 continues to monitor the amount of laundry within the treating chamber 20 and then compares the monitored amount to the predetermined amount threshold at 104 to determine if the threshold is satisfied. When it is determined at 104 that the monitored amount satisfies the predetermined threshold, then the controller 68 at 106 may determine one or more cycles of operation which may be optimally implemented for the laundry load located in the treating chamber 20. The controller 68 may have a table of cycles that may be optimally implemented for the predetermined amount threshold stored in its memory 72. The controller 68 may determine that only these cycles are selectable based on the monitored amount of the laundry load in the treating chamber 20.

[0034] Once it is determined which cycles of operation are selectable, the controller 68 may correspondingly activate an indicator 78 on the user interface 70 to indicate the one or more selectable cycles of operation. This may be done using any of the previously described methods.

[0035] A benefit of the method 100 is that the feedback provides the user with information regarding what cycles of operation are appropriate for the load that has been placed in the treating chamber 20. Such an indication provided to the user allows the user to optimally operate the washing machine 10 based on the load in the treating chamber 20. Such feedback gives additional information to the user so that the user does not have to estimate the load size or guess which cycles will provide optimal treating performance for the load.

[0036] Figure 10 is a flow chart of a method 200 for determining a filled condition for a selected cycle of operation of the treating appliance of Figure 1 and indicating the same to a user according to a third embodiment of the invention. The method 200 assumes that no fabrics have been loaded into the treating chamber 20. The method 200 may be initiated automatically when the door 25 is opened or when the user selects a cycle of operation.

[0037] The method 200 begins at 202 where the controller 68 determines what cycle of operation has been selected by a user via the user interface 70. This may also include determining which, if any, cycle modifiers are optionally selected, such as a load color, and/or a fabric type. Examples of load colors are whites and colors. Examples of fabric types are cotton, silk, polyester, delicates, permanent press, and heavy duty.

[0038] At 204 the controller 68 may set an amount threshold for the selected cycle of operation. It is contemplated that the amount threshold may correlate to a weight threshold or a volume threshold based on the determined cycle of operation. The set amount threshold may be predetermined experimentally and stored in the memory 72 of the controller 68. The set amount threshold may include a predetermined value that is based on the determined cycle of operation and such a value may be satisfied when the monitored amount is equal to or greater that the predetermined amount value. Alternatively, the set amount threshold may include a predetermined amount range that is based on the determined cycle of operation and the predetermined amount threshold is satisfied when the monitored amount falls within the predetermined amount range. It has also been contemplated that for a selected cycle the controller 68 may set multiple predetermined amount threshold values or ranges correlating to a percentage (0%, 20%, etc.) of the optimal amount which may be provided in the treating chamber 20 for the selected cycle.

[0039] The method 200 continues at 206 where the controller 68 monitors the amount of the laundry load within the treating chamber 20 when items are being loaded into the treating chamber 20. At 208, the controller 68 compares the monitored amount with the set amount threshold, which was previously set at 204, to determine when the amount of the laundry loaded into the treating chamber satisfies the set amount threshold. If the monitored amount does not satisfy the set threshold then the controller 68 returns to 206 where the controller 68 continues to monitor the amount of laundry within the treating chamber 20 and then compares it to the set amount threshold at 208 to see if the set amount threshold is satisfied. When it is determined at 208 that the monitored amount satisfies the set amount threshold then a filled condition of the washing machine is determined at 210 by the controller 68. More specifically, the controller 68 may determine from the satisfied amount threshold if the treating chamber 20 is optimally filled. Further, if the set amount thresholds correlate to a percentage (0%, 20%,

etc.) of the optimal amount which may be provided in the treating chamber 20 for the selected cycle, then the controller 68 may determine what percent of the treating chamber 20 has been filled.

[0040] At 212, the controller 68 may operate the indicator 78 to indicate the determined filled condition to the user. If the set amount threshold is an optimally filled amount for the selected cycle, then indicating the satisfying of the predetermined amount threshold on the user interface at 212 may include visually indicating with the indicator 78 that the treating chamber 20 is optimally filled for the selected cycle. If the set amount threshold is an overfilled amount, then indicating the satisfying of such an amount may include visually indicating with the indicator 78 that the treating chamber is overfilled for the selected cycle. Alternatively, the indication may include illuminating a portion of the range indicator 90 indicating a filled level correlating to the satisfied amount threshold to give the user continuous feedback as the machine is filled. If the set amount range correlates to an optimally filled level then a unique indication may be given to the user when the amount is within the set amount range. Such unique indications may include at least one of a different color, a color in combination with a sound, a graphic, an animation, text, and sequentially displaying text. In this manner the user may be alerted that the laundry located within the treating chamber 20 is within the set amount range for the selected cycle before the user overloads the treating chamber 20.

[0041] It is also contemplated that the washing machine 10 may continue to monitor the amount of laundry placed within the treating chamber 20 after an optimally filled condition has been indicated. In this manner the controller 68 may determine an overfilled condition of the treating chamber 20. The indicator 78 and the range indicator 90 may both be used to indicate an overfilled condition for the selected cycle if the user continues to load laundry into the treating chamber 20 beyond the set amount threshold.

[0042] A benefit of the method 200 is that the indication provided to the user during loading allows the user to obtain a sense of the actual capacity of the treating chamber and allows the user the ability to optimally fill the treating chamber 20 before starting the cycle of operation. Users often over or under fill the treating chamber 20 and the invention disclosed herein enables information to be given to the user such that the user may add or remove laundry to optimally fill the treating chamber for the selected cycle of operation.

[0043] Further, depending on the type of load amount sensor used the sensor may provide additional benefits including that ability to determine how much water is being applied to the laundry machine, which in conjunction with the known load mass may determine a recommended detergent amount. Further, exact knowledge of how much water weight versus fabric weight may be used to determine the type of load. Further, the amount of water remaining in the load may be determined and used during extraction. Further, the determined load amount may be used during the cycle such as to aid in unbalance management and as an input to detect bunching and entanglement. It is also contemplated that a moisture sensor may be used to determine if the laundry loaded into the treating chamber 20 is wet or dry and the moisture content of such laundry. Such a moisture sensor may be operably coupled to the controller 68 such that the controller 68 may receive a signal indicative of the moisture in the laundry and the controller 68 may display on the user interface an indication regarding such moisture content. By way of non-limiting example such an indication may indicate saturated states of the laundry and a potential water to cloth ratio. Further, the controller 68 may be capable of using such moisture information to determine a dry load weight estimated value and operate the indicator 78 accordingly.

[0044] Depending on the type of sensor 66 used in the washing machine 10 the output of the sensor 66 may be skewed if either the treating chamber 20 and/or washing machine 10 is not level. Thus, it is contemplated that either of the methods described above may also include an initial sensing of any unlevelness of either the treating chamber 20 and/or the washing machine 10 and adjusting the monitored amount to compensate for any sensed unlevelness. This calibration may occur regardless of whether the determined amount is a weight or a volume. By way of non-limiting example, at the beginning of each method 100 and 200 the levelness of the treating chamber and/or the washing machine 10 may be calculated and if there is an unlevelness, then the controller 68 may calibrate the output of the sensors 66 such that the output of the sensors 66 may be adjusted according to any detected unlevelness. More specifically, the controller 68 may receive an output signal indicative of the levelness or unlevelness of either the laundry treating appliance and/or the treating chamber from a level sensor 76. The controller 68 may then adjust the output from the sensor 66 according to the output received from the level sensor 76. In this manner, the controller 68 may compensate for any sensed unlevelness in determining the amount of the laundry load in the treating chamber 20. This may allow for the controller 68 to make a more accurate amount determination because the calibrated sensors 66 will provide a more accurate indication of the amount of the laundry in the drum.

Claims

1. A method of operating a laundry treating appliance (10) having a treating chamber (20) for receiving laundry for treatment according to at least one cycle of operation, a controller (68) for implementing the cycle of operation, and a user interface (70) coupled to the controller, the method comprising:

   monitoring the amount of laundry placed in the

treating chamber (20) during loading;
comparing the monitored amount to a predetermined amount threshold;
determining at least one selectable cycle of operation when the monitored amount satisfies the predetermined amount threshold; and
indicating the at least one selectable cycle of operation on the user interface of the laundry treating appliance (10).

2. The method of claim 1 wherein the monitoring the amount comprises repeatedly sensing the amount of the laundry during loading, preferably sensing a change in the amount of laundry in the treating chamber (20) during loading.

3. The method of claim 2 wherein repeatedly sensing the amount comprises the controller (68) receiving output from a sensor (66, 76), where the output is indicative of the amount of the laundry.

4. The method of claim 1 wherein the predetermined amount threshold is a predetermined amount range and the predetermined amount threshold is satisfied when the monitored amount falls within the predetermined amount range.

5. The method of claim 1, further comprising compensating the monitored amount for any unlevelness in at least one of the treating chamber (20) and the treating appliance (10), preferably using the sensed unlevelness to compensate for the monitored amount.

6. The method of claim 1, further comprising determining at least one of a selectable cycle option and a selectable cycle modifier when the monitored amount satisfies the predetermined amount threshold and indicating the at least one of the selectable cycle option and selectable cycle modifier on the user interface of the laundry treating appliance.

7. The method of claim 1 further comprising:

determining a selected cycle of operation;
setting a predetermined amount threshold for the selected cycle of operation;
determining a filled condition of the laundry treating appliance when the monitored amount satisfies the predetermined amount threshold; and
indicating the satisfying of the predetermined amount threshold on the user interface of the laundry treating appliance (10).

8. The method of claim 7 wherein the predetermined amount threshold comprises a predetermined amount range that is based on the determined cycle of operation and the predetermined amount threshold is satisfied when the monitored amount falls within the predetermined amount range.

9. The method of claim 8 wherein the indicating the satisfying of the predetermined amount threshold on the user interface (70) comprises visually indicating when the amount is in the predetermined amount range, such visually indicating comprising preferably illuminating a range indicator (78) having a range greater than the predetermined amount range and having at least one unique indication when the amount is within the predetermined amount range.

10. The method of claim 7 wherein determining the selected cycle of operation includes determining at least one of a selected cycle option and a selected cycle modifier and setting the predetermined amount threshold includes setting a predetermined amount threshold for the selected cycle of operation and the at least one of the selected cycle option and selected cycle modifier.

11. A laundry treating appliance for treating laundry according to a cycle of operation, comprising:

a housing (12) defining an interior;
a treating chamber (20) located within the interior and receiving laundry for treatment;
an amount sensor (67, 76) repeatedly outputting a signal indicative of the amount of the laundry loaded in the treating chamber (20);
a controller (68) having a memory (72) in which is stored a set of executable instructions comprising at least one user-selectable cycle of operation; and
a user interface (70) operably coupled to the controller (68) and providing an input and output function for the controller;
wherein the controller (68) repeatedly receives the output from the amount sensor (66, 76) and compares it with an amount threshold stored in the memory (72) to determine when the amount of the laundry loaded into the treating chamber (20) satisfies the amount threshold and correspondingly activates an output on the user interface (70)

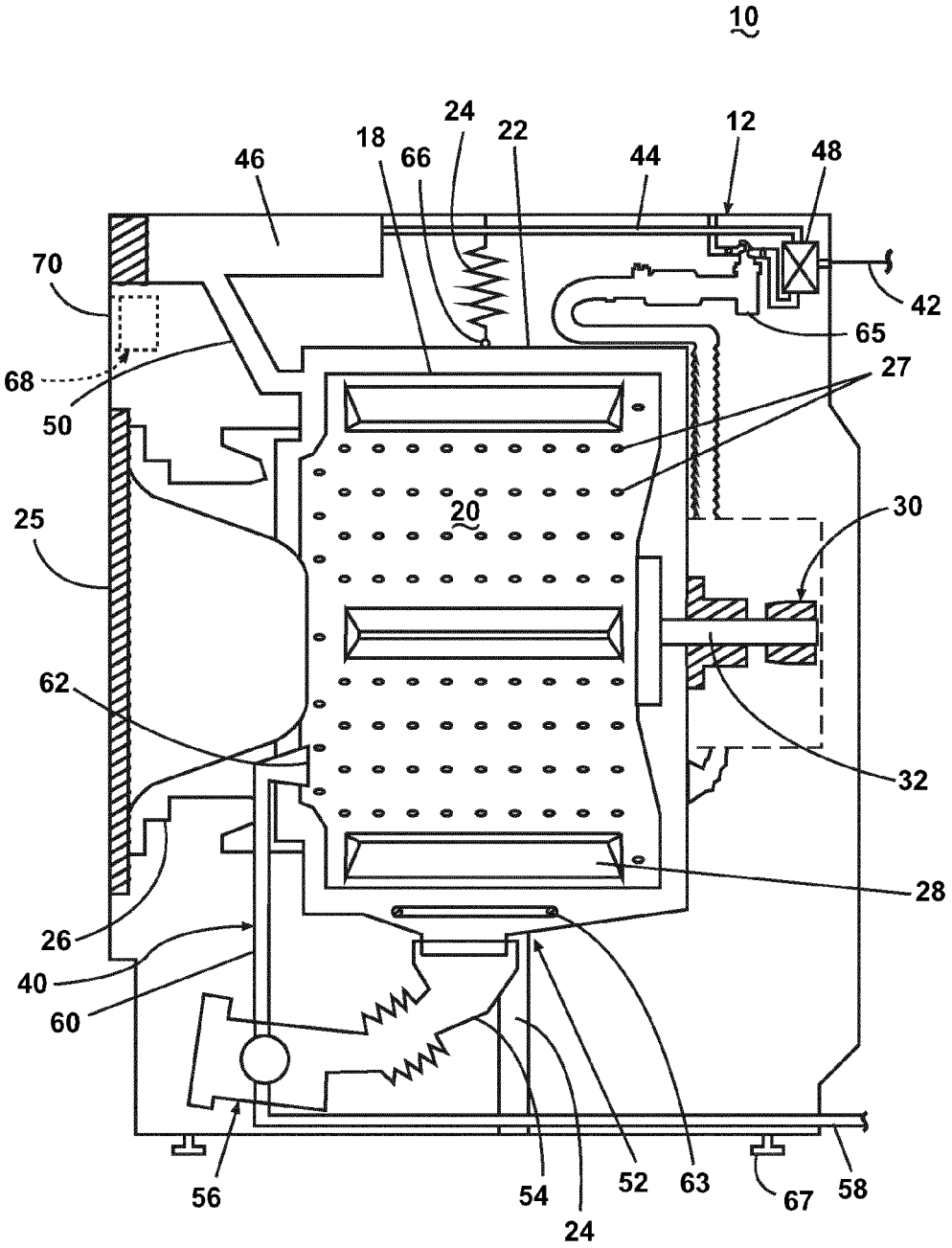
12. The laundry treating appliance of claim 11, further comprising a level sensor (76) outputting a signal indicative of a levelness of at least one of the laundry treating appliance and the treating chamber (20) and wherein the controller (68) receives the output from the level sensor (76) and adjusts the output from the amount sensor according to the output from the level sensor, the amount sensor being preferably a weight sensor.

13. The laundry treating appliance of claim 12, further

comprising at least one pair of feet extending from the housing (12) and supporting the housing on a floor and wherein the weight sensor (67) is operably coupled to at least one of the at least one pair of feet (67) to sense the weight borne by the one of the at least one pair of feet, which correlates to the weight of the laundry loaded into the treating chamber (20) such that the weight sensor may indicate the weight of the laundry loaded in the treating chamber, the weight sensor comprising preferably multiple weight sensors and each of the multiple weight sensors being operably coupled to a separate one of the at least one pair of feet (67).

14. The laundry treating appliance of claim 12, further comprising a suspension system and wherein the treating chamber (20) may be mounted within the housing (12) by the suspension system (24) and the weight sensor (66, 76) is operably coupled to a portion of the suspension system (24) to sense the weight borne by the suspension system, which correlates to the weight of the laundry loaded into the treating chamber (20) such that the weight sensor may indicate the weight of the laundry loaded in the treating chamber.

15. The laundry treating appliance of claim 11 wherein the output on the user interface (70) comprises a laundry fill indicator (78) to indicate at least one of a filled condition and an overfilled condition of the treating chamber, the laundry fill indicator (78) comprising preferably a weight indicator to indicate a weight of the laundry loaded into the treating chamber.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24

Fig. 1

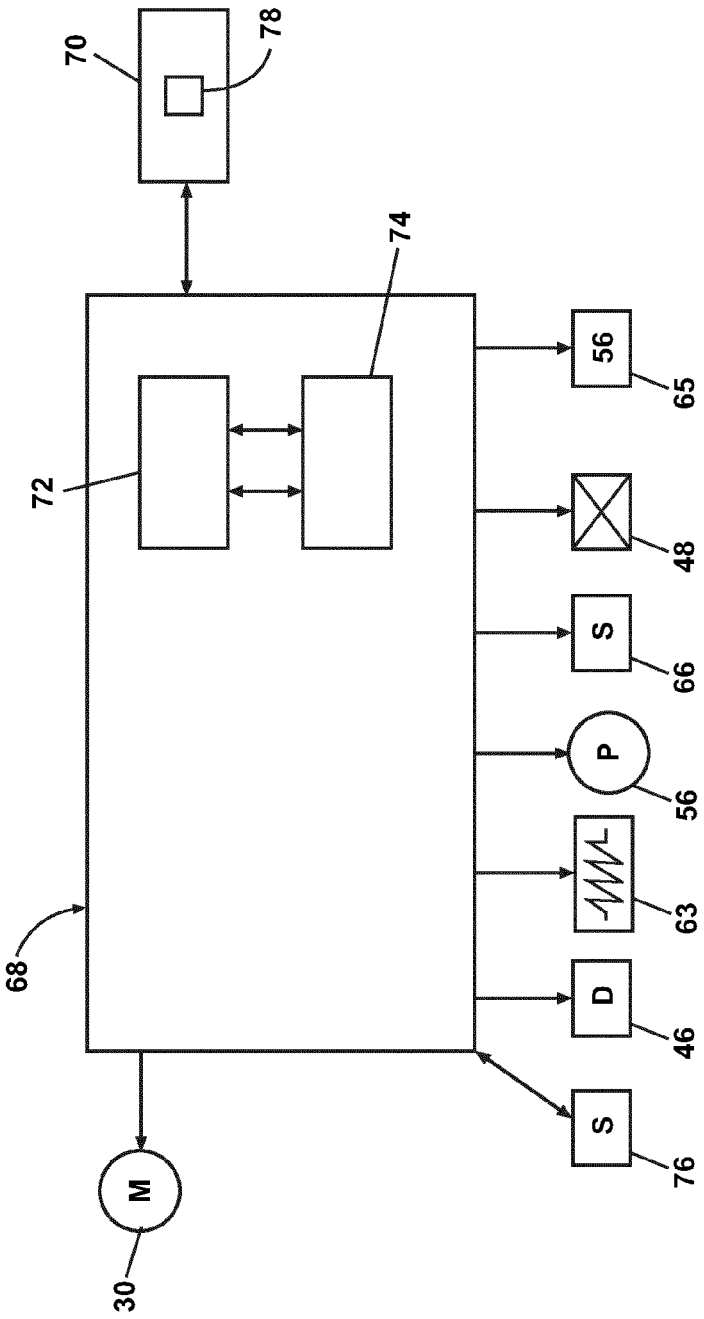

Fig. 2

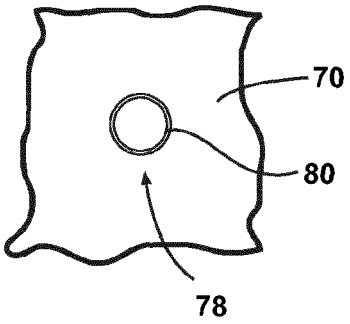

Fig. 3

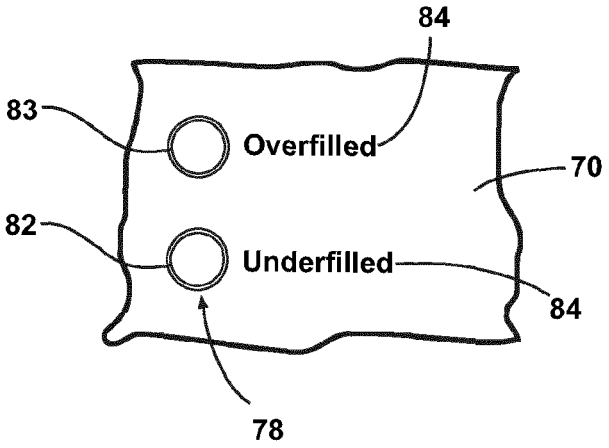

Fig. 4

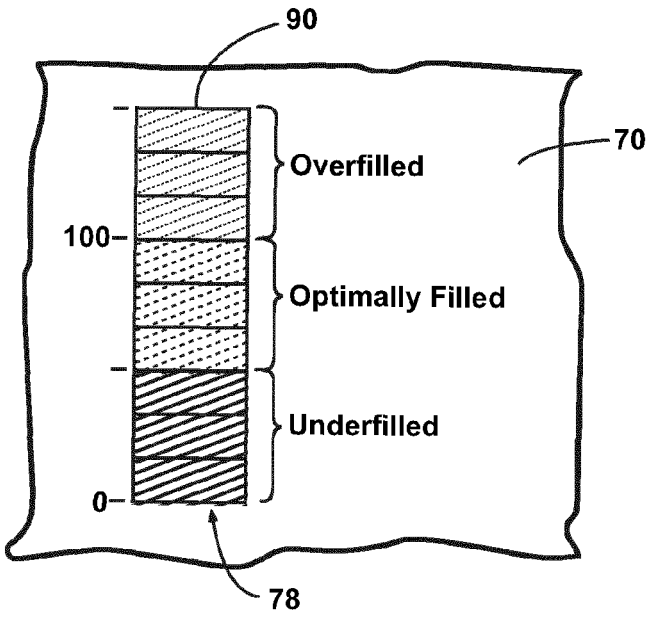

Fig. 5

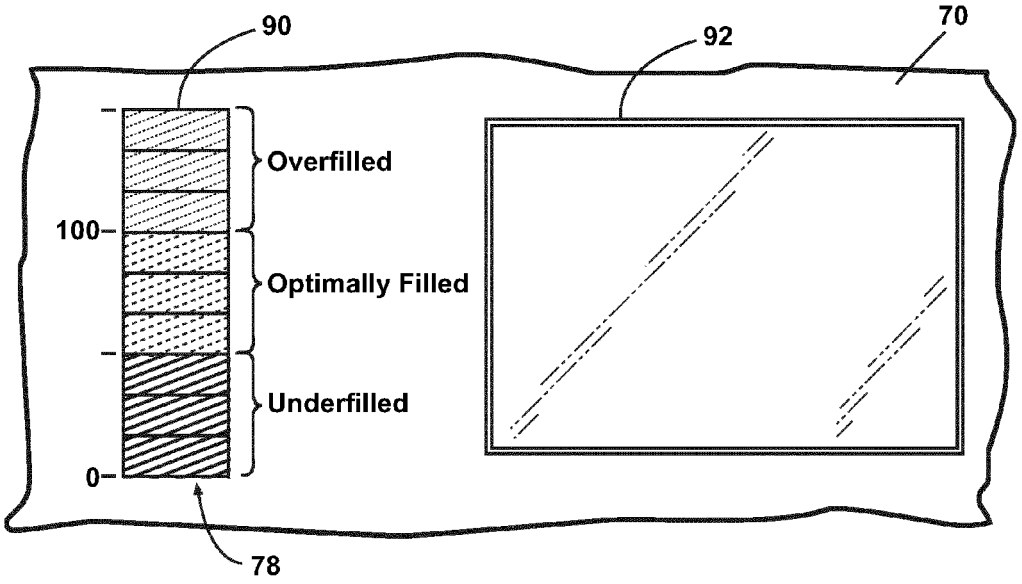
90
92
70
Overfilled
100
Optimally Filled
Underfilled
0
78

Fig. 6

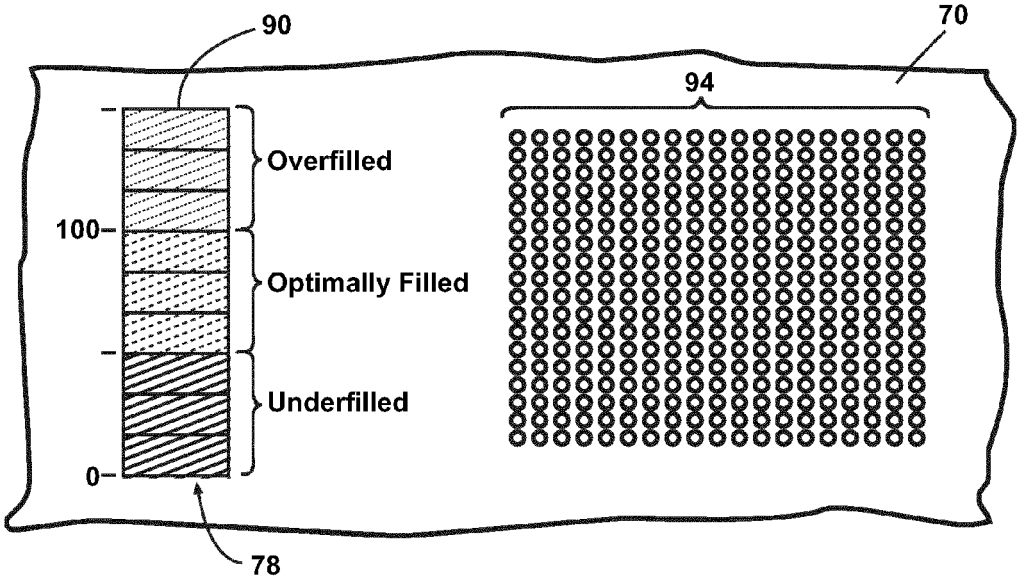
90
70
94
Overfilled
100
Optimally Filled
Underfilled
0
78

Fig. 7

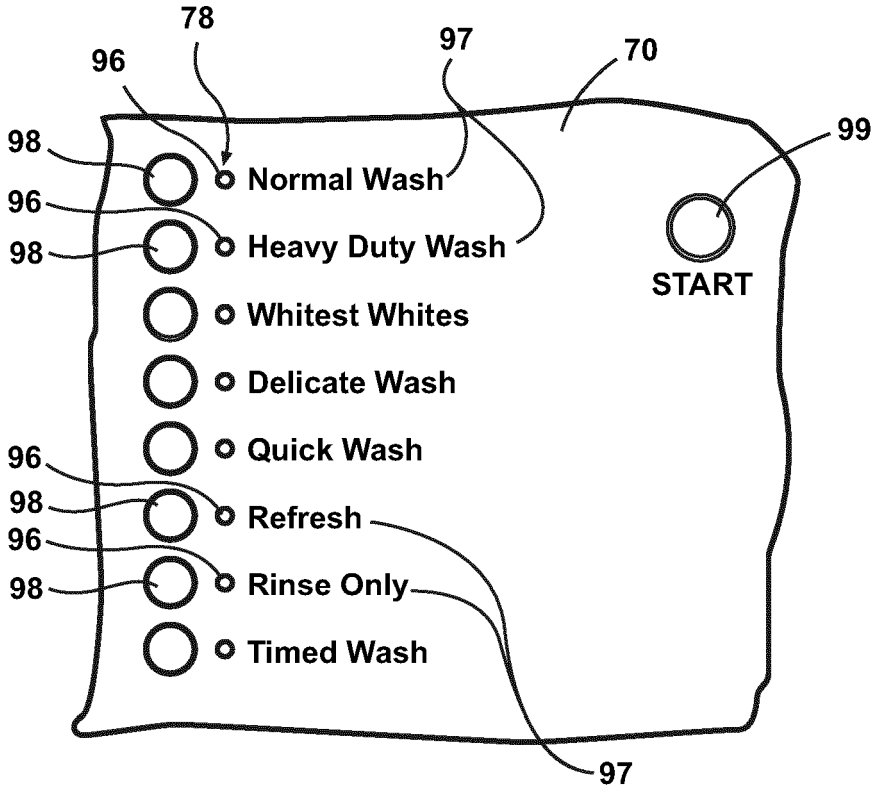
78
96
97
70
99
98
96
98
Normal Wash
Heavy Duty Wash
START
Whitest Whites
Delicate Wash
Quick Wash
96
98
96
98
Refresh
Rinse Only
Timed Wash
97

Fig. 8

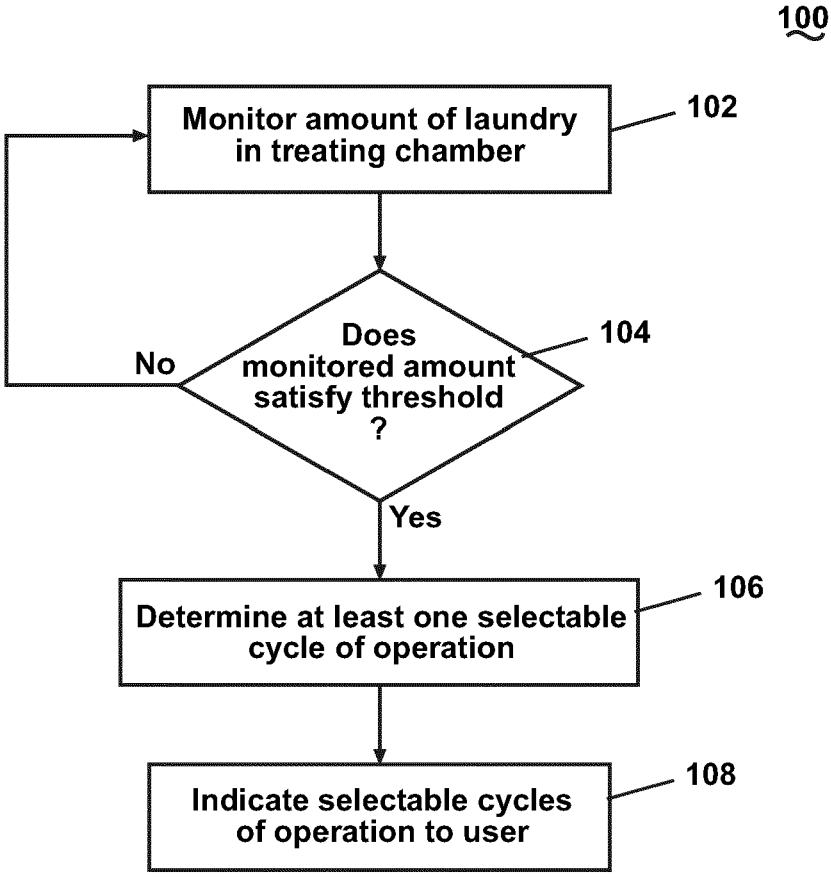
100
Monitor amount of laundry in treating chamber
102
Does monitored amount satisfy threshold ?
104
No
Yes
Determine at least one selectable cycle of operation
106
Indicate selectable cycles of operation to user
108

Fig. 9

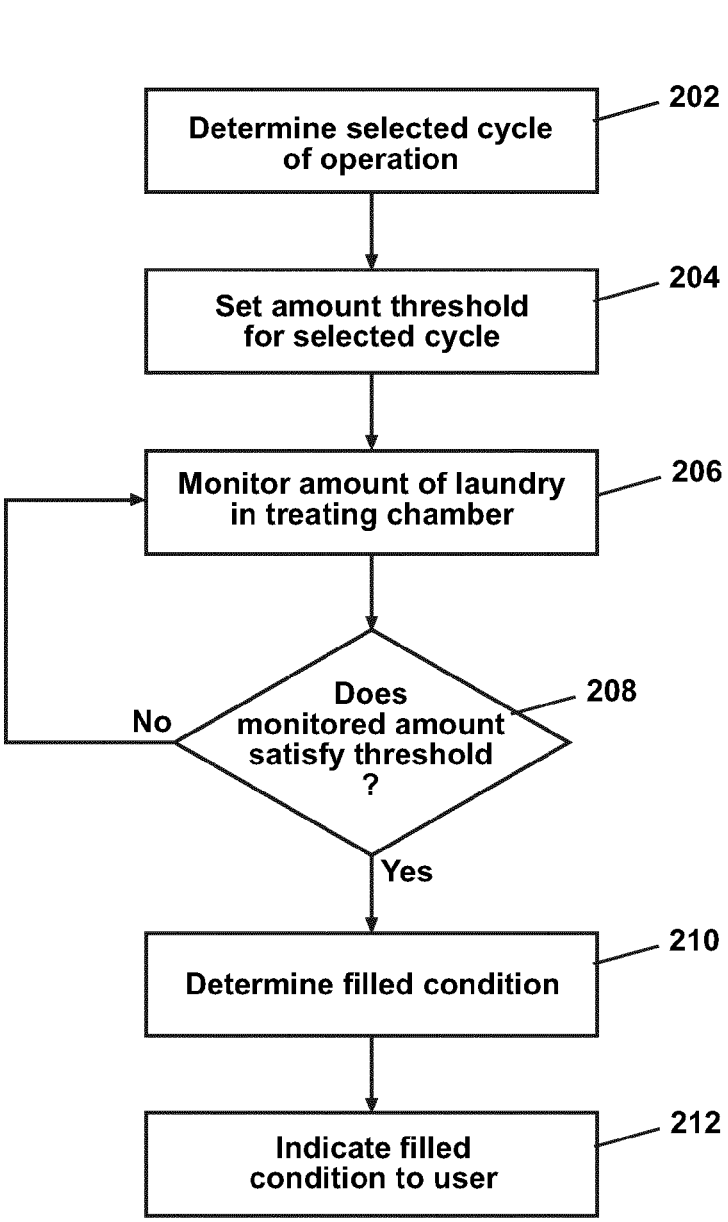
200
Determine selected cycle of operation
202
Set amount threshold for selected cycle
204
Monitor amount of laundry in treating chamber
206
Does monitored amount satisfy threshold ?
208
No
Yes
Determine filled condition
210
Indicate filled condition to user
212

Fig. 10