(54) **Title:** A WASHING MACHINE
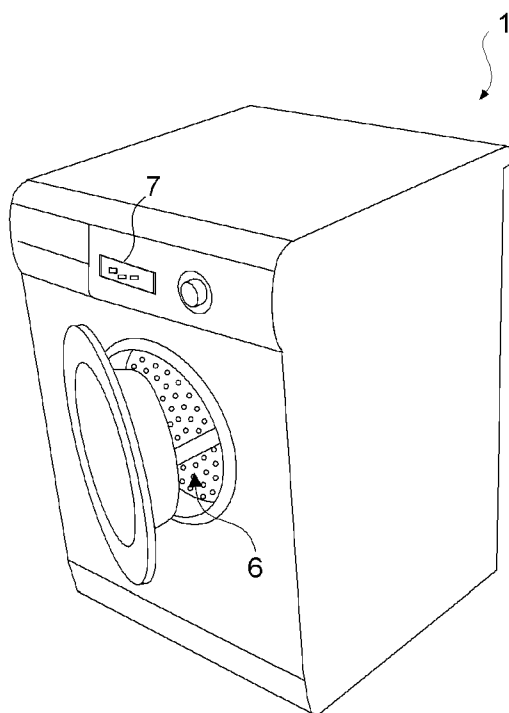
(57) **Abstract:** By means of the present invention, the determination of colored-white laundry (L) can be made for the laundry (L) emplaced into the drum (2) by utilizing the color sensor (4) before starting the washing process. The washing parameters are determined depending on the colored-white laundry (L) differentiation and the washing process is started accordingly. Particularly in single button washing machines (1) wherein the intervention of the user is minimal, the determination of the washing process depending on the color of the laundry (L) can be made independently from the user.

Description

A WASHING MACHINE

[0001]   The present invention relates to a washing machine wherein the washing process is realized for white and colored washing.

[0002]   In particularly the washing machines operated by a single button wherein user intervention in the washing algorithm is minimal, it is important to determine which washing process is the suitable one by detecting the color of the laundry. For determining the washing process, the information on the weight, type of the laundry as well as the color plays an important role. The duration and temperatures of the washing and rinsing steps differ in the washing programs to be implemented for colored or white laundry. In state of the art, the washing machine is operated after sorting the laundry according to their colors.

[0003]   In the state of the art United States of America Patent no. US4406028, washing control is established or the user is warned by detecting the release of laundry dye in the wash water during the washing operation. In this implementation, since detection is made depending on the release of dye into the wash water, the washing has to be made for a certain time period. However, since not all colored laundry release dye into water, the distinction of white and colored laundry is not very reliable. Furthermore, since release of dye into the wash water is taken as the base in determining the colors, the washed laundry is discolored. By this method mainly laundry that release dye rapidly such as jeans can be detected.

[0004]   In the German patent Application no. DE19756515, a method is described that provides to detect the color of the laundry emplaced in the washing machine.

[0005]   The object of the present invention is to design a washing machine wherein the color of the laundry is determined before starting the washing process and the colored or white washing process is carried out depending on the color data.

[0006]   The washing machine designed to fulfill the object of the present invention, explicated in the first claim and the respective claims thereof, comprises a color sensor providing to detect the color of the laundry emplaced therein and a control unit that determines the washing parameters before starting the washing process according to the color data received from the color sensor.

[0007]   Consequently the washing process that will be implemented is determined without the intervention of the user before starting the washing operation.

[0008]   Since the color sensor is in the active position independent from the operation of the

washing machine, the color of the laundry emplaced in the drum by the user can be detected even when the washing machine is in the off position. Accordingly, the color of the laundry emplaced in the drum can be detected either just before the washing process or when laundry is emplaced in the drum at spaced apart intervals and can be evaluated by the control unit.

[0009]   In another embodiment of the present invention, the color sensor detects simultaneously with a presence sensor disposed at the loading port. In this embodiment, erroneous detection resulting from the hand of the user or any other factor of the outer environment is prevented.

[0010]   In another embodiment of the present invention, the washing machine comprises preferably a white light source. The light source, which is energized as the laundry is emplaced into the drum through the loading port, provides to adjust the lighting level of the region to be detected by the color sensor. Accordingly, faulty color detection is prevented in the region that does not always have the same light intensity. White light emitting diode is used as the light source for convenience of use and costs.

[0011]   In another embodiment of the present invention, the washing machine comprises an indicator that displays for the user whether the laundry in the drum at that moment is colored or white according to the color values detected by the color sensor. Furthermore the indicator warns the user momentarily if the color of the newly placed laundry in the drum is different from the color values of the laundry determined earlier. Consequently, the user can load laundry in the drum knowing whether the previously loaded laundry in the drum is colored or white.

[0012]   In another embodiment of the present invention, the color sensor can be changed to the active or passive position with a button by the user.

[0013]   By means of the present invention, whether the washing process will be for colored laundry or white laundry is automatically determined before starting the washing process, and the washing process follows after this determination procedure. Accordingly, discoloring of the laundry or erroneous washing is prevented.

[0014]   The washing machine designed to fulfill the object of the present invention is illustrated in the attached figures, where:

[0015]   Figure 1 – is the perspective view of a washing machine.

[0016]   Figure 2 – is the schematic view of a washing machine.

[0017]   The elements illustrated in the figures are numbered as follows:

1.   Washing machine

2.   Drum

3.   Control unit

4.   Color sensor

5.   Presence sensor

6.   Loading port

7.   Indicator

8.   Light source

[0018]   The washing machine (1) of the present invention comprises a drum (2) wherein laundry (L) is emplaced, a loading port (6) for loading and unloading of laundry (L) into the drum (2) by the user, a color sensor (4) that detects the color of the laundry (L) while the laundry (L) is loaded into the drum (2) or afterwards and a control unit (3) that decides whether the laundry (L) to be washed is colored or white according to the detected color data before starting the washing process and then starting the washing process by determining the washing parameters depending on this data (Figure 1).

[0019]   The color sensor (4) is preferably disposed on the loading port (6) of the drum (2) or on the bellows situated at the loading port (6). Accordingly the color data of the laundry (L) can easily be detected while the laundry (L) is being loaded into the drum (2).

[0020]   The color sensor (4) and the control unit (3) can be fed by energy sources such as batteries etc. independently from the power supply. By this means, the colors of the laundry (L) emplaced in the washing machine (1) at different times can be detected before operating the washing machine (1) and are transmitted to the control unit (3) to be stored and evaluated.

[0021]   While the laundry (L) is being loaded into the drum (2) by the user and/or after loading, the colors thereof are detected by the color sensor (4) and the color data is transmitted to the control unit (3) to be stored until the washing machine (1) starts operating. When the washing machine (1) is operated, the color data values stored in the control unit (3) is analyzed and compared with a value predetermined by the producer. As a result of this comparison process, it is decided whether the laundry (L) emplaced in the drum (2) is colored or white. The washing parameters are determined depending on this decision and the washing process is implemented according to these parameters.

[0022]   In another embodiment of the present invention, the washing machine (1) furthermore comprises a presence sensor (5). The presence sensor (5) is disposed on the loading port (6) and the entry of each piece of laundry (L) loaded into the drum (2) is detected. When the entry of the laundry (L) through the loading port (6) is detected,

the color data of the laundry (L) is detected simultaneously and transmitted by the color sensor (4) to the control unit (3). Consequently, while the laundry (L) is being loaded into the drum (2) through the loading port (6), erroneous detection by the insertion of the user's hand into the detection area of the color sensor (4) is prevented. In this embodiment, it is assumed that the loaded laundry (L) will enter the detection area of the color sensor (4) before the user's hand (Figure 2).

[0023]   In this embodiment, while the laundry (L) is emplaced into the drum (2), the laundry (L) passes through the detection area of the presence sensor (5) and the presence sensor (5) changes to the active position. As the presence sensor (5) becomes active, the color sensor (4) also becomes active and detects the color of the laundry (L) passing through the detection area thereof. Consequently, the color data of each piece of laundry (L) emplaced into the drum (2) is detected by the color sensor (6) and stored in the control unit (3).

[0024]   In another embodiment of the present invention, the washing machine (1) comprises an indicator (7) that displays for the user whether the laundry (L) in the drum (2) at that moment is colored or white. In this embodiment, furthermore the indicator (7) momentarily warns the user if the color of the new piece of laundry (L) loaded into the drum (2) is different from the color value of the laundry (L) determined previously. Consequently, the user knows whether the previously loaded laundry (L) in the drum is colored or white, then loads laundry (L) into the drum (2) accordingly.

[0025]   In yet another embodiment of the present invention, the washing machine (1) comprises preferably a white light source (8) that is disposed in the vicinity of the color sensor (6) such that the detection area of the color sensor (6) is illuminated. The light source (8), that is activated while the laundry (L) is being loaded into the drum (2) through the loading port (6), illuminates the area that will be detected by the color sensor (4), providing to adjust the light level in that area. Consequently, incorrect color detection by the color sensor (4) in that area that does not always have the same light intensity is thus prevented. A white LED (light emitting diode) is used as the light source (8) for use of convenience and costs.

[0026]   In another embodiment of the present invention, the color data of the laundry (L) loaded into the washing machine (1) is collected by utilizing various optical and imaging systems (camera, infrared scanners, infrared imaging devices etc.).

[0027]   In another embodiment of the present invention, the washing machine (1) comprises a button that enables the user to change the color sensor (4) to the active or passive position.

[0028] By means of the present invention, the determination of colored-white laundry (L) can be made for the laundry (L) emplaced into the drum (2) by utilizing the color sensor (4) before starting the washing process. The washing parameters are determined depending on the colored-white laundry (L) differentiation and the washing process is started accordingly. Particularly in single button washing machines (1) wherein the intervention of the user is minimal, the determination of the washing operation depending on the color of the laundry (L) can be made independently from the user.

Claims

[0001]   A washing machine (1) comprising a drum (2) wherein laundry (L) is emplaced, a loading port (6) for loading and unloading of the laundry (L) into the drum (2) by the user, and a color sensor (4) that detects the color of the laundry (L) as the laundry (L) is being loaded into the drum (2) or afterwards **and characterized by** a control unit (3) that decides whether the laundry (L) to be washed is colored or white according to the detected color data before starting the washing operation, and then starting the washing process by determining the washing parameters depending on this data.

[0002]   A washing machine (1) as in Claim 1, **characterized by** a color sensor (4) disposed at the loading port (6).

[0003]   A washing machine (1) as in Claim 1, **characterized by** a color sensor (4) disposed on the bellows situated at the loading port (6).

[0004]   A washing machine (1) as in any one of the above claims, **characterized by** a color sensor (4) and a control unit (3) that can be fed by energy sources such as batteries and the like independently from the main power supply.

[0005]   A washing machine (1) as in Claim 1, **characterized by** a control unit (3) wherein the parameters such as duration, temperature etc. for the washing process are stored, that analyzes the color data values and compares with a value predetermined by the producer, and as a result of this comparison process, decides whether the laundry (L) emplaced into the drum (2) is colored or white.

[0006]   A washing machine (1) as in Claim 1, **characterized by** a presence sensor (5) disposed at the loading port (6) that detects the entry of each piece of laundry (L) into the drum (2).

[0007]   A washing machine (1) as in Claim 6, **characterized by** a control unit (3) that provides the color data of the laundry (L) to be detected by the color sensor (4) simultaneously while the presence sensor (7) detects the entry of laundry (L) through the loading port (6).

[0008]   A washing machine (1) as in any one of the above claims, **characterized by** an indicator (7) that displays to the user whether the laundry (L) in the drum (2) is colored or white.

[0009]   A washing machine (1) as in Claim 8, **characterized by** an indicator (7) that momentarily warns the user if the color of the new piece of laundry (L) loaded into the drum (2) is different from the color value of the laundry (L) determined

previously.

[0010]   A washing machine (1) as in any one of the above claims, **characterized by** a light source (8) that is disposed in the vicinity of the color sensor (4) so that the detection area of the color sensor (4) is illuminated.

[0011]   A washing machine (1) as in Claim 10, **characterized by** a light source (8) that changes to the activate position while the laundry (L) is being loaded into the drum (2) through the loading port (6), and illuminates the area that will be detected by the color sensor (4) providing to adjust the light level in that area.

[0012]   A washing machine (1) as in any one of the above claims, **characterized by** a button that provides the color sensor (4) to be changed to the active or passive position by the user.
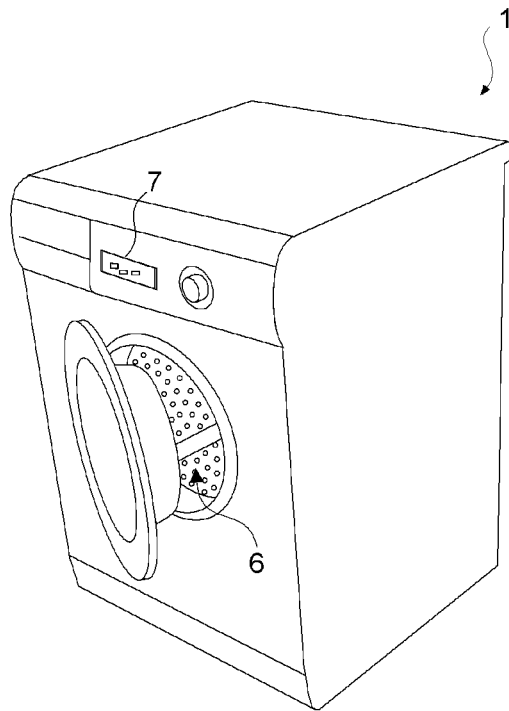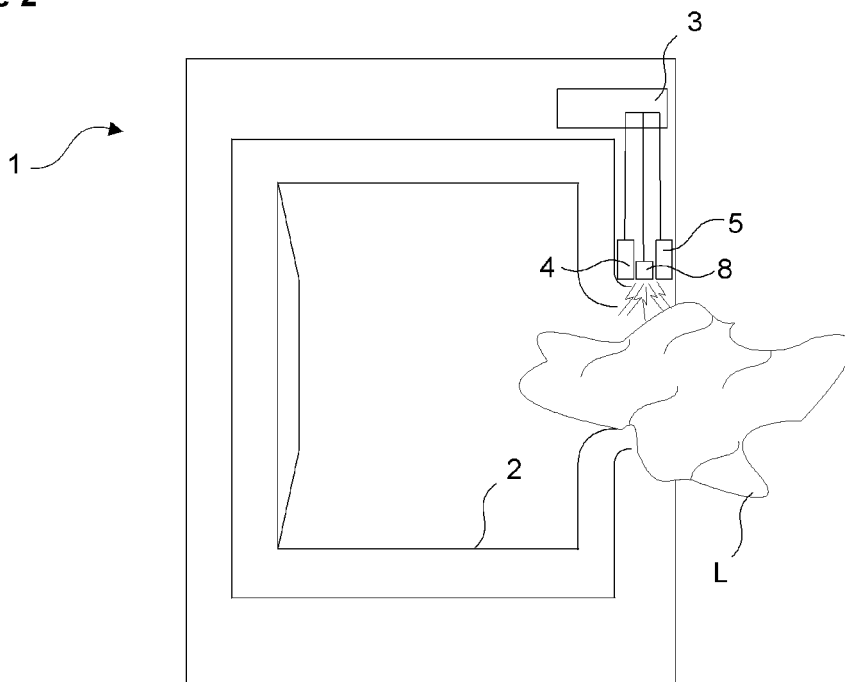
[Fig.]
Figure 1

Figure 2

INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER
INV. D06F39/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

D06F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

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

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 01/46509 A (BSH BOSCH SIEMENS HAUSGERAETE [DE]; SAMS WALTER [DE]; LORENZ TILMANN [) 28 June 2001 (2001-06-28)	1-3
A	page 2, lines 10-14; page 3, line 21 – page 4, line 15; page 5, lines 7-18; claims; figures	4-12
Y	DE 197 56 515 A1 (BOSCH SIEMENS HAUSGERAETE [DE]) 24 June 1999 (1999-06-24) cited in the application	1-3
A	page 1, lines 3-29, claims	4-12
A	EP 0 911 710 A (BOSCH SIEMENS HAUSGERAETE [DE] BSH BOSCH SIEMENS HAUSGERAETE [DE]) 28 April 1999 (1999-04-28) claims; figures	1-12

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| X | Further documents are listed in the continuation of Box C. | X | See patent family annex. |

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

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

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

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

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

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

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
5 November 2007	21/11/2007

| Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31–70) 340-2040, Tx. 31 651 epo nl, Fax: (+31–70) 340-3016 | Authorized officer Clivio, Eugenio |

Form PCT/ISA/210 (second sheet) (April 2005)

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DE 198 10 907 A1 (MAAS RUTH [DE]) 16 September 1999 (1999-09-16) claims; figures	1-12
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International application No

PCT/EP2007/056540

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EP 1452636	A	01-09-2004	NONE		