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(71) Applicant *(for AL, AM, AT, AZ, BA, BE, BF, BG, BJ, BR, BY, CF, CG, CH, CI, CM, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, FR, GA, GE, GN, GQ, GR, GW, HR, HU, ID, IS, IT, JP, KG, KP, KR, KZ, LR, LT, LU, LV, MA, MC, MD, MG, MK, ML, MR, MX, MZ, NE, NI, NL, NO, PH, PL, PT, RO, RU, SE, SI, SK, SN, SY, TD, TG, TJ, TM, TN, TR, UA, UZ, VN, YU only)*: **UNILEVER N.V.** [NL/NL]; UNILEVER N.V., Weena 455, NL-3013 AL Rotterdam (NL).

(71) Applicant *(for AE, AG, AU, BB, BZ, CA, CY, EG, GB, GD, GH, GM, IE, IL, KE, LC, LK, LS, MN, MW, NZ, OM, PG, SC, SD, SG, SL, SZ, TT, TZ, UG, VC, ZA, ZM, ZW only)*: **UNILEVER PLC** [GB/GB]; Unilever House, Blackfriars, London, Greater London EC4P 4BQ (GB).

(71) Applicant *(for IN only)*: **HINDUSTAN LEVER LIMITED** [IN/IN]; Hindustan Lever House, 165/166 Backbay Reclamation, Maharashtra, 400 020 Mumbai (IN).

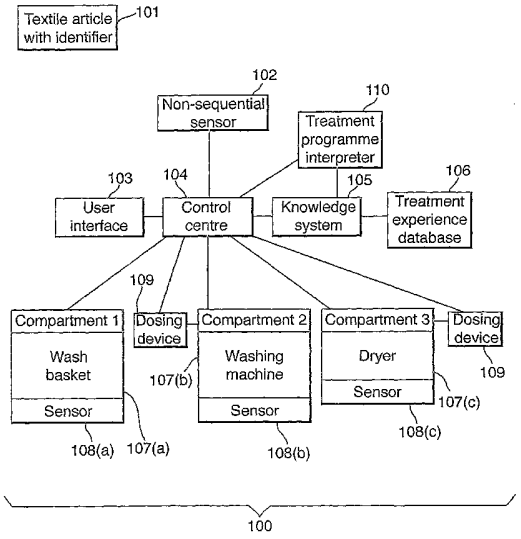
(72) Inventors; and

(75) Inventors/Applicants *(for US only)*: **BIRKER, Paul, Johan,M,W,L** [NL/NL]; Unilever R & D Vlaardingen, Olivier van Noortlaan 120, NL-3133 AT Vlaardingen (NL). **POOS, Arie,Michiel** [NL/NL]; Unilever R & D Vlaardingen, Olivier van Noortlaan 120, NL-3133 AT Vlaardingen (NL). **SMIT-KINGMA, Irene,Erica** [NL/NL]; Unilever R & D Vlaardingen, Olivier van Noortlaan 120, NL-3133 AT Vlaardingen (NL). **VERHAGEN, Johannes,Jacob** [NL/NL]; Unilever R & D Vlaardingen, Olivier van Noortlaan 120, NL-3133 AT Vlaardingen (NL). **WARMOESKERKEN, Marinus, Maria, C,G** [NL/NL]; Unilever R & D Vlaardingen, Olivier van Noortlaan 120, NL-3133 AT Vlaardingen (NL).

(74) Agent: **TJON TIEN RIL, Hon, Kong, Guno**; Unilever NV, Patent Department, Olivier van Noortlaan 120, NL-3133 AT Vlaardingen (NL).

[Continued on next page]

(54) Title: METHOD FOR MANAGEMENT OF TEXTILE ARTICLES



(57) Abstract: A method (100) for the home management of textile articles (101) comprising the steps ofa) providing a compartment (107) within a residential home with a non-sequential sensor (102) configured to identify multiple textile articles (101) placed simultaneously into the compartment (107), b) identifying multiple textile articles (101) placed into the compartment (107) with the non-sequential sensor (102); each textile article being provided with an identifier, said non-sequential sensor (102) configured to read said identifier, said identifier holding article parameters;c) compiling an article list whereby said list comprises the thus identified textile articles and said article parameters;d) upon request retrieving said article parameters from said article list;whereby at least one compartment comprises treatment means for treating the textile articles placed in that compartment (107).

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METHOD FOR MANAGEMENT OF TEXTILE ARTICLES

The present invention relates to a method for textile articles, in particular to a method for the home management of textile articles.

Consumer households are generally increasing in complexity as the number of house hold articles, appliances and size of households increase. Managing this complexity may cost more time than desired and there is an increasing need for a smart management system. One type of house hold articles that benefit from a smart management system are textile articles such as clothing. Clothing is usually placed at certain compartments in a household but despite the limited number of compartments, it is often troublesome to locate a specific piece of clothing. When it is found, it may not be usable because it may for example need cleaning or ironing. For people who frequently travel, it is important to have the appropriate clothing clean and ironed before departure. Usually clothing is worn in certain combinations of specific articles depending the colour and style. Often certain combinations are favoured. However, not all articles may be available because they may need ironing and/or cleaning. Furthermore, the increasing availability of novel fabric types combined with the growing number of different treatments also increases the complexity in choosing the optimal treatment. The laundry systems disclosed in US 2001/0049846 and WO 00/32865 require the handling of textile articles one by one which is inconvenient since a normal wash load may easily contain 30-40 separate textile articles. The laundry system discloses in US-A- 5,715.555 is not flexible since all the laundering instructions are located on the tags. Therefore there is a need for a method for the home management of textile articles that overcomes one or more of the above mentioned problems.

Surprisingly we have now found a method according to claim 1.

One of the advantages according to an aspect of the invention is that it allows for a more convenient handling of textile articles. Textile articles need not be placed one by one into a compartment but a bundle of textile articles can be placed into a compartment simultaneously. Another advantage is the location of textile articles in a domestic home can be easily retrieved.

These and other aspects, features and advantages will become apparent to those of ordinary skill in the art from a reading of the following detailed description and the appended claims. For the avoidance of doubt, any feature of one aspect of the present invention may be utilised in any other aspect of the invention. It is noted that the examples given in the description

below are intended to clarify the invention and are not intended to limit the invention to those examples per se. Other than in the experimental examples, or where otherwise indicated, all numbers expressing frequencies or conditions used herein are to be understood as modified in all instances by the term "about". Where the term "comprising" is used in the specification or claims, it is not intended to exclude any terms, steps or features not specifically recited. All documents cited are in relevant part, incorporated herein by reference.

Detailed description of the invention

The term "textile article" as used herein is typically a garment but may include any textile article such carpets, rugs, upholstery, curtains, linen. Textile articles include - but are not limited to - those made from natural fibres such as cotton, wool, linen, hemp, silk and man made fibres such as nylon, viscose, acetate, polyester, polyamide, polypropylene elastomer, natural or synthetic leather, natural or synthetic fur and mixtures thereof.

The "article parameter" is intended to mean any parameter useful to optimise the treatment or surveillance of the textile article including - but not limited to - at least one of the group consisting of fibre type, colour, history of treatment (e.g. number of washes), dye type and mixtures thereof.

The term "treatment parameter" as used herein is intended to mean any parameter used to optimise a treatment to obtain an optimal treatment result. The treatment parameter comprises at least one of the group selected from the treatment type, amount and type of treatment agent, treatment temperature, and treatment period.

The treatment may be any process suitable for cleaning, conditioning, drying, ironing sorting, or otherwise maintaining or enhancing the appearance, function or condition of the textile article. The treatment includes but is not limited to sorting, pretreating, cleaning, conditioning, drying, de-wrinkling, perfuming, ironing, storing and mixtures thereof. Cleaning includes aqueous wash processes but also dry cleaning processes. Conditioning may include any treatment not principally intended for cleaning such as softening or refreshing.

Preferably the treatment agent is selected from water, dry cleaning solvent, surfactants, builders, enzymes, bleach activators, bleach catalysts, bleach boosters, bleaches, alkalinity sources, antibacterial agents, colorants, perfumes, pro-perfumes, finishing aids, lime soap dispersants, malodour control agents, odour neutralisers, polymeric dye transfer inhibiting agents, crystal growth inhibitors, photobleaches, heavy metal ion sequestrants, anti-tarnishing

agents, anti-microbial agents, anti-oxidants, anti-redeposition agents, soil release polymers, electrolytes, pH modifiers, thickeners, abrasives, divalent or trivalent ions, metal ion salts, enzyme stabilisers, corrosion inhibitors, diamines or polyamines and/or their alkoxylates, suds stabilising polymers, process aids, fabric softening agents, optical brighteners, hydrotropes, suds or foam suppressors, suds or foam boosters, fabric softeners, anti-static agents, dye fixatives, dye abrasion inhibitors, anti-crocking agents, wrinkle reduction agents, wrinkle resistance agents, soil repellency agents, sunscreen agents, anti-fade agents, mechanical force such as agitation, and mixtures thereof.

In yet another example the article parameter colour may be used to optimise the presence and amount of any treatment agent that may influence the colour such as anti dye transfer agent or bleach in a cleaning process.

Figure 1 shows some –non limiting – embodiments. According to one aspect of the inventive method (100) one or more compartments (107) within a residential home are provided with a non-sequential sensor (102) configured to identify multiple textile articles simultaneously, each textile article (101) being provided with an identifier.

The non-sequential sensor may be any sensor configured to identify multiple textile articles placed simultaneously into said compartment, each textile article being provided with an identifier, said identifier holding article parameters. For the present purpose simultaneously is intended to mean that a bundle of at least 3 textile articles can be placed into the apparatus together and identified. Identification is intended to mean that the sensor is able to read data stored on the identifier. Prior art methods always demand a sequential entrance of the textile articles.

The identifier, for example, might comprise any combination of bar codes, radio frequency identification tags, data, chips, smart cards and the like whereby the sensor is configure to read said identifier. The non-sequential sensor (102) is preferably a wireless sensor. Wireless is intended to mean that the sensor can read the data from the identifier without physical contact. The identifier and sensor are preferably part of a passive, inductive magnetically-coupled radio frequency identification (RF ID) system. RF ID sensors are a preferred example of wireless sensors. The identifiers are located on the object to be identified and hold the article parameters. The identifiers comprise an electronic circuit like a microchip and an antenna (coupling element). The identifiers are small sophisticated radio transmitters and receivers. When the identifier which usually does not possess its own voltage supply, is not

within the interrogation zone of a sensor it is passive. The identifier is only activated when it is within the interrogation zone of a sensor. They are powered by the RF field generated by the sensor. Upon being powered up, the identifier will continuously transmit, by damping the incoming RF power field, its data. An RF ID sensor typically comprises a radio frequency module (transmitter and receiver), a control unit and an antenna (coupling element) to the identifier. RF ID sensor has the following main functions: energising, demodulating and decoding the data on the identifier such as the article parameters and unique identification code. The sensor, using the antenna - also be referred to as a tuned antenna-capacitor circuit - emits a radio wave field. This is used to power up the identifiers. The information sent by the identifier must be demodulated. The encoded information may be decoded by the sensor's control unit. Such a control unit may also be part of a control centre (104). This information can then be used by the control centre. In both the sensor and the identifier, the antenna can be shaped and sized in different ways.

A preferred non-sequential sensor (102) is a radio frequency scanning device configured to operate at 13.56 MHz. Her frequencies may be used provided that the frequency is useful in the current application without disturbing other appliances. The non-sequential sensor preferably comprises an antenna incorporated into the circumference of the opening of the apparatus. The identifier is preferably configured to allow adding and/or deleting information stored on the identifier. This may be done a separate writer configured to add or delete information stored on the identifier. The writer may also be incorporated in the sensor.

The non-sequential sensor (102) preferably comprises an antenna incorporated into the circumference of the opening of a compartment (107), such as the opening of a washing machine, drying machine, wash basket or smart storage space. The washing machine may be any washing machine suitable for cleaning textile articles such as for aqueous cleaning or dry cleaning and of any suitable configuration such as horizontal or vertical axis machines. Preferably the side of the compartment wherein the opening of the compartment is located comprises at least partially a non metal compound. At least one of the compartments (107) in the residential home may be a compartment provided with treatment means for treating a textile article (101). Examples of compartments are a washing machine (107b), a drier (107c), a wash basket (107a), a storage space (not shown). When the compartment is a washing machine the treatments means may be a rotatable drum and means for the inlet of water, treatment agents such as a detergent formulation. When the compartment is a drier the treatment means may be means to heat and circulate air. When the compartment is a smart storage space, the treatment means may be a dosing device for malodour control agent

and/or odour neutraliser. A compartment may also be a room or closet without treatment means also in some case all compartments comprise treatment means.

The identifier is preferably configured to be read by the non-sequential sensor (102) and is preferably a radio frequency transponder configured for use at 13.56 MHz. The non-sequential sensor (102) is preferably configured to read said identifier. The non-sequential sensor (102) is preferably configured for use at 13.56 MHz.

The identifier preferably holds one or more article parameters such as the unique identification code, fibre type, dye type, colour, wash history and other parameters useful in the invention. In another embodiment the identifier holds the unique identification code of said article and the article parameters of said article can be found in an article parameter database wherein the article parameters are coupled to the unique identification code. The wash history of an article may be added either to the identifier or a database coupling the unique identification code to article parameters.

Data from non-sequential sensor (102) is communicated to control centre which is configured to compile an article list whereby said list comprises the thus identified textile articles (101) and said article parameters. Preferably, the control centre (104) is an microprocessor comprising a set of executable instructions such as in the form of software, routines, programs, algorithms, code, logic and the like, which would, inter alia, facilitate the control of and communication between the different components.

The control centre (104) preferably communicates with a user via a user interface (103). The term "user interface" as used herein is intended to mean any interface useful to allow communication between the control centre and the user such as a computer, a personal digital assistant (PDA), a device with wireless application protocol programs (WAP) such as cell phone, auto computer or PDA, interactive TV, or an Internet appliance, or the like. User interface (103) allows the user to interact with the control centre (104) and, as will be understood, can take any of a virtually unlimited number of alternative and/or audio, visual and/or other communicative forms. In an exemplary embodiment, the user interface (103) may comprise a computer system comprising a CPU, memory, a visual display device and an input means. In other cases the CPU functionality may reside in the control centre and the user interface may comprise a visual and/or auditive display and input means. Preferred input means comprise a keyboard or mouse or other means of input such as speech recognition, touch screen and/or visual input utilising a video camera.

The communication between the control centre (104) and the different components or between the different components may be via links known in the art such as via a token ring, Ethernet, telephone modem connection, radio or microwave connection, parallel cables, serial cables, telephone lines, universal serial bus "USB", Firewire, Bluetooth, fiber optics, infrared "IR", radio frequency "RF" and the like, or combinations thereof. In one preferred embodiment, control centre (104) is wirelessly linked a compartment (108) provided with the non-sequential sensor (102), any dosing device (109) and other components such as the knowledge system (105), treatment experience database (106), programme interpreter (110), user interface (103).

Upon request the article parameters may be retrieved from said article list for example through control centre (104). Preferably, the list includes information from which for example the compartment where the textile article (101) is located can be derived. The user may input such a request via the user interface (103) to track the location.

Control centre (104) may communicate the article list to a knowledge system (105) via suitable communication means. In one preferred embodiment, the method further comprises the step of optimising the treatment of the textile articles (101) in said compartment based on the article list from the control centre (104) and treatment rules from a knowledge system (105) said knowledge system (105) being configured to calculate treatment rules for obtaining optimal treatment results based on information retrieved from a treatment experience database (106) said database comprising treatment parameters, article parameters and treatment results. The treatment experience database (106) may comprise a historical part containing historical general treatment results for given combination of treatment parameters and article parameters generated in laboratories. The treatment experience database (106) may in addition comprise a actual part containing actual treatment results from recent treatments at consumers. The knowledge system (105) is preferably configured to calculate treatment rules for obtaining optimal treatment results. There can be a number of ways to determine optimal treatment results for example by using algorithms. The algorithms would preferably comprise potential combinations of treatment parameters which have been designed with the system's intended application in mind, so that appropriate optimised operating conditions can be established that pertain to textile articles. Any conflicts or recommendations in the treatment programme may be communicated to the user via the user interface (103).

Via a suitable communication means, the knowledge system (105) may communicate the treatment rules for a specific textile article (101) or a set of textile articles (101) to treatment programme interpreter (110) which is configured to process the treatment rules into an optimal treatment programme said programme comprising a set of executable instructions. Programme interpreter (110) sends the treatment programme to control centre (104) which uses said programme to instruct for example a washing machine and dosing device (109). The instructions for a washing machine may for example comprise instructions like opening water valve, heating water to a certain temperature, draining water and any other instruction needed to carry out the treatment programme. For a dosing device (109) the instructions may be to dose a certain treatment agent at a particular time. The executable instructions may also be communicated to the user via user interface (103) for example how to hand wash or pretreat a certain article. The treatment programme interpreter (110) may be part of the control centre (104) or separate from the control centre (104).

The control centre (104) may be part of a compartment such as a washing machine or separate in a personal computer communicating with the different compartments and components. In one aspect of the invention, the control centre (104) is configured to communicate with a remote server via a suitable communication link. The knowledge system (105), treatment experience database (106) and programme interpreter (110) may be stored locally or at a remote server accessible via internet or any other suitable communication means. Either way, the knowledge system (105) treatment experience database (106) and programme interpreter (110) may be updated from a remote server via suitable communication link. The treatment experience database (106) may also be analysed remotely or uploaded to a remote server for analysis for marketing, research and development purposes.

In order to update the optimisation process to allow for modification of the algorithms, one embodiment of the present invention comprises the knowledge system (105) being updated by an artificial intelligence system such as a neural network. In the washing machine example, the neural network would assess various applicable laundering factors and feedback data retrieved from the treatment experience database (106) to determine if any changes to the mathematical algorithms or dialog scripts are needed to facilitate or optimise the decision making process of determining optimised laundering conditions. For example, a neural network can continuously update its decision making algorithm by incorporating user input such as feedback, frequency of laundering, number of launderings and laundering compositions utilised into the decision making process akin to artificial intelligence or "smart"

logic. According to Haykin, S. (1994), Neural Networks: A Comprehensive Foundation, NY: Macmillan, p. 2, a neural network is a massively parallel distributed processor that has a natural propensity for storing experiential knowledge and making it available for use. It resembles the brain in two respects: 1) Knowledge is acquired by the network through a learning process; and 2) Interneuron connection strengths known as synaptic weights are used to store the knowledge. The neural network analyses the treatment experience database (106) for trends, feedback data, laundering factor data and other additional data to develop and refine algorithms for decision making. In a preferred embodiment, a neural network would automatically make changes to the knowledge system (105) algorithms based upon the growing base of treatment parameters and user feedback data.

Preferably the treatment comprises a cleaning process and the treatment parameters comprise at least two of the following treatment parameters, treatment temperature, treatment period, amount and type of treatment agent, timing of the treatment agent, and mixtures thereof.

Preferably, the compartment is provided with a dosing device (109) configured to dose at least one treatment agent or when more than one treatment agent is used select and dose the at least one treatment agent. The dosing device (109) may be part of the compartment or a separate device connected to the compartment such that the treatment agent may be dosed. In a preferred embodiment, the compartment comprises a compartment sensor (108) configured to sense the treatment result or the treatment agent. For example the sensor (108) may be a humidity sensor in a drier or a sensor to sense the level of a fragrance in a smart storage space. The compartment sensor (108) may be directly linked to the dosing device (109) such that the information of the compartment sensor is directly fed back to the dosing device (109). In a another embodiment the information from the compartment sensor is configured to communicate the information to the control centre (104) and used for optimising the treatment result. When the compartment is a washing machine the sensor (108) may be a sensor for sensing any treatment parameter such as the temperature, cycle, pH, suspended soil, turbidity, acceleration, ionic strength, water hardness, presence and concentration of any treatment agent, agitation, weight of the wash load. The dosing device (109) may dose single treatment agents or pre-formulated mixtures of treatment agents. The dosing device (109) and/or control centre (104) may keep track of the inventory of the dosing device (109) so the user may be warned in time via user interface (103) to order or add treatment agent. This can be done by summing up the used treatment agent over time knowing the starting amount. In the alternative the dosing device (109) may be provided with a weight or level indicator.

In yet another embodiment, the method may include a pretreatment step. The optimal treatment may then include a recommendation to the user how to pretreat the textile article prior to another treatment. The pretreatment may be manual or may be in a pretreatment device which may be a compartment provided with a non-sequential sensor.

According to a further embodiment, after for example a cleaning process the textile articles (101) may be dried in a drier (108c) or simply hung to dry on a line. Drier (108c) may be a separate device or incorporated into the washing machine. Thus in one embodiment, knowledge system (105) calculates optimal drying rules based on the treatment experience database (106). The knowledge system (105) communicates drying rules to programme interpreter (110).The drying which may be processed by a programme interpreter (110) into a set of executable instructions for a drier or the user. In the latter case the recommendation may be to dry the textile article without any automated device such as hanging it from a line, laying it flat and any other means suitable to dry the specific garment. The drying process is preferably optimised as described above for cleaning. Based on the drying rules an optimal drying programme is calculated and communicated to control centre (104) which sends a set of executable instructions to drier to obtain an optimal drying result.

Programme interpreter (110) may also receive conflicting treatment rules from knowledge system (105) . For example when one red textile article (101) has been identified whereas the remaining wash load is white cotton. Such conflicts may then be communicated via control centre (104) and interface (10) to the user. The user may be warned to remove the red article to store it in the wash basket (3) for storage.

According to yet another embodiment, programme interpreter (110) may present the user via user interface (104) the option to hand wash certain textile articles (101). Similar to the situation where the cleaning device is used, this option preferably includes instructions regarding the optimal treatment parameters such as amount of treating agent, treatment temperature, treatment period. After the hand wash, the textile article (101) may be dried as described above in drier (108c)

According to still another embodiment, additional article parameters may be added to the article parameters held on the identifier such as for example the wash history or that a favourite article should always be hand washed. Furthermore, article parameters may be obtained by scanning the article with a suitable sensor to obtain information any article

parameter useful to determine the optimal treatment, such as the dye type, colour, exact fibre characteristics, stain and soil type and level.

Control centre (104) may prompt the user for various types of input such as confirming a recommended treatment, a recommended treatment parameter or the start of treatment. In addition, the control centre (104) may communicate various types of messages to the user such as the end of a treatment, warning that a treatment agent needs to be reordered, remove a particular textile article (101) for a different treatment such as a hand wash, pretreatment, dry cleaning.

According to yet another embodiment, the treatment may be ironing by an ironing machine. For the present purpose ironing machine is intended to mean any means suitable to de-wrinkle textile articles. The ironing machine may be configured to receive treatment parameters for ironing a textile article from the control centre include ironing temperature and one or more treatment agents such a water (e.g. sprayed or administered as steam), wrinkle reduction agents, wrinkle resistance agents, perfume and any other treatment agent useful for ironing. In addition, the recommendation to the user via a user interface may include the order of articles to be ironed for example ascending or descending in ironing temperature. The ironing machine may comprise a sensor configured to identify textile articles being provided with an identifier. The sensor may also be incorporated into the ironing board. The ironing machine may be an ironing machine configured to iron multiple articles or a more conventional ironing machine.

According to yet another embodiment, the compartment may comprise treatment means to refresh and condition textile articles. Treatment agents may be administered in a form of mist or spray rather than immersion in a treatment liquid.

According a further embodiment, the control centre may compile a database of all textile articles in a household, and used for a recommendation system as disclosed in WO 02/17160.

Claims

1. A method for the home management of textile articles comprising the steps of
a) providing a compartment within a residential home with a non-sequential sensor configured to identify multiple textile articles placed simultaneously into the compartment,
b) identifying multiple textile articles placed into the compartment with the non-sequential sensor; each textile article being provided with an identifier, said non-sequential sensor configured to read said identifier, said identifier holding article parameters;
c) compiling an article list whereby said list comprises the thus identified textile articles and said article parameters;
d) upon request retrieving said article parameters from said article list;
whereby at least one compartment comprises treatment means for treating the textile articles placed in that compartment.

2. A method according to claim 1 wherein the non-sequential sensor comprises an antenna incorporated into the circumference of the opening of a compartment.

3. A method according to claim 1 whereby in a residential home at least two compartments are each provided with said sensor and said article list includes information from which the compartment where the textile article is located can be derived.

4. A method according to claim 3 wherein the non-sequential sensor and identifier is configured for use at the 13.56 MHz frequency.

5. A method according to any one of the preceding claims wherein the method further comprises the step of optimising the treatment of the textile articles in said compartment based on the article list and treatment rules from a knowledge system said knowledge system being configured to calculate treatment rules for obtaining optimal treatment results based on information retrieved from a treatment experience database said database comprising treatment parameters, article parameters and treatment results.

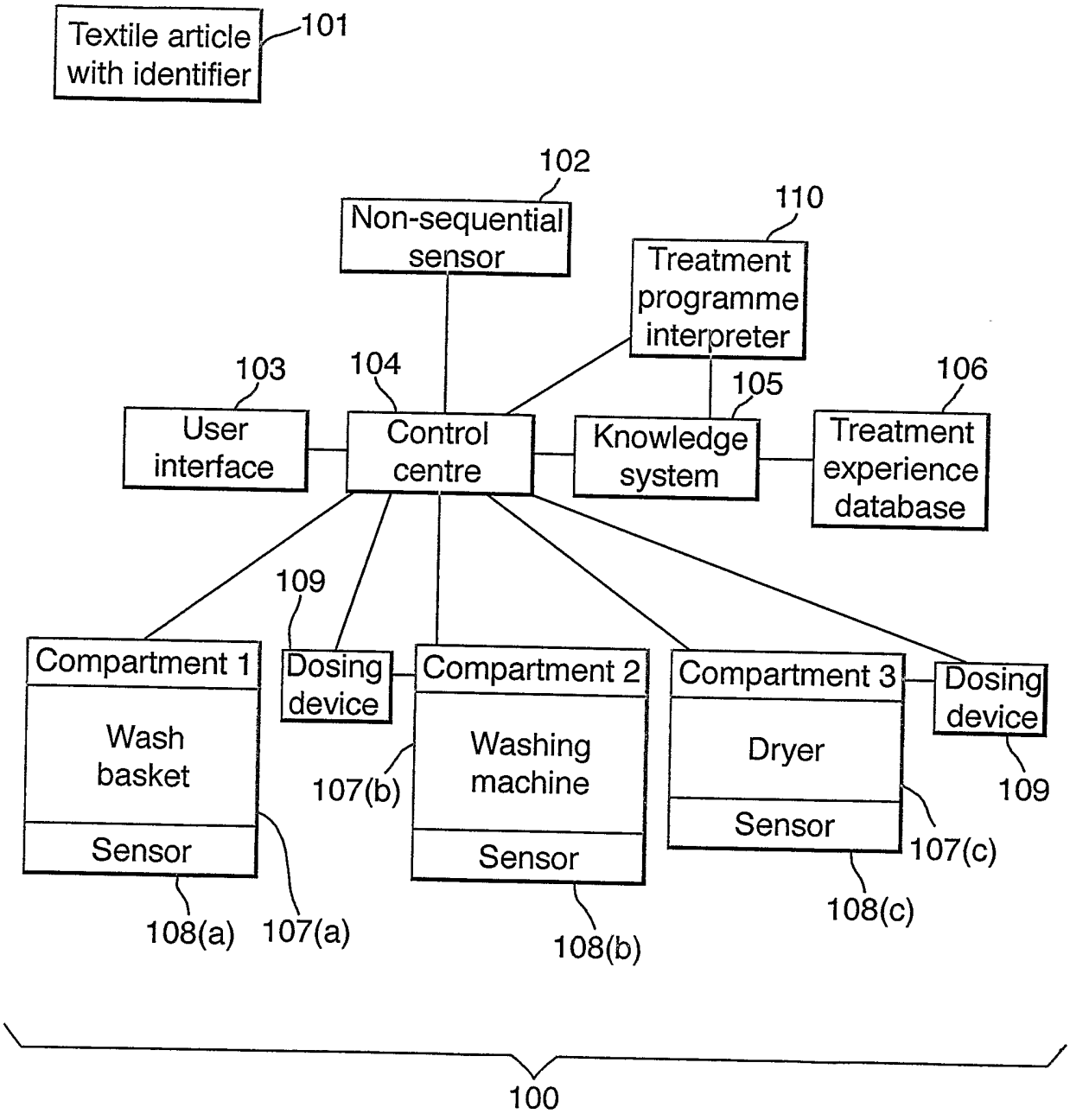
6. A method according to claim 5 wherein the treatment comprises a process for pretreating, cleaning, conditioning, drying, de-wrinkling, perfuming, ironing, storing and mixtures thereof.

7. A method according to claim 6 wherein the treatment comprises a cleaning process and the treatment parameters comprise at least two of the following treatment parameters,

treatment temperature, treatment period, amount and type of treatment agent, timing of the treatment agent, and mixtures thereof.

8. A method according to claim 7 wherein the treatment agent is selected from water, dry cleaning solvent, surfactants, builders, enzymes, bleach activators, bleach catalysts, bleach boosters, bleaches, alkalinity sources, antibacterial agents, colorants, perfumes, pro-perfumes, finishing aids, lime soap dispersants, malodour control agents, odour neutralisers, polymeric dye transfer inhibiting agents, crystal growth inhibitors, photobleaches, heavy metal ion sequestrants, anti-tarnishing agents, anti-microbial agents, anti-oxidants, anti-redeposition agents, soil release polymers, electrolytes, pH modifiers, thickeners, abrasives, divalent or trivalent ions, metal ion salts, enzyme stabilisers, corrosion inhibitors, diamines or polyamines and/or their alkoxylates, suds stabilising polymers, process aids, fabric softening agents, optical brighteners, hydrotropes, suds or foam suppressors, suds or foam boosters, anti-static agents, dye fixatives, dye abrasion inhibitors, wrinkle reduction agents, wrinkle resistance agents, soil repellency agents, sunscreen agents, anti-fade agents, mechanical force, and mixtures thereof.

Fig.1.


Textile article with identifier
101
102
Non-sequential sensor
110
Treatment programme interpreter
103
User interface
104
Control centre
105
Knowledge system
106
Treatment experience database
109
Compartment 1
Wash basket
Sensor
108(a)
107(a)
Dosing device
107(b)
Compartment 2
Washing machine
Sensor
108(b)
Compartment 3
Dryer
Sensor
107(c)
108(c)
Dosing device
109
100

INTERNATIONAL SEARCH REPORT

International Application No
PCT/EP 03/12651

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 D06F93/00 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)
IPC 7 D06F G06K

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, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2001/049846 A1 (STIGALL JAMES RANDALL ET AL) 13 December 2001 (2001-12-13) cited in the application	1,2,5-8
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[X] Further documents are listed in the continuation of box C.

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Date of the actual completion of the international search	Date of mailing of the international search report
4 March 2004	12/03/2004

Name and mailing address of the ISA	Authorized officer
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	Falkentoft, C

INTERNATIONAL SEARCH REPORT

International Application No
PCT/EP 03/12651

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

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