(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
7 August 2014 (07.08.2014)

WIPO | PCT

(10) International Publication Number
WO 2014/120100 A1

(51) International Patent Classification:
D06B 3/32 (2006.01) *D06C 15/02* (2006.01)
D06M 13/00 (2006.01) *D06P 3/14* (2006.01)

(21) International Application Number:
PCT/TR2013/000312

(22) International Filing Date:
30 September 2013 (30.09.2013)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
2013/01092 29 January 2013 (29.01.2013) TR

(71) Applicant: **GÜVEN BOYA APRE VE DOKUMA FABRİKALARI ANONİM ŞİRKETİ** [TR/TR]; Tevfikbey Mah.tahsin Tekoğlu Cad.no.28 Küçükçekmece, Istanbul (TR).

(72) Inventor: **TEKOĞLU, Tahsin**; Tevfikbey Mahallesi Tahsin Tekeoğlu, Cad.no.28 Sefaköy Küçükçekmece, Istanbul (TR).

(74) Agent: **DESTEK PATENT,INC.**; Konak Mah. Lefkose Cad. NM Ofis Park B Blok No: 36 / 5 BEŞEVLER NİLÜFER, 16110 Bursa (TR).

(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Published:
— *with international search report (Art. 21(3))*

(54) Title: PRODUCTION METHOD PROVIDING SIZE STABILITY OF WOOL AND WOOL BLEND FABRICS

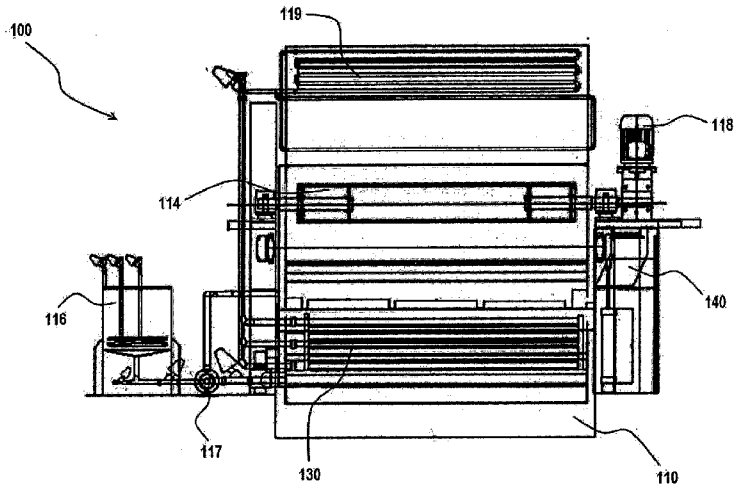

FIGURE 1

(57) Abstract: The present invention relates to the production method providing size stability of wool/wool blend fabrics. In particular, the present invention relates to a method providing size stability of the wool or wool blend fabrics in the textile industry, wherein it comprises the following process step: application of a force by means of a pressing roller on said fabrics with temperature and time values varying according to the wool content, color tone, and loading amount of said fabrics and enabling the disulfide bonds to be broken in a water bath disposed inside a wet finishing machine provided with temperature, time and pressing control.

WO 2014/120100 A1

DESCRIPTION

PRODUCTION METHOD PROVIDING SIZE STABILITY OF WOOL AND WOOL BLEND FABRICS

Technical Field

The present invention relates to the wool/wool blend fabrics produced in the textile industry. In particular, the present invention relates to the production method providing size stability of wool/wool blend fabrics by the effect of temperature, time and pressure.

Prior Art

Today, completely wool or wool blend fabrics are produced in the textile industry. After the production of said fabrics, dresses are sewn from these fabrics in the desired pattern and style during the apparel production stage. The sewn clothes are delivered to the users as such. The most important difficulty encountered in the production of wool and wool blend fabrics is that the wool fibers absorb the moisture into the structure thereof when said fibers are present in wet and moist environments and the temperature is especially high. In such wool and wool blend fabrics absorbing the moisture into the structure thereof, the wool fiber swells due to the moisture. The length of the wool fibers, and thus the fabric provided therewith, is reduced due to said swelling. This situation leads to undesired shrinking in the wool or wool blend fabrics. Size changes take place in the fabrics undergoing shrinking and stabilization of the size becomes impossible.

In the production of wool or wool blend fabrics produced in the prior art, there is no production method or machine to prevent shrinkages. Thus, during the apparel production with said fabrics or during use, the size change should be accepted. The wool or wool blend fabrics of the prior art with varying size have some disadvantages. One of these disadvantages is the shape deformations occurring in the appearance of the dress/clothing during the sewing of the clothing from respective fabrics in the apparel production stage of said type of fabrics and especially during the use of said clothing and after the dry cleaning or ironing thereof. Namely, the wool or wool blend fabrics undergo size change in both the production and post-production utilization especially when said fabrics are exposed to steam

and moisture. In this case, deformations occur in the respective fabric in apparel production stage as well as in the utilization stage. In order to partially tolerate said adverse situation, in the apparel production stage, sewing operation is carried out with an internationally accepted tolerance of 2%. However, even said tolerance of 2% is not sufficient to prevent the size change and resulting deformations occurring in the respective wool or wool blend fabrics. In addition, the fabrics are used more than the amount required to be used in the apparel production stage due to said tolerance. This situation causes a problem to the manufacturer in terms an increase in raw material costs.

Another disadvantage of the prior art wool or wool blend fabrics is the tests implemented before sewing for understanding the size change in sewing of each batch of fabrics due to the size change taking place in said fabrics. The fabrics foreseen to change size in these tests can only be started to be sewn just after this stage. Then, the patterns are arranged for the batch of fabrics provided with calculation of the size change. After the arrangement of the patterns, cutting operation is carried out so as to correspond to the estimated shrinkage amount, resulting in wastage. Finally, the sewing of the fabrics contained in the respective batch is also performed according to the estimated size change.

Said apparel production stages are repeated for each batch due to the size change in the wool or wool blend fabrics. Namely, test is conducted again for each batch of fabrics. Cutting with wastage is performed with arranging and change the patterns again. This situation makes the production of the respective wool or wool blend fabrics in the apparel production stage difficult and time consuming, requiring labor intensive processes. Thus, the production of the respective fabrics is realized with low efficiency and performance due to the impossibility of repeatability. This, in turn, does not allow the respective fabrics to be produced in mass. In addition, production being carried out as such increases the amount of labor and raw materials, as well as the energy consumption, and causes the costs associated with the apparel processes to be high.

Another disadvantage of the prior art wool or wool blend fabrics is the protruding of the liner outwards most of the time, size and form deformations occurring in the utilization stage of the clothing obtained from the respective fabrics due to the size change taking place therein. In addition, the use fastness of clothing obtained from wool or wool blend fabrics remains far below the desired level as a result of the

treatment thereof especially with moisture and steam. Both of said adverse situations eliminate the utilization pleasure, comfort and aesthetics of the respective clothing made of wool or wool blend fabrics. This, in turn, leads to the emergence of dissatisfaction of the users using said clothing.

In conclusion, an improvement in the relevant art is necessary due to the aforementioned drawbacks and the insufficiency of the existing solutions in the field.

Brief Description of the Invention

The present invention is developed by being inspired by the existing situations and seeks to solve the above mentioned drawbacks.

The primary object of the present invention is to prevent size change in the wool or wool blend fabrics occurring during the apparel production stage or use.

The present invention is intended to reduce the costs incurring during obtaining the textile products such as clothing, etc. from wool or wool blend fabrics.

An object of the present invention is to prevent the defects resulting from the size change during the sewing of wool or wool blend fabrics.

Another object of the present invention is to eliminate the difficulties such as changing the patterns, etc. in the apparel production carried out with wool or wool blend fabrics. Thus, the apparel sewing from the wool or wool blend fabrics can always be performed with a single pattern in an easy and long lasting manner.

The present invention is also intended for completing the apparel production stages of the wool or wool blend fabrics at a very short time. Thus, mass apparel production from the respective fabrics becomes possible.

Another object of the present invention is to provide savings on labor and sewing time in the apparel production stage of the wool and wool blend fabrics.

Another object of the present invention is to eliminate the problems such as liner hanging, arm shrinkage, etc. in the clothing made of wool and wool blend fabrics.

Another object of the present invention is to avoid the return of the clothing to the sellers by user as well as return of the defective clothing by the sellers to the manufacturers with reclamation invoices by eliminating the undesired situations such as liner hanging, etc. thanks to the size stability of the wool and wool blend fabrics.

Another object of the present invention is to increase the seller and consumer satisfaction in the products obtained from wool and wool blend fabrics.

The present invention, in order to achieve the aforementioned objects, relates to a method providing size stability of the wool or wool blend fabrics in the textile industry, wherein it comprises the following process step:

- application of a force by means of a pressing roller on said fabrics with temperature and time values varying according to the wool content, color tone, and loading amount of said fabrics and enabling the disulfide bonds to be broken in a water bath disposed inside a wet finishing machine provided with temperature, time and pressing control.

The structural and the characteristic features and all advantages of the present invention will be understood more clearly with the following figures and the detailed description written by referring to said figures. Therefore, the evaluation needs to be done by taking these figures and the detailed description into consideration.

Figures for a Better Understanding of the Invention

Figure 1: A front view of the dyeing machine in which the production method according to the present invention is carried out.

Figure 2: A side view of the dyeing machine in which the production method according to the present invention is carried out.

Figure 3: A flow chart showing the sequence of processes of the production method according to the present invention during the dyeing and finishing applications of the undyed fabrics.

Figure 4: A flow chart showing the sequence of processes of the production method according to the present invention during the finishing applications of the dyed fabrics.

Scaling of drawings is not absolutely required and details which are not needed for understanding the present invention could have been neglected. Furthermore, the elements which are at least substantially identical or have at least substantially identical functions are indicated with the same number.

Description of Part References

100 - Dyeing machine
110 - Body
111 - Cover
112 - Steam pipes
113 - Water inlet
114 - Fabric winding roller
115 - Docking lever roller
116 - Chemical preparation tank
117 - Circulation pump
118 - Motor
119 - Roof coil
120 - Pressing roller
130 - Temperature sensor
140 - Control panel

Detailed Description of the Invention

In this detailed description, the production method according to the present invention and the elements of the dyeing machine (100) in which said method is carried out are described only for a better understanding of the subject, without constituting any restrictive effect.

For the method according to the present invention, a conventional jigger dyeing machine (100) provided with a body (110) comprising the following main elements is used: steam pipes (112), water inlets (113), a motor (118), fabric winding rollers (114), a docking lever roller (115), a chemical preparation tank (116), a circulation pump (117), a roof coil (119) and cover (111). Said machine (100) also comprises a temperature sensor (130) and a control panel (140). Further, a pressing roller (120) enabling the method eliminating the shrinkage problem of the wool or wool blend fabrics to be carried out is also disposed inside the body (110). The production method providing the size stability of the wool and wool blend fabrics is carried out by means of the temperature sensor (130), control panel (140) and pressing roller (120) comprised in the machine (100).

In Figures 1 and 2, 2 dimensional front and side views of the dyeing machine (100) in which the production method according to the present invention is carried out are

illustrated, respectively. The dyeing machine (100) in which the production method according to the present invention is carried out is a conventional jigger machine, wherein application of said method in any type of wet finishing machine comprising a temperature sensor (130), a control panel (140) and a pressing roller (120) is possible.

The body (110) is the main structure of the dyeing machine (100), wherein the other elements are mounted or interactively operated thereon. The production method according to the present invention is carried out in said body (110). The upper portion of the body (110) is closed with two covers (111). These covers (111) enable the formation of an enclosed environment inside said body (110). In addition, they enable the respective wool and wool blend fabrics to be loaded into or removed from the body (110). Said covers (111) can be bidirectionally opened and closed.

Steam pipes (112) and water inlets (113) are disposed in the lower portion of the body (110). The water required for the processes (dyeing/finishing processes, size stabilization (shrink proof) providing production method, etc.) carried out are taken into the body (110) through the water inlets (113). The steam pipes (112) are mounted in the vertical axis on top of each other on both sides immediately below the water inlets. Said pipes (112) enable the steam providing directly and indirectly the heating required for the processes to be carried out (dyeing/finishing, size stabilization providing production method, etc.) to reach into the body (110). Temperature is a very important parameter for the production method. Monitoring of this temperature is provided by means of the temperature sensor (130) mounted on the portion provided with the water inlets (113) and steam pipes (112) in the lower portion of the body (110). Said sensor (130) is a pt100 type sensor, wherein it transmits the temperature values to the control panel (140) connected and interactively operating therewith by monitoring the temperature inside the body (110). The temperature sensor (130) is an element employed for carrying out the production method according to the present invention. Said sensor (130) enables the monitoring and control of the temperature and heat values, which are important for the production method according to the present invention.

The fabric winding rollers (114) are symmetrically and mutually mounted in the portion close to the side walls in the middle portion of the body (110). Loading the wool or wool blend fabrics into the dyeing machine (100) is provided by means of said rollers (114). In addition, the wet processes are carried out with passages inside the machine (100) by means of the transfer of the fabrics through in between said two winding rollers (114). Each of said transfer processes is called a passage. In each passage, the respective fabrics are transferred from one fabric winding roller (114) to the other fabric winding roller (114) by passing through the liquid disposed in the lower portion of the body (110). The number of passages is selected according to the characteristics of the process being carried out. The docking lever roller (115) enable first the fabrics to be loaded onto the fabric winding rollers (114) and then the fabrics to be discharged therefrom after the process. The movement of said docking lever (115) and fabric winding rollers (114) is provided by means of the motor (118) disposed on the side portion of the dyeing machine (100).

One pressing roller (120) is disposed connectedly inside the body (110) so as to apply pressure on one of said fabric winding rollers (114). Said roller (120) is an element added to the dyeing machine (100) for the production method according to the present invention to be realized. The function of the pressing roller (120) is to apply pressure on the fabrics during the application of the method providing size stability of the fabrics comprising wool. Therefore, the disulfide bonds comprised in the structure of the fabrics are broken by means of the pressure created on said fabrics being processed. Thus, these bonds cannot come together in the hot and cold environments; hence, shrinkage problem does not occur in the fabrics.

Said pressing roller (120) is connected to the control panel (140) and operates interactively with this element. Therefore, pressure application can be carried out so as to be in accordance with the time parameter settings entered into the control panel (140). The pressing roller (120) bilaterally moves on the body (110) and has the ability to apply pressure when the respective fabrics are wound onto the two fabric winding rollers (114).

The roof coil (119) is disposed below the covers (111) in the upper portion of the body (110). Said coil (119) prevents the vapor condensation on the inner surface of

the body (110) due to the temperature difference occurring during the processes being carried out and dripping thereof. The circulation pump (117) is disposed next to the dyeing machine (100). The function thereof is to provide circulation of the water, dyestuff, chemicals inside the dyeing machine (100). Thus, further penetration of said substances into the respective fabrics is provided by the continuous circulation thereof. The chemical preparation tank (116) is also disposed next to the dyeing machine (100). The function thereof is to enable preparation of the chemicals and dyestuff to be delivered into the respective dyeing machine (100) according to the finishing process to be carried out (shrink proof process, dyeing, etc.) and delivery thereof into the machine (100) after being prepared.

The control panel (140) is the brain of the respective dyeing machine (100), wherein it is disposed immediately outside said machine (100). Setting parameters such as time, temperature, etc. of the production method being realized in the respective dyeing machine (100) are entered into said element. The panel (140) carries out the execution of the production method according to the entered setting parameters. In the execution of the production method, the temperature sensor (130) helps the panel (140) to monitor the temperature and the pressing roller (120) helps said panel (140) in the pressure application.

In the dyeing machine (100) described above with the elements thereof and with the locations, functions, and mounting of said elements, the production method according to the present invention is carried out by the following steps:

Programming step:

In this step, the setting parameters such as time, temperature, etc. of the production method to be carried out are entered into the control panel (140). Among said parameters, the temperature parameter is monitored by means of the interaction of the temperature sensor (130). The timer disposed inside the programmer (140) monitors the time parameter. The parameters of time, temperature and pressure rate to be applied by the pressing roller (120) are determined according to the wool comprised in the fabric and the color tone of said fabric (dark, medium, light). The tabulated data exemplifying said parameters is given below in Table 1.

Table 1: The parameters of the method providing size stabilization of fabric comprising wool

FIBER TYPE	COLOR	TEMPERATURE (°C)	TIME (hours)	PRESSURE (Bar)
100% WOOL	DARK COLOR	45-50	15	2.5
	MEDIUM COLOR	60-65	10	2.5
	LIGHT COLOR	75-80	7.5	2.5
70% WOOL 30% PES	DARK COLOR	45-50	13.5	2.5
	MEDIUM COLOR	60-65	9.5	2.5
	LIGHT COLOR	75-80	7	2.5
50% WOOL 50% PES	DARK COLOR	50-55	12	2.5
	MEDIUM COLOR	70-75	8	2.5
	LIGHT COLOR	80-85	6.5	2.5
30% WOOL 70% PES	DARK COLOR	55-60	11	2.5
	MEDIUM COLOR	75-80	7.5	2.5
	LIGHT COLOR	85-90	6	2.5
50% WOOL 50% WOOL-VIS	DARK COLOR	50-55	12	2.5
	MEDIUM COLOR	70-75	8	2.5
	LIGHT COLOR	80-85	6.5	2.5
30% WOOL 70% PES	DARK COLOR	55-60	11	2.5
	MEDIUM COLOR	75-80	7.5	2.5
	LIGHT COLOR	85-90	6	2.5
85% WOOL 15% PES	DARK COLOR	45-50	15	2.5
	MEDIUM COLOR	60-65	10	2.5
	LIGHT COLOR	75-80	7.5	2.5

Heating step:

In this step, the water inside the dyeing machine (100) is heated according to the type of the respective wool or wool blend fabrics being processed by means of the steam provided through the steam pipes (112) in accordance with the temperature parameter entered into the programmer (140). The compliance of the heated water and ambient temperature is monitored by means of the pt100 temperature sensor (130). The temperature sensor (130) transmits the temperature values being monitored to the programmer (140). The programmer (140) compares the instantly transmitted temperature values to the temperature values entered thereinto. When the entered temperature parameter value is reached, the other step of the production method according to the present invention is executed.

Pressure application step:

After the dyeing machine (100) receives water therein, the temperature control is operated, as well as the pressing roller (120) being actuated. Namely, the pressing roller (120) creates pressure on the wool or wool blend fabrics disposed on the fabric winding roller (114) by contacting therewith. In the method according to the present invention, a pressure value of 2.5 bars is applied on the fabric by means of the pressing roller (120).

The time parameter is monitored by means of the timer disposed in the structure of the programmer (140). The time parameter is determined in accordance with the fiber type and loading amount of the fabrics being processed.

For the production method according to the present invention to be understood better, the structure of the wool fibers on which said production method is carried out should be explained. Wool is a natural animal protein fiber. The protein substances forming the wool are referred to as keratins. Carbon (C), oxygen (O), nitrogen (N), hydrogen (H) and sulfur (S) atoms are provided in the structure of keratin. The percentage of said atoms in keratin is as follows:

50% carbon
22-25% oxygen
16-17% nitrogen
3-4% sulfur

7% hydrogen

Various bonds are already formed between the aforementioned atoms contained in the keratin. These bonds are disulfide (cystine) bonds, salt bonds, and hydrogen bonds. Cystine containing disulfide groups can be present as a diamine dicarboxylic acid in two separate macropeptide chains by forming peptide bonds. In this case, the two macropeptide chains are covalently bonded over a disulfide bridge.

Keratin forming the wool comprising the aforementioned atoms and bonds shows different interactions in cold or hot media.

When keratin is treated with cold water, the hydrogen (H) bridges and salt bods between the macromolecules partially break by the effect of cold water. Thus, wool fibers swell and stretch more in the acidic media.

When keratin is treated with hot water or moisture, the hydrogen (H) bridges and salt bonds as well as a certain amount of disulfide (cysteine) bonds comprised in the structure of the wool also break in the case where long duration processing with hot water is carried out. At this point, the time, temperature and pressing parameters forming the basis of the production method according to the present invention are applied for each type of fabric as in the production method according to the present invention. Thus, different size shrinkage values encountered in the wool or wool blend fabrics are zeroed by means of the applied production method. This situation provides full size stabilization for the respective fabric types regardless of the media. Appropriate program is established by determining the extent and manner of the application of the three parameters of the production method according to the present invention according to the content and weaving characteristics of the wool forming the respective fabric. The established program is entered into the programmer (140) and the production method is carried out in any wet finishing machine.

An example of the production method according to the present invention is given below:

Fabric characteristics: 100% wool with a weight of 280 g/m.

Shrinkage values before the production method:

weft shrinkage size of ±3.5%

warp shrinkage size of ±3.0%

Production method parameters:

Time parameter: 10 hours

Temperature parameter: 60 °C

Pressure associated with time parameter: Yes

Shrinkage values after the production method:

weft shrinkage size of ±0%

warp shrinkage size of ±0%

As can be seen above, the production method successfully providing solutions to the technical problems zeros and eliminates the size change frequently encountered in the wool/wool blend fabrics produced in the textile sector. Thus, high efficiency and performance in the operations of the apparel production stage of the respective fabrics are provided.

As can be seen in the examples presented above and in Table 1, the time increases as the wool content of the fabrics increases. Similarly, the time also increases as the loading amount of the machine increases. The temperature value decreases for maintaining the dyeing fastness towards the darker colors and thus, the time is prolonged. The method according to the present invention can be applied in any type of wet finishing machine where temperature, time and pressing control can be provided. In Figures 3 and 4, a flow chart showing the sequence of processes of the production method according to the present invention during the dyeing and finishing applications of the undyed and dyed fabrics are illustrated, respectively.

CLAIMS

1. A method providing size stability of the wool or wool blend fabrics in the textile industry, characterized in that it comprises the following process step:

- application of a force by means of a pressing roller on said fabrics with temperature and time values varying according to the wool content, color tone, and loading amount of said fabrics and enabling the disulfide bonds to be broken in a water bath disposed inside a wet finishing machine provided with temperature, time and pressing control.

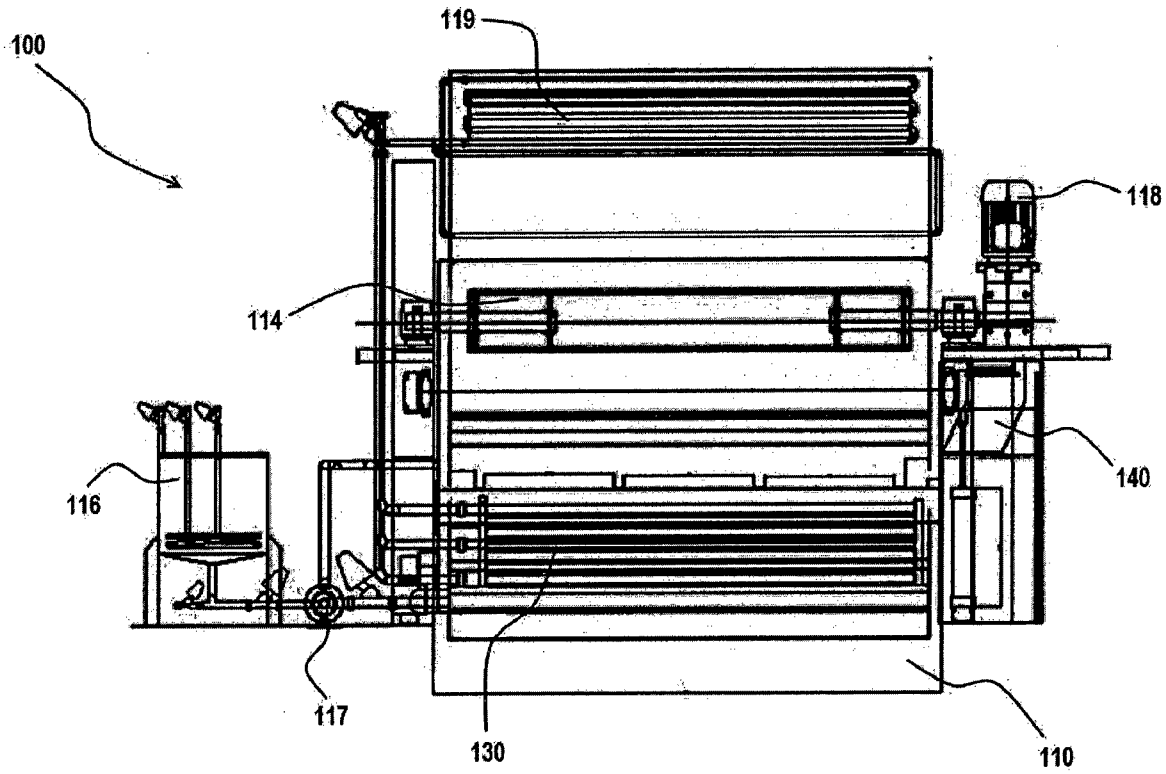

FIGURE 1

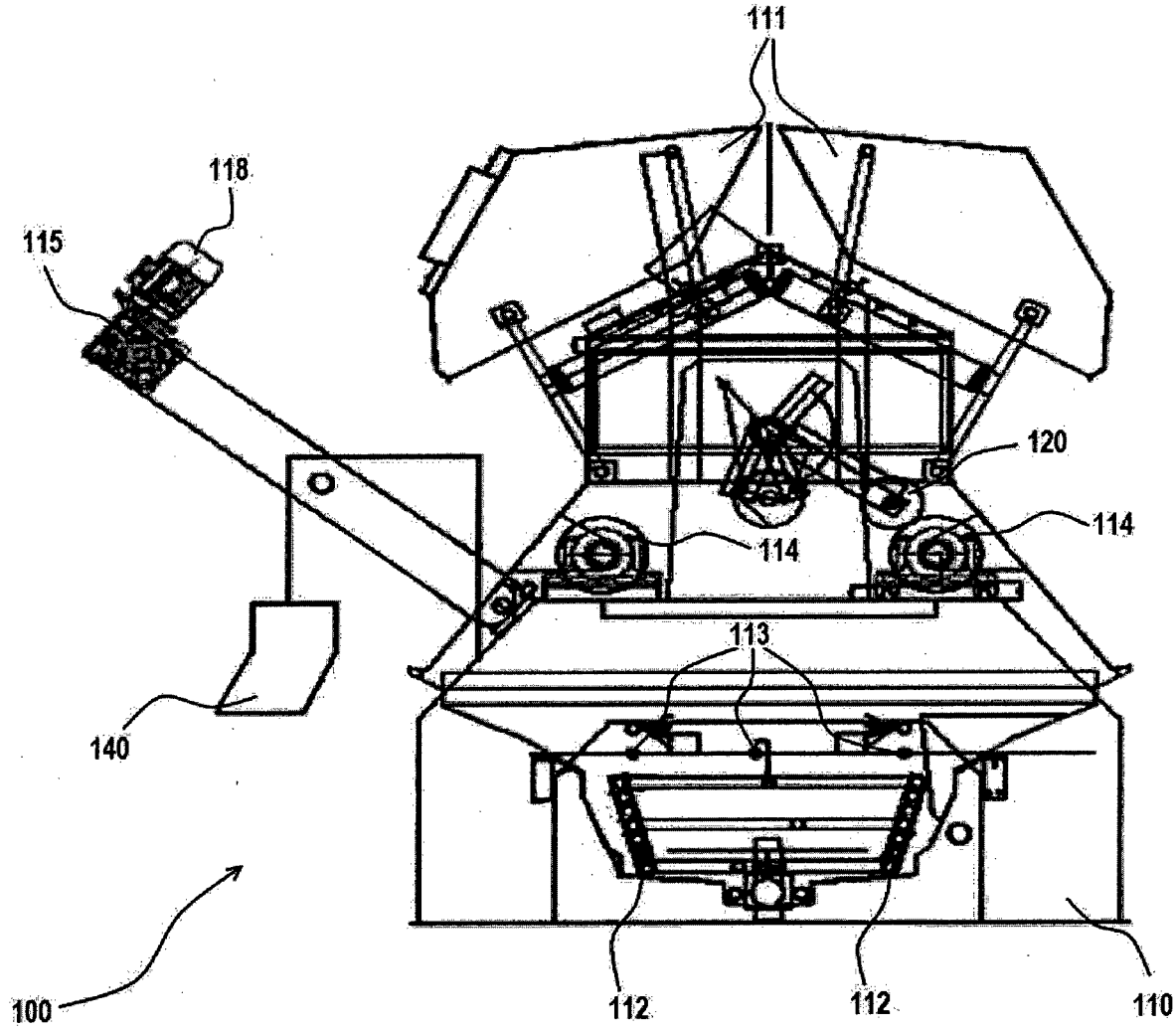

FIGURE 2

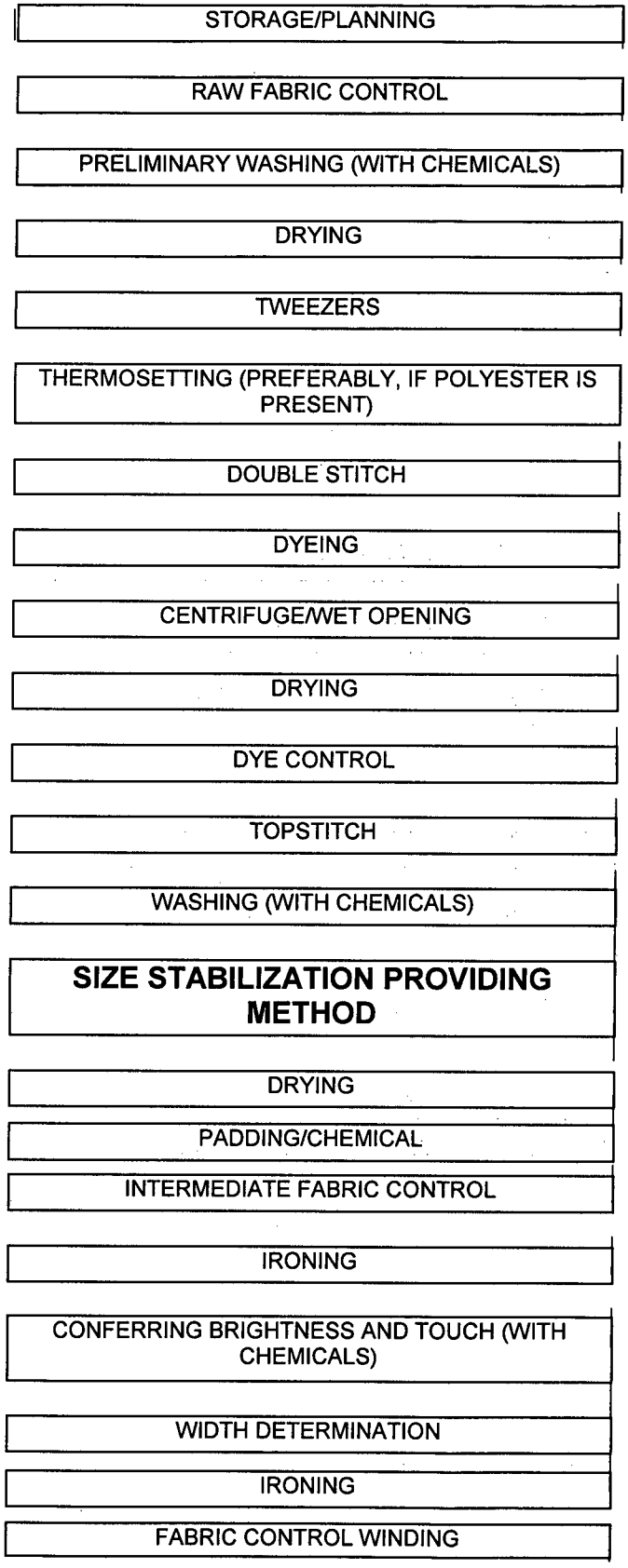
STORAGE/PLANNING
RAW FABRIC CONTROL
PRELIMINARY WASHING (WITH CHEMICALS)
DRYING
TWEEZERS
THERMOSETTING (PREFERABLY, IF POLYESTER IS PRESENT)
DOUBLE STITCH
DYEING
CENTRIFUGE/WET OPENING
DRYING
DYE CONTROL
TOPSTITCH
WASHING (WITH CHEMICALS)
SIZE STABILIZATION PROVIDING METHOD
DRYING
PADDING/CHEMICAL
INTERMEDIATE FABRIC CONTROL
IRONING
CONFERRING BRIGHTNESS AND TOUCH (WITH CHEMICALS)
WIDTH DETERMINATION
IRONING
FABRIC CONTROL WINDING

FIGURE 3

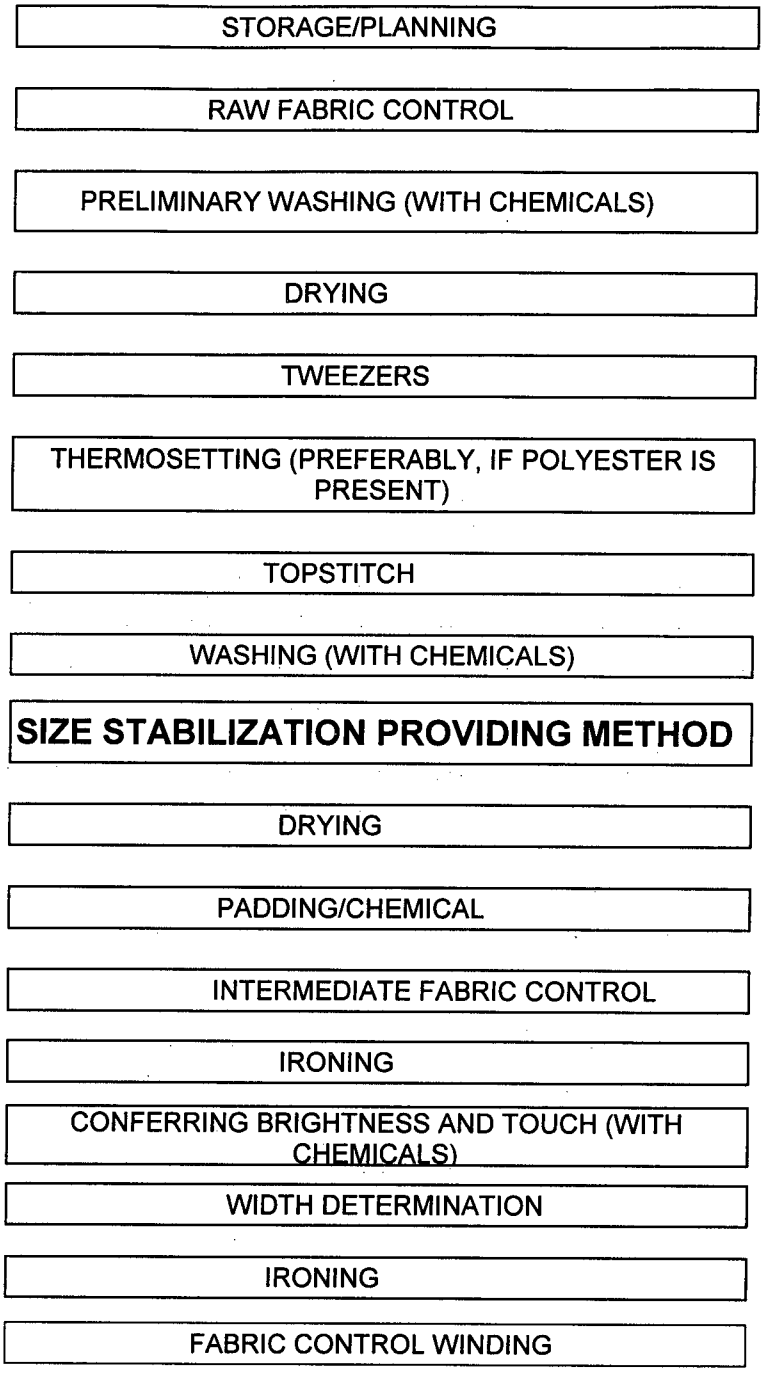
STORAGE/PLANNING
RAW FABRIC CONTROL
PRELIMINARY WASHING (WITH CHEMICALS)
DRYING
TWEEZERS
THERMOSETTING (PREFERABLY, IF POLYESTER IS PRESENT)
TOPSTITCH
WASHING (WITH CHEMICALS)
SIZE STABILIZATION PROVIDING METHOD
DRYING
PADDING/CHEMICAL
INTERMEDIATE FABRIC CONTROL
IRONING
CONFERRING BRIGHTNESS AND TOUCH (WITH CHEMICALS)
WIDTH DETERMINATION
IRONING
FABRIC CONTROL WINDING

FIGURE 4

INTERNATIONAL SEARCH REPORT

International application No
PCT/TR2013/000312

A. CLASSIFICATION OF SUBJECT MATTER
INV. D06B3/32 D06M13/00 D06C15/02 D06P3/14
ADD.

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)
D06B D06M D06C D06P

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 practicable, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 3 497 310 A (FARMER LARRY B ET AL) 24 February 1970 (1970-02-24) example VII column 1, lines 51-65	1
X	GB 1 181 373 A (DEERING MILLIKEN RES CORP [US]) 18 February 1970 (1970-02-18) page 1, line 37 - page 2, line 38 page 9, lines 25-40 page 8, lines 13-29	1
X	GB 1 064 982 A (DEERING MILLIKEN RES CORP) 12 April 1967 (1967-04-12) page 2, lines 10-27	1
A	EP 1 164 219 A1 (SUMITOMO CORP [JP]) 19 December 2001 (2001-12-19) the whole document	1

-/--

[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

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"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
13 February 2014	25/02/2014

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, Fax: (+31-70) 340-3016	Bichi, Marco

1

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

INTERNATIONAL SEARCH REPORT

International application No
PCT/TR2013/000312

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2006/096037 A1 (GUARDUCCI MASSIMO [IT]) 11 May 2006 (2006-05-11) the whole document -----	1

1

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/TR2013/000312

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 3497310 A	24-02-1970	AT 279533 B	10-03-1970
		BE 689880 A	18-05-1967
		FR 1507330 A	29-12-1967
		GB 1161748 A	20-08-1969
		IL 26815 A	19-02-1970
		LU 52388 A1	18-01-1967
		NL 6616279 A	22-05-1967
		SE 335512 B	01-06-1971
		US 3497310 A	24-02-1970
GB 1181373 A	18-02-1970	BE 695453 A	14-09-1967
		FR 1513989 A	16-02-1968
		GB 1181373 A	18-02-1970
		LU 53191 A1	16-05-1967
		NL 6703851 A	15-09-1967
		US 3498740 A	03-03-1970
		US 3687605 A	29-08-1972
GB 1064982 A	12-04-1967	BE 638673 A	13-02-2014
		CH 462099 A	11-04-1968
		DE 1444047 A1	19-02-1970
		DK 116792 B	16-02-1970
		ES 292122 A1	01-03-1964
		FI 43728 B	01-03-1971
		FR 1377613 A	06-11-1964
		GB 1064982 A	12-04-1967
		LU 44605 A1	10-12-1963
		NL 144005 B	15-11-1974
		NL 299245 A	13-02-2014
		SE 339285 B	04-10-1971
EP 1164219 A1	19-12-2001	NONE	
US 2006096037 A1	11-05-2006	AT 447068 T	15-11-2009
		CN 1748055 A	15-03-2006
		EP 1590522 A1	02-11-2005
		KR 20050097987 A	10-10-2005
		US 2006096037 A1	11-05-2006
		WO 2004070104 A1	19-08-2004