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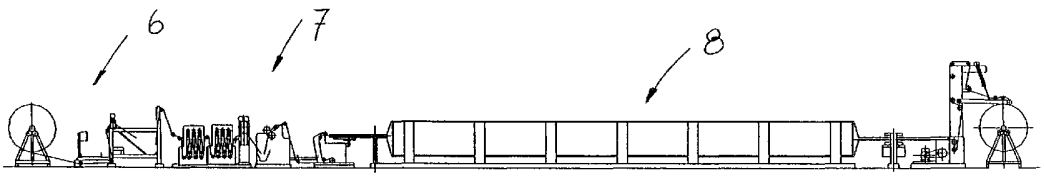
(54) Title: PROCEDURE FOR REALISING A JACQUARD DESIGN ON A FABRIC AND FABRIC OBTAINED WITH SAID PROCEDURE



(57) Abstract: The procedure for realising a jacquard effect in a natural cellulosic fibre fabric such as cotton or artificial derivatives or animal derivatives such as silk comprises a first impregnation step of the fabric with at least one product based upon resins suitable for chemically and mechanically linking with themselves and with the fabric, a second uniform squeezing step of the impregnated fabric, a third drying step of the fabric at a low temperature at least lower than the polymerisation temperature of the resins leaving a predetermined residual humidity to the fabric, a fourth calandering step through at least one embossing roller and a fifth polymerisation step of the resins followed by a washing and lifting step of the fabric to eliminate the substances in the resin-based product which have not been fixed to the fabric during the previous washing steps and to give the finished look to it.

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PROCEDURE FOR REALISING A JACQUARD DESIGN ON A FABRIC AND FABRIC OBTAINED WITH SAID PROCEDURE

DESCRIPTION

The present finding refers to a procedure for realising a jacquard design on a fabric and to a fabric obtained with said procedure.

As is known, when the weave of a frame has a ratio in which it is not possible to carry it out with harnesses, which usually are 24 in number, a "jacquard" mechanism must be used.

This mechanism allows a thread, or groups of thread, to be controlled independently from each other, so as to be able to obtain designs with a large ratio.

To proceed to realising a jacquard design on a fabric, which shall from now on be called operated fabric, it is necessary to prepare the sketch of the drawing in black and white or in colour, to copy it on paper or through another system so as to have the design exactly as it appears on the finished fabric, without flattening or stretching of the figures of the sketch.

The reading of the design allows the continuous cards or papers of the jacquard to be prepared which, suitably perforated, give the possibility to the frame of only lifting the thread, or groups of thread, which is necessary to achieve the operating purpose of the fabric.

Even if currently such a procedure has largely been automated thanks to the arrival of the computer, the fact remains,

however, that the jacquard design still involves substantial preparation work and use of suitable frames for the purpose with the consequence that the finished product has a high cost due to the procedural complications for the realisation thereof.

The task proposed of the present invention is that of eliminating the aforementioned drawbacks of the prior art.

In this task, an important purpose of the finding is to realise a procedure for realising a jacquard design on a fabric and to a fabric obtained with said procedure which allow the production times and costs to be reduced enormously with respect to the conventional jacquard system.

Yet another purpose of the finding is to realise a procedure which allows a fabric with a jacquard design to be obtained which last a long time even after numerous washes.

The last but not least purpose of the finding is to realise a procedure which allows a fabric with a jacquard design to be obtained which has the same aesthetic characteristics as a conventional jacquard design, since it has a three-dimensional effect like the conventional jacquard design.

This task, as well as these and other purposes are achieved by a procedure for realising a jacquard effect in a natural cellulosic fibre fabric such as cotton or artificial derivatives or animal derivatives such as silk, characterised in that it comprises:

a first impregnation step of said fabric with at least one product based upon resins suitable for chemically and

mechanically linking with themselves and with said fabric,

a second uniform squeezing step of said impregnated fabric,

a third drying step of said fabric at a low temperature at least lower than the polymerisation temperature of said resins leaving a predetermined residual humidity to said fabric,

a fourth calandering step through at least one embossing step roller, and

a fifth polymerisation step of said resins followed by a washing and lifting step of said fabric to eliminate the substances in said resin-based product which have not been fixed to said fabric during the previous washing steps and to give the finished look to it.

Forming the object of the present finding is also a fabric with a jacquard design characterised in that said fabric has been treated with a resin-based product suitable for chemically and mechanically linking with itself and with the fabric itself and which is subjected to an embossing operation through a roller acting on said product before the polymerisation thereof.

Further characteristics and advantages of the invention shall become clearer from the description of a preferred but not exclusive embodiment of a procedure and fabric according to the finding, illustrated for indicating and not limiting purposes in the attached drawings, in which:

figures 1, 2 and 3 schematically show the procedure which the fabric undergoes to get the results obtained.

With particular reference to the aforementioned figures, the procedure for realising a jacquard design on a natural cellulosic fabric, such as cotton or artificial derivatives thereof, or an animal derivative, such as silk, comprises the following steps.

The fabric can be of any type: white, coloured, pattern finish, etc.

The fabric, in a first step, is subjected to impregnation 1 with a product based upon resins chosen from amongst those which are capable of being chemically and mechanically linked, both with itself and with the fabric.

In particular, the resin-based product comprises at least one linear reactive resin and a reaction catalyst thereof and an acidic additive so as to have an acid pH of the bath between 6 and 3 and which is optimal for obtaining an optimal reaction of the resins and also for having a good elimination of the residual substances during the drying and polymerisation step of the impregnated fabric of the resin based-product.

After the first impregnation step, the fabric undergoes a second uniform squeezing step 2 so as to eliminate the excess resin-based product.

Then a third drying step 3 is carried out on the fabric at a low temperature at least lower than the polymerisation temperature of the resins, so as to also leave a predetermined residual humidity to the fabric.

In particular, the drying operation takes place at a

temperature of between 80° and 120° C and more precisely at a temperature of between 100 and 110 degrees centigrade.

For all intents and purposes, the drying temperature must have a well-defined residual humidity preferably between 6 and 10%.

At this point the fabric is ready to undergo a fourth calandering step 4 through an embossing roller which advantageously has on its cylindrical surface an incision realised on at least three different level planes, so as to give the design which is realised on the fabric a three-dimensional effect which is totally similar and can be mistaken for the effect which the jacquard design has.

With the embossing step finished, there is a fifth polymerisation step 5 of the resins at a temperature between 140 and 180 degrees centigrade and preferably around 160 degrees centigrade for a time of between 2 and 4 minutes.

Finally, there is the washing and raising step 6, 7 of the fabric suitable for bringing the fabric back to side, so as to allow the total elimination of the products which have not been fixed to the fabric during the previous treatment step and to give it the finished look following a final drying step 8.

Advantageously, the linear reactive resin used in the resin-based product is a reactive resin for cellulosic fibres derived from melamine and/or glyoxal.

It has also been found that other types of linear reactive resins, such as urea-formaldehyde resin, can work, but they

have big drawbacks in terms of environmental pollution.

Clearly, instead of melamine resin any type of equivalent resin can be used, so long as, as stated, the desired chemical and aesthetic effects are achieved.

The reaction catalyst is an inorganic salt, whereas the acidic additive is which is added into the resin-based product comprises an organic acid, for example preferably an acetic acid.

Additives suitable for improving the procedure and fabric with a jacquard design obtained are also put into the resin-based product.

For example, a water and oil repellent resin is also introduced so as not to wet the fibre of the fabric too much and to swell the fabric to a small degree at the end of the impregnation step.

For example, it has been found that it is possible to use a fluorocarbon resin or a resin with the same chemical-physical characteristics as a water and oil repellent resin.

To then obtain the required softness, a silicon elastomer is mixed into the resin-based product.

The fabric which is achieved from the procedure is a fabric which is totally soft to the touch with jacquard designs represented which are totally similar to jacquard designs obtained with conventional weaving procedures.

In practice, it has been noted how the procedure and the fabric obtained with the described and claimed procedure allows an aesthetic effect similar to conventional jacquard

fabrics to be realised at much lower costs.

Moreover, the mechanical resistance to washes is substantially high without the fabric and the design represented in it undergoing deteriorating effects.

The finding thus conceived is susceptible to numerous modifications and variants all covered by the inventive concept itself.

Moreover, all of the details can be replaced by technically equivalent elements.

In practice, the materials used, as well as the sizes can be whatever according to the requirements and the state of the art.

CLAIMS

1. Procedure for realising a jacquard effect in a natural cellulosic fabric such as cotton or artificial derivatives or animal derivatives such as silk, characterised in that it comprises:

a first impregnation step of said fabric with at least one product based upon resins suitable for chemically and mechanically linking with themselves and with said fabric,

a second uniform squeezing step of said impregnated fabric,

a third drying step of said fabric at a low temperature at least lower than the polymerisation temperature of said resins leaving a predetermined residual humidity to said fabric,

a fourth calandering step through at least one embossing roller, and

a fifth polymerisation step of said resins followed by a washing and lifting step of said fabric to eliminate the substances in said resin-based product which have not been fixed to said fabric during the previous washing steps and to give the finished look to it.

2. Procedure for realising a jacquard effect on a fabric according to claim 1, characterised in that said resin-based product comprises at least one linear reactive resin and a reaction catalyst thereof and an acidic additive to have an acidic pH of the bath to obtain an optimal reaction of the resins and to have a good elimination of residual products during said drying and polymerisation steps.

3. Procedure for realising a jacquard effect according to one or more of the previous claims, characterised in that said drying step takes place at a temperature of between 80 and 120 degrees centigrade.

4. Procedure for realising a jacquard effect according to one or more of the previous claims, characterised in that said residual humidity is between 6% and 10%.

5. Procedure for realising a jacquard effect according to one or more of the previous claims, characterised in that said polymerisation temperature is between 140 and 180 degrees centigrade for a time of between 2 and 4 minutes.

6. Procedure for realising a jacquard effect according to one or more of the previous claims, characterised in that said embossing roller has the embossing incision arranged on at least two different level planes and preferably on at least three different level planes.

7. Procedure for realising a jacquard effect according to one or more of the previous claims, characterised in that said linear reactive resin is a reactive resin for cellulosic fibres derived from melamine and/or glyoxal.

8. Procedure for realising a jacquard effect according to one or more of the previous claims, characterised in that said linear reactive resin is a urea-formaldehyde resin.

10. Procedure for realising a jacquard effect according to one or more of the previous claims, characterised in that said catalyst is an inorganic salt.

11. Procedure for realising a jacquard effect according to

one or more of the previous claims, characterised in that said acidic additive comprises an organic acid and preferably an acetic acid.

12. Procedure for realising a jacquard effect according to one or more of the previous claims, characterised in that said resin-based product comprises at least one water and oil repellent resin.

13. Procedure for realising a jacquard effect according to one or more of the previous claims, characterised in that said water and oil repellent resin is a fluorocarbonic resin.

14. Procedure for realising a jacquard effect according to one or more of the previous claims, characterised in that said resin-based product comprises at least one siliconic elastomer to soften said fabric.

15. Fabric with a jacquard design obtained according to a procedure as claimed in one or more of the previous claims, characterised in that said fabric has been treated with a resin-based product suitable for chemically and mechanically linking with itself and with the fabric itself and which is subjected to an embossing operation through a roller acting on said product before the polymerisation thereof.

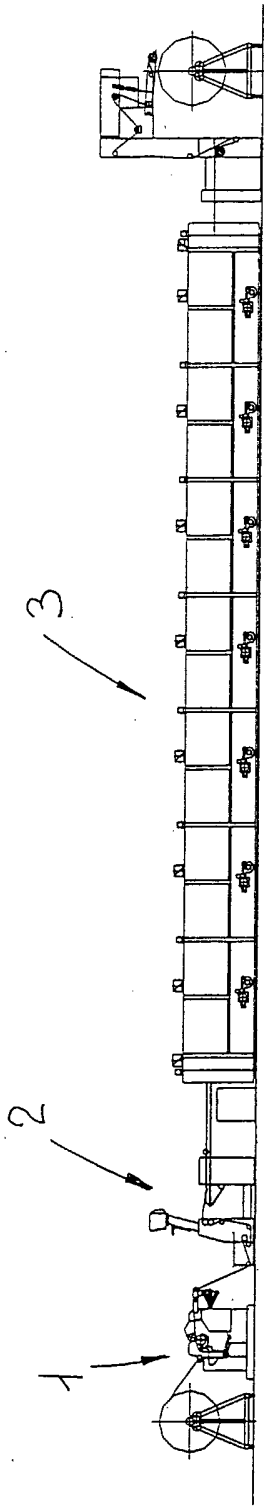

FIG 1

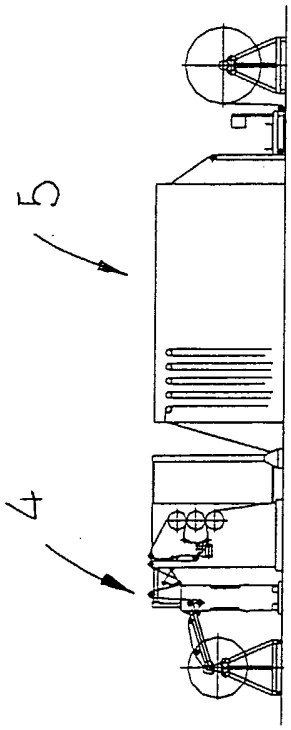

FIG. 2

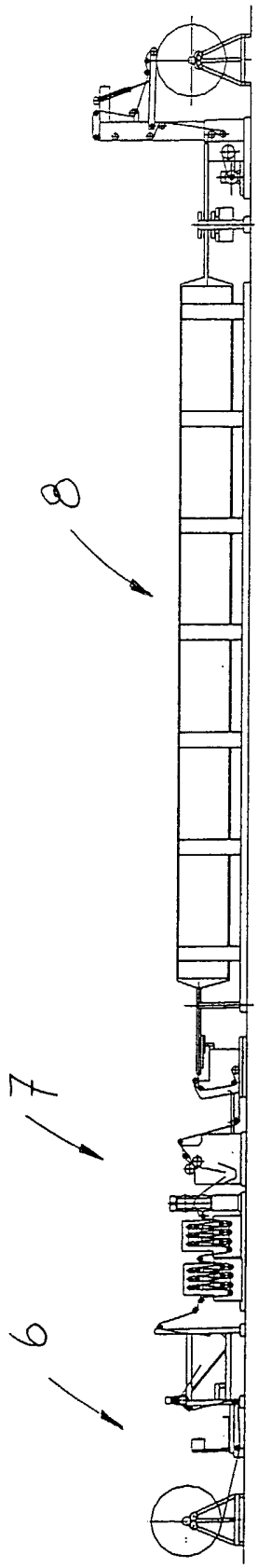

FIG.3

INTERNATIONAL SEARCH REPORT

International Application No
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A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 D06M23/14 D06M13/52 D06M13/525 D06Q1/08

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 D06M D06Q

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)
WPI Data, EPO-Internal, 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 2 899 263 A (BANCROFT & SONS CO J) 11 August 1959 (1959-08-11) column 1, line 16 - line 28 column 2, line 2 - line 40 column 3, line 50 - line 71 column 4, line 16 -column 5, line 61; examples ---	1,2,4,5, 10-12, 14,15
X	DE 10 05 924 B (BASF AG) 11 April 1957 (1957-04-11) claims; examples ---	1,2,5,7, 10-12, 14,15
X	GB 742 885 A (BANCROFT & SONS CO J) 4 January 1956 (1956-01-04) example 1C --- -/--	1,8,15

[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
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INTERNATIONAL SEARCH REPORT

International Application No
PCT/EP 03/06246

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication,where appropriate, of the relevant passages	Relevant to claim No.
X	US 3 054 699 A (ALBERT MOYSE JAMES) 18 September 1962 (1962-09-18) example 1 -----	1,2,4,5, 7-11

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No
PCT/EP 03/06246

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
US 2899263	A	11-08-1959	BE	497571 A	
			CH	306971 A	15-05-1955
			DE	878788 C	05-06-1953
			FR	1023955 A	26-03-1953
			GB	690237 A	15-04-1953
			NL	82933 C	
DE 1005924	B	11-04-1957	NONE		
GB 742885	A	04-01-1956	BE	519832 A	
			CH	318418 A	15-01-1957
			FR	1077239 A	05-11-1954
US 3054699	A	18-09-1962	GB	841640 A	20-07-1960
			DE	1047745 B	31-12-1958
			FR	1212753 A	25-03-1960