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(54) **TEXTILE DOUBLE-SIDED INKJET PRINTING METHOD USING DIGITAL INKJET PRINTER, AND TEXTILE**

(57) A textile double-sided inkjet printing method using a digital inkjet printer, and a textile. The inkjet printing method comprises the following steps: 1) importing a target pattern to a storage unit (21); 2) mirroring the target pattern to obtain a mirror target pattern, and storing the mirror target pattern to the storage unit (21); 3) placing a textile in a inkjet printing region of a guide belt (42), and printing the target pattern on the front side of the textile by means of a digital head (1) to form a front-side printed pattern; 4) turning over the textile and placing same on the guide belt, acquiring a pattern penetrating the reverse side of the textile by using an image acquisition unit (3), and transmitting the pattern to the storage unit (21); 5) adjusting the mirror target pattern by means of a processing unit (22) to align with the reverse-side pattern acquired by the image acquisition unit (3); and 6) printing the adjusted mirror target pattern on the reverse side of the textile by means of the digital head (1).

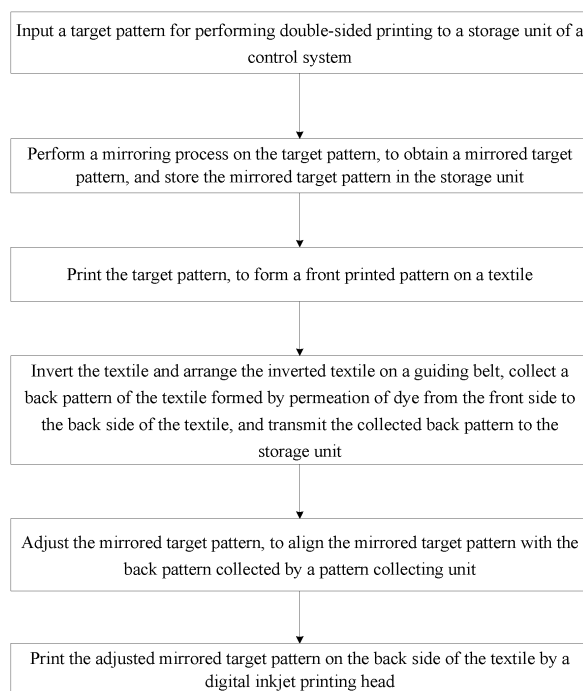


Figure 3

Description

[0001] The present application claims priority to Chinese Patent Application No. 201711248858.X, titled "METHOD FOR PERFORMING DOUBLE-SIDED INKJET PRINTING METHOD ON TEXTILE BY DIGITAL INKJET PRINTER AND TEXTILE", filed on December 1, 2017 with the Chinese Patent Office, which is incorporated herein by reference in its entirety.

FIELD

[0002] The present disclosure relates to the field of textile printing, and in particular to a textile, a digital inkjet printer, and a method and device for performing double-sided inkjet printing on the textile.

BACKGROUND

[0003] With the increasing development of computer technology, a digital printing technology is developed, which is a high technology combining the machinery technology, the computer technology and the electronic information technology, and in which printing is performed via the digital technology. With the development and improvement of the digital printing technology, a great development is to be achieved in the textile printing industries.

[0004] A current digital inkjet printer for performing digital printing generally includes a digital inkjet printing head, a guiding belt and a control system. In practice, a to-be-printed textile is arranged on the guiding belt, a target pattern is inputted to the control system, and the control system controls the digital inkjet printing head to print the target pattern on the textile.

[0005] In some cases, it is required to print patterns on both sides of the textile, that is, a front side and a back side of the textile, to prevent an adverse effect to the character of the textile due to unaesthetic single-sided printed pattern. However, in the conventional technology, it is difficult to ensure that a pattern on the front side is superposed and aligned with that on the back side. For example, in the conventional technology, in order to achieve double sided printing, a dye with good permeability is used to firstly print a pattern on one side of the textile, and the dye is permeated through the textile to form a pattern on the other side of the textile. However, the dye with good permeability may permeate across the textile, which may affect the character of the textile. In another conventional method, paintings are separately performed on the two sides of the textile respectively via two rollers. However, with this method, it is difficult to align the patterns on the two sides of the textile with each other, which may affect the appearance of the textile. In addition, taking a case that printing is performed on the front side and the back side of the textile with the digital printing technology as an example, reference is made to Figures 5 and 6. Figure 5 schematically shows a target

pattern. Figure 6 schematically shows a textile a front side of which is printed and a back side of which is arranged upward. In Figure 6, the textile is made of a flexible material, and the textile is easily distorted and deformed when being left aside, thus once being inverted, it is difficult to maintain the textile to be located in the same state as in the previous arrangement. In this case, it is impossible to ensure that the pattern on the front side is aligned with that on the back side just by printing the target pattern on the back side of the textile by the digital inkjet printer with a conventional method.

[0006] A method for producing a double-sided inkjet printed textile of pure cotton is disclosed in a Chinese Patent Publication No. CN105926331A, published on September 7, 2016, which includes the following steps 1) to 6).

In step 1), a pretreatment process is performed, in which a singeing process, a desizing process, a scouring process, an oxidation bleaching process and a mercerizing process are performed sequentially. In the mercerizing process, a concentration of NaOH ranges from 180g/L to 320g/L.

In step 2), the textile is pretreated. The textile is sized with a padding method. In a sizing agent, a concentration of Na₂CO₃ ranges from 20g/L to 40g/L, a concentration of carbamide ranges from 60g/L to 90g/L, a concentration of a sizing material Lyoprint RD-HT ranges from 12g/L to 25g/L, a concentration of a sizing material Lyoprint ATP-30 ranges from 15g/L to 25g/L, a concentration of an antireducer LyoprintRG ranges from 2g/L to 15g/L, and a concentration of a permeability-reducing admixture HPU liq ranges from 6g/L to 12g/L. After the textile is sized, the textile is pre-dried at 80 degree Celsius to 90 degree Celsius, then the textile is dried at 100 degree Celsius to 120 degree Celsius. After being dried, the textile is rolled orderly.

In step 3), inkjet printing is performed on one side of the textile by a reactive inkjet printer, and the textile is dried and rolled orderly.

In step 4), the inkjet printing is performed on the other side of the textile by the reactive inkjet printer, and the textile is dried.

In step 5), the textile is steamed at 102 degree Celsius for 10 minutes to 14 minutes. After being steamed, the textile is washed, to remove loose colors and auxiliaries on the surfaces of the textile.

In step 6), the textile is softened and preshrunk.

[0007] The method in the above application is only suitable for producing a textile having different patterns on the two sides, and cannot satisfy requirements for dou-

ble-sided printed textile having patterns that are superposed and aligned with each other on the two sides. With the increasing demand of customers on the double-sided printing process for a textile, it has become a main index in determining the printing quality and aesthetics of a thin or translucent textile that whether a pattern on the front side is superposed and aligned with a pattern on the back side, which directly affects the character of a printed product. However, it is difficult to ensure alignment and superposition between the printed pattern on the front side and the printed pattern on the back side in the conventional printing technology.

SUMMARY

[0008] To solve the above problem, a textile and a method for performing double-sided inkjet printing on the textile by a digital inkjet printer are provided according to the embodiments of the present disclosure, to achieve alignment and superposition between a pattern on a front side of the textile and a pattern on a back side of the textile during performing the double-sided inkjet printing on the textile, thereby significantly improving satisfaction of a customer on the textile.

[0009] A method for performing double-sided inkjet printing on a textile by a digital inkjet printer is provided according to an embodiment of the present disclosure.

[0010] The digital inkjet printer includes a digital inkjet printing head, a control system, a pattern collecting unit and a material feeding device. The digital inkjet printing head is configured to perform inkjet printing based on a target pattern. The control system includes a storage unit, a processing unit and a control unit. The storage unit is configured to store data. The processing unit is configured to receive, process and transmit data. The control unit is configured to control the processing unit to process the data and transmit a printing signal. The pattern collecting unit is configured to collect a pattern on the textile and transmit the collected pattern to the storage unit of the control system. The material feeding device includes a rack and a guiding belt arranged on the rack. A printing region is arranged on the guiding belt, and the digital inkjet printing head is arranged above the printing region.

[0011] The method includes:

inputting a target pattern for performing double-sided inkjet printing to the storage unit of the control system;

performing a mirroring process on the target pattern to obtain a mirrored target pattern, and storing the mirrored target pattern in the storage unit;

arranging the textile in the printing region of the guiding belt, transmitting a printing signal to the digital inkjet printing head by the control unit, and printing the stored target pattern on a front side of the textile by the digital inkjet printing head, to form a front print-

ed pattern;

inverting the textile and arranging the inverted textile on the guiding belt, collecting, by the pattern collecting unit, a back pattern on a back side of the textile which is formed by permeation and is inverted to the front printed pattern on the front side of the textile, and transmitting the collected back pattern to the storage unit by the pattern collecting unit;

adjusting the mirrored target pattern obtained in step 2) by the processing unit, to align the mirrored target pattern with the back pattern collected by the pattern collecting unit; and

printing the adjusted mirrored target pattern on the back side of the textile by the digital inkjet printing head.

[0012] In the present disclosure, "the front side" and "the back side" of the textile do not indicate a specific meaning. That is, one side of the textile is designated as a front side, and the other side of the textile is designated as a back side.

[0013] Preferably, the adjusting the mirrored target pattern by the processing unit includes:

a. determining a plurality of feature points on the mirrored target pattern;

b. recognizing, by the processing unit and on the back pattern collected by the pattern collecting unit, feature points each of which is located corresponding to one of the plurality of feature points on the mirrored target pattern, and calculating a deviation between each of the feature points obtained in step b and the corresponding one feature point obtained in step a; and

c. adjusting, by the processing unit, the mirrored target pattern based on the deviation obtained in step b, to align each of the feature points on the mirrored target pattern with the corresponding one feature point on the back pattern collected by the pattern collecting unit, to align the mirrored target pattern with the back pattern collected by the pattern collecting unit.

[0014] Preferably, after the target pattern is printed on the front side of the textile, the method further includes: performing a dry process on the textile.

[0015] Preferably, before determining the feature points on the mirrored target pattern, a grayscale process is performed on the mirrored target pattern, to obtain a grayscale template of the mirrored target pattern.

[0016] Preferably, the pattern collecting unit is a scanning device or a camera.

[0017] Preferably, the guiding belt is arranged with a

heat sensitive adhesive or a pressure sensitive adhesive, to adhesively spread the textile flat on the guiding belt.

[0018] Preferably, the feature points are determined in a manner of 0.5 to 3 feature points per square inch, points that are easy to be aligned and positioned on the mirrored target pattern are determined as the feature points, and no feature point is determined at a region of a single color on the mirrored target pattern in which the mirrored target pattern has no change.

[0019] The digital inkjet printer further includes a movable unit. The movable unit is configured to move in a direction perpendicular to a feeding direction of the guiding belt. The digital inkjet printing head and the pattern collecting unit are arranged on the movable unit. The pattern collecting unit is configured to move along with the movable unit and collect the back pattern in real time.

[0020] Preferably, if the deviation for aligning the mirrored target pattern with the back pattern collected by the pattern collecting unit is large, it is determined whether the mirrored target pattern is aligned with the back pattern collected by the pattern collecting unit through manual observation. If it is determined that the mirrored target pattern is not aligned with the back pattern collected by the pattern collecting unit, the mirrored target pattern is adjusted manually through manual intervention, to align each of the feature points on the mirrored target pattern with the corresponding one feature point on the back pattern collected by the pattern collecting unit..

[0021] Preferably, the feature points are determined on the mirrored target pattern in a manner of one feature point per square inch, no feature point is determined in a blank region or a region with a large area background color, and a point at a position required to be aligned is determined as a feature point.

[0022] A textile is further provided, which includes a front printed pattern and a back printed pattern. The front printed pattern is arranged on a front side of the textile and the back printed pattern is arranged on a back side of the textile, and the front printed pattern and the back printed pattern are aligned with each other. The front printed pattern and the back printed pattern are formed with any method for performing double-sided inkjet printing on a textile by a digital inkjet printer described above.

[0023] Compared with the conventional technology, the following advantages and beneficial effects can be achieved according to the present disclosure. With the method for performing double-sided inkjet printing on a textile, the target pattern is firstly printed onto the front side of the textile, then the textile is inverted. Before printing a mirrored target pattern, a back pattern on the back side of the textile is collected, which is formed by permeation of dye from the front side to the back side of the textile, and the mirrored target pattern is adjusted to be aligned with the collected back pattern, then the adjusted mirrored target pattern is printed. In this way, it is ensured the alignment and superposition between patterns on two sides of the textile, thereby solving the problem in the conventional double-sided printing method that patterns

on two sides of the textile cannot be aligned and superposed with each other, thus improving the quality of the double-sided printing for the textile and making printing color more abundance satiation.

BRIEF DESCRIPTION OF THE DRAWINGS

[0024] In order to more clearly illustrate technical solutions in embodiments of the present disclosure or in the conventional technology, the drawings to be used in the description of the embodiments or the conventional technology are briefly described below. Apparently, the drawings in the following description show only some embodiments of the present disclosure, and other drawings may be obtained by those skilled in the art from the drawings without any creative work.

Figure 1 schematically shows a control principle according to a first embodiment;

Figure 2 schematically shows a hardware structure according to the first embodiment;

Figure 3 schematically shows a process flowchart according to a second embodiment;

Figure 4 schematically shows a front side and a back side of a textile according to a third embodiment;

Figure 5 schematically shows an example of a target pattern; and

Figure 6 schematically shows a textile a front side of which is printed and a back side of which is arranged upward.

DETAILED DESCRIPTION OF EMBODIMENTS

[0025] The present disclosure is described in detail below through embodiments with reference to the drawings. The following embodiments are used to explain the present disclosure other than intend to limit the present disclosure.

[0026] It should be further noted that positional terms such as up, down, left, right, front, back are only referred to relative concepts in the drawings or a normal usage state of a product and are not restrictive.

First Embodiment

[0027] Reference is made to the embodiments described in the drawings. In order to obtain a comprehensive understanding of the present disclosure, various specific details are described in the following description. However, those skilled in the art should understand that the present disclosure may be implemented without those details.

[0028] As shown in Figures 1 and 2, in this embodi-

ment, a digital inkjet printer includes a digital inkjet printing head 1, a control system 2, a pattern collecting unit 3 and a material feeding device 4. The digital inkjet printing head 1 is connected to the control system 2. The pattern collecting unit 3 is connected to the control system 2. In addition, the digital inkjet printer further includes a peripheral interface, a display screen, and an external port, which are not described in detail herein. Components shown in Figure 1 may be implemented as hardware, software or a combination of the hardware and the software. Each of the components shown in Figure 1 includes one or more signal processing and/or specific integrated circuits.

[0029] In this embodiment, the digital inkjet printing head 1 is configured to perform inkjet printing based on a target pattern.

[0030] In this embodiment, the control system 2 includes a storage unit 21, a processing unit 22 and a control unit 23. The storage unit 21 is configured to store data, which includes but is not limited to a target pattern inputted from an external device, a mirrored target pattern and a back pattern collected in a real time. The pattern collecting unit 32 is connected to the storage unit 21. The processing unit 22 is configured to receive, process and transmit data. The processing on data includes but is not limited to determining feature points, performing a mirroring process on the target pattern, obtaining the mirrored target pattern, aligning the mirrored target pattern with the collected back pattern and converting the target pattern into a grayscale template. The processing unit 22 is connected to the storage unit 21. The control unit 23 is configured to control the processing unit 22 to process data and transmit a printing signal. The control unit 23 is connected to the processing unit 22 and the digital inkjet printing head 1. The above components may be implemented as hardware, software or a combination of the hardware and the software. Each of the above components includes one or more signal processing and/or specific integrated circuits.

[0031] In this embodiment, the pattern collecting unit 3 is configured to collect a pattern on a textile and transmit the collected pattern to the storage unit 21 of the control system 2. The pattern collecting unit 3 may be a scanning device or a camera, as long as the pattern collecting unit 3 is capable of collecting a pattern on the textile.

[0032] In this embodiment, the material feeding device 4 includes a rack 41 and a guiding belt 42. The guiding belt 42 is arranged on the rack 41. A printing region is arranged on the guiding belt 42. The digital inkjet printing head 1 is arranged above the printing region. The guiding belt 42 is rotated by a power device to feed material. Specifically, the power device may include a motor, a driving pulley, and a slave pulley. The motor is connected to the driving pulley and is configured to control the driving pulley to rotate. The guiding belt is looped over the driving pulley and the slave pulley, such that the slave pulley is rotated following the driving pulley.

[0033] In this embodiment, a heat sensitive adhesive

or a pressure sensitive adhesive is arranged on the guiding belt 42, such that the textile may be spread flat and fixed on the guiding belt 42 when being arranged on the guiding belt 42, thereby preventing the textile from partially arching or crinkling, thus facilitating inkjet printing and ensuring accuracy of the inkjet printing.

[0034] In this embodiment, the digital inkjet printer further includes a movable unit 5. The movable unit 5 is configured to move in a direction perpendicular to a feeding direction of the guiding belt 42. The digital inkjet printing head 1 and the pattern collecting unit 3 are arranged on the movable unit 5. There is a certain distance between the pattern collecting unit 3 and the digital inkjet printing head 1 in the feeding direction of the guiding belt. The pattern collecting unit 3 is configured to move along with the movable unit and collects the pattern in real time. After one material feeding process is performed via the guiding belt 42, the digital inkjet printing head 1 performs inkjet printing once via the movable unit 5. In addition, the pattern collecting unit 3 collects a back pattern of the to-be-printed textile.

Second Embodiment

[0035] In this embodiment, a method for performing double-sided inkjet printing on a textile by the above digital inkjet printer is provided, which includes the following steps 1) to 7).

In step 1), a textile is arranged. The textile is adhesively spread on the guiding belt 42 of the material feeding device 4. The guiding belt 42 is arranged with a heat sensitive adhesive or a pressure sensitive adhesive, to prevent the textile from moving or crinkling.

In step 2), a target pattern is inputted and printed. The target pattern is inputted to the storage unit 21 of the control system 2. The control unit 23 transmits a printing signal to the digital inkjet printing head 1, to print the stored target pattern on a front side of the textile by the digital inkjet printing head 1, and the textile is dried. The target pattern may be inputted before performing step 1).

In step 3), the textile is inverted and is arranged. After the target pattern is printed on the front side of the textile, the textile is inverted and is arranged on the guiding belt 42, such that a back side of the textile which is not printed is arranged toward the digital inkjet printing head 1.

In step 4), a mirroring process is performed on the target pattern. The processing unit 22 performs the mirroring process on the target pattern, to obtain a mirrored target pattern, and stores the mirrored target pattern in the storage unit 21. Step 4) may be performed at any time before the back side of the

textile is printed. The mirror process may be performed on the target pattern by a computer outside this system, and the mirrored target pattern is duplicated in this system for subsequent use.

In step 5), a pattern on the textile is collected. The pattern collecting unit 3 collects a pattern on the back side of the textile which is not printed. This pattern is formed by permeation of dye from the front side of the textile to the back side of the textile, that is, a back pattern converted to the target pattern on the front side of the textile. The pattern collecting unit 3 transmits the collected back pattern to the storage unit 21.

In step 6), the mirrored target pattern is adjusted. The processing unit 22 adjusts the mirrored target pattern, to align the mirrored target pattern with the back pattern collected by the pattern collecting unit 3 (that is, feature points on the mirrored target pattern are paired with feature points on the collected back pattern and a feature point on the mirrored target pattern which is not aligned with a paired feature point on the collected back pattern is adjusted to be aligned with the paired feature point), such that an actually outputted target pattern is completely superposed with the collected pattern. In a case that the front side of the textile is printed and the back side of the textile is arranged upward on the guiding belt 42, the textile may be stretched and the pattern printed on the textile may be distorted or deformed. In this case, the processing unit 22 adjusts the mirrored target pattern based on the collected back pattern, to completely align a pattern on the back side of the textile with the pattern on the front side of the textile, thereby solving the problem in the conventional technology that it is impossible to exactly align a pattern on the back side of the textile with the pattern on the front side of the textile.

In step 7), the back side of the textile is printed. The adjusted mirrored target pattern is printed on the back side of the textile by the digital inkjet printing head 1. After step 7) is performed, a dry process may be performed as needed.

[0036] Specifically, in step 6), the processing unit 22 adjusts the mirrored target pattern through the following steps a, b and c.

In step a, multiple feature points are determined on the mirrored target pattern.

In step b, the processing unit 22 recognizes, on the back pattern collected by the pattern collecting unit 3, feature points each of which is located corresponding to one of the feature points on the mirrored target pattern and calculates a deviation between

each of the feature points obtained in step b and the corresponding one feature point obtained in step a.

In step c, the processing unit 22 adjusts the mirrored target pattern based on the deviation obtained in step b, to align each of the feature points on the mirrored target pattern with the corresponding one feature point on the back pattern collected by the pattern collecting unit 3, such that the mirrored target pattern is aligned with the back pattern collected by the pattern collecting unit 3.

[0037] In this embodiment, after step 2) is performed, a dry process is performed on the textile, to prevent a case in which subsequent processes are performed before the dye is dried, which may affects the quality of the printing.

[0038] In this embodiment, in step a, the mirrored target pattern is converted into a grayscale template before determining the feature points on the mirrored target pattern, where a resolution of a processed pattern may be 150DPI or 300DPI. With this process, pixels of the mirrored target pattern are reduced, thereby increasing a processing speed of the processing unit 22, thus improving operating efficiency. However, a color pattern may be directly used without being converted into the grayscale template, which may result in a slow recognizing speed, while have an advantage that a color pattern with any colors may be recognized (however, it is difficult to recognize a color pattern with certain colors).

[0039] In this embodiment, in step a, the feature points are determined in a manner of 0.5 to 3 feature points per square inch, and points that are easy to be aligned and positioned on the pattern are determined as features points, such as a point at a junction of lines or a corner of lines.

[0040] In this embodiment, in step c, if the deviation for aligning the mirrored target pattern with the back pattern collected by the pattern collecting unit 3 is large, it is determined whether the mirrored target pattern is aligned with the back pattern collected by the pattern collecting unit 3 through manual observation. If it is determined that the mirrored target pattern is not aligned with the back pattern collected by the pattern collecting unit 3, the mirrored target pattern is adjusted manually through manual intervention, to align each of the feature points on the mirrored target pattern with the corresponding one feature point on the back pattern collected by the pattern collecting unit 3. In order to align the feature point on the mirrored target pattern with the corresponding one feature point on the back pattern collected by the pattern collecting unit 3, the above manual observation process may be replaced by an automatic detection and an automatic skip process performed by the processing unit 22.

[0041] Preferably, in step a, the feature points are determined in a manner of one feature point per square inch. A large number of feature points may lead to a high

accuracy in alignment, while result in a large calculating amount.

[0042] In this embodiment, multiple mirrored target patterns may be spread flat and successively, to achieve continuous printing, thereby improving printing efficiency.

Third Embodiment

[0043] As shown in Figure 4, a textile is provided in this embodiment. The textile has a front printed pattern and a back printed pattern. The front printed pattern is arranged on a front side of the textile and the back printed pattern is arranged on a back side of the textile, and the front printed pattern and the back printed pattern are aligned with each other. The front printed pattern and the back printed pattern are formed with the method for performing double-sided inkjet printing described in the second embodiment.

[0044] In this embodiment, the front printed pattern has feature points, and the back printed pattern has feature points located respectively corresponding to the feature points on the front printed pattern.

[0045] In this embodiment, the textile may be applied for producing silk scarves, scarves, cloths or the like.

[0046] The above description in this specification is merely for illustrating the present disclosure. Those skilled in the art may make various modifications or additions to the specific embodiments described above or replace the specific embodiments described above in a similar manner without departing from the scope of this specification or beyond the scope of the claims, all should fall within the scope of protection of the present disclosure.

Claims

1. A method for performing double-sided inkjet printing on a textile by a digital inkjet printer, wherein the digital inkjet printer comprises:

a digital inkjet printing head configured to perform inkjet printing based on a target pattern;
 a control system comprising a storage unit, a processing unit and a control unit, wherein the storage unit is configured to store data, the processing unit is configured to receive, process and transmit data, and the control unit is configured to control the processing unit to process the data and transmit a printing signal;
 a pattern collecting unit configured to collect a pattern on the textile and transmit the collected pattern to the storage unit of the control system;
 and
 a material feeding device comprising a rack and a guiding belt arranged on the rack, wherein a printing region is arranged on the guiding belt,

and the digital inkjet printing head is arranged above the printing region, and wherein the method comprises:

- 1) inputting a target pattern for performing double-sided inkjet printing to the storage unit of the control system;
- 2) performing a mirroring process on the target pattern to obtain a mirrored target pattern, and storing the mirrored target pattern in the storage unit;
- 3) arranging the textile in the printing region of the guiding belt, transmitting a printing signal to the digital inkjet printing head by the control unit, and printing the stored target pattern on a front side of the textile by the digital inkjet printing head, to form a front printed pattern;
- 4) inverting the textile and arranging the inverted textile on the guiding belt, collecting, by the pattern collecting unit, a back pattern on a back side of the textile which is formed by permeation and is inverted to the front printed pattern on the front side of the textile, and transmitting the collected back pattern to the storage unit by the pattern collecting unit;
- 5) adjusting the mirrored target pattern obtained in step 2) by the processing unit, to align the mirrored target pattern with the back pattern collected by the pattern collecting unit; and
- 6) printing the adjusted mirrored target pattern on the back side of the textile by the digital inkjet printing head.

2. The method for performing double-sided inkjet printing on a textile by a digital inkjet printer according to claim 1, wherein in step 5), the adjusting the mirrored target pattern by the processing unit comprises:

- a. determining a plurality of feature points on the mirrored target pattern;
- b. recognizing, by the processing unit and on the back pattern collected by the pattern collecting unit, feature points each of which is located corresponding to one of the plurality of feature points on the mirrored target pattern, and calculating a deviation between each of the feature points obtained in step b and the corresponding one feature point obtained in step a; and
- c. adjusting, by the processing unit, the mirrored target pattern based on the deviation obtained in step b, to align each of the feature points on the mirrored target pattern with the corresponding one feature point on the back pattern collected by the pattern collecting unit, to align the mirrored target pattern with the back pattern col-

lected by the pattern collecting unit.

3. The method for performing double-sided inkjet printing on a textile by a digital inkjet printer according to claim 1, further comprising:
after step 3), performing a dry process on the textile. 5
4. The method for performing double-sided inkjet printing on a textile by a digital inkjet printer according to claim 2, wherein in step a, before determining the feature points on the mirrored target pattern, the mirrored target pattern is converted into a grayscale template. 10
5. The method for performing double-sided inkjet printing on a textile by a digital inkjet printer according to claim 1, wherein the pattern collecting unit is a scanning device or a camera. 15
6. The method for performing double-sided inkjet printing on a textile by a digital inkjet printer according to claim 1, wherein the guiding belt is arranged with a heat sensitive adhesive or a pressure sensitive adhesive, to spread the textile flat on the guiding belt. 20
7. The method for performing double-sided inkjet printing on a textile by a digital inkjet printer according to claim 2, wherein in step a, the feature points are determined in a manner of 0.5 to 3 feature points per square inch, points that are easy to be aligned and positioned on the mirrored target pattern are determined as the feature points, and no feature point is determined at a region of a single color on the mirrored target pattern in which the mirrored target pattern has no change. 25 30 35
8. The method for performing double-sided inkjet printing on a textile by a digital inkjet printer according to claim 1, wherein the digital inkjet printer further comprises a movable unit configured to be movable in a direction perpendicular to a feeding direction of the guiding belt, and wherein
the digital inkjet printing head and the pattern collecting unit are arranged on the movable unit, and
the pattern collecting unit is configured to move along with the movable unit and collect the back pattern in real time. 40 45
9. The method for performing double-sided inkjet printing on a textile by a digital inkjet printer according to claim 2, wherein in step c, in a case that the deviation for aligning the mirrored target pattern with the back pattern collected by the pattern collecting unit is large, it is determined whether the mirrored target pattern is aligned with the back pattern collected by the pattern collecting unit through manual observation,
if it is determined that the mirrored target pattern is 50 55

not aligned with the back pattern collected by the pattern collecting unit, the mirrored target pattern is adjusted manually through manual intervention, to align each of the feature points on the mirrored target pattern with the corresponding one feature point on the back pattern collected by the pattern collecting unit.

10. The method for performing double-sided inkjet printing on a textile by a digital inkjet printer according to claim 7, wherein in step a, the feature points are determined in a manner of one feature point per square inch, no feature point is determined in a blank region or a region with a large area background color, and a point at a position required to be aligned is determined as a feature point.
11. A textile comprising a front printed pattern and a back printed pattern, wherein
the front printed pattern is arranged on a front side of the textile and the back printed pattern is arranged on a back side of the textile, and the front printed pattern and the back printed pattern are aligned with each other, and wherein
the front printed pattern and the back printed pattern are formed with the method for performing double-sided inkjet printing on a textile by a digital inkjet printer according to any one of claims 1 to 10.
12. The textile according to claim 11, wherein the front printed pattern has feature points, and the back printed pattern has feature points located respectively corresponding to the feature points on the front printed pattern.

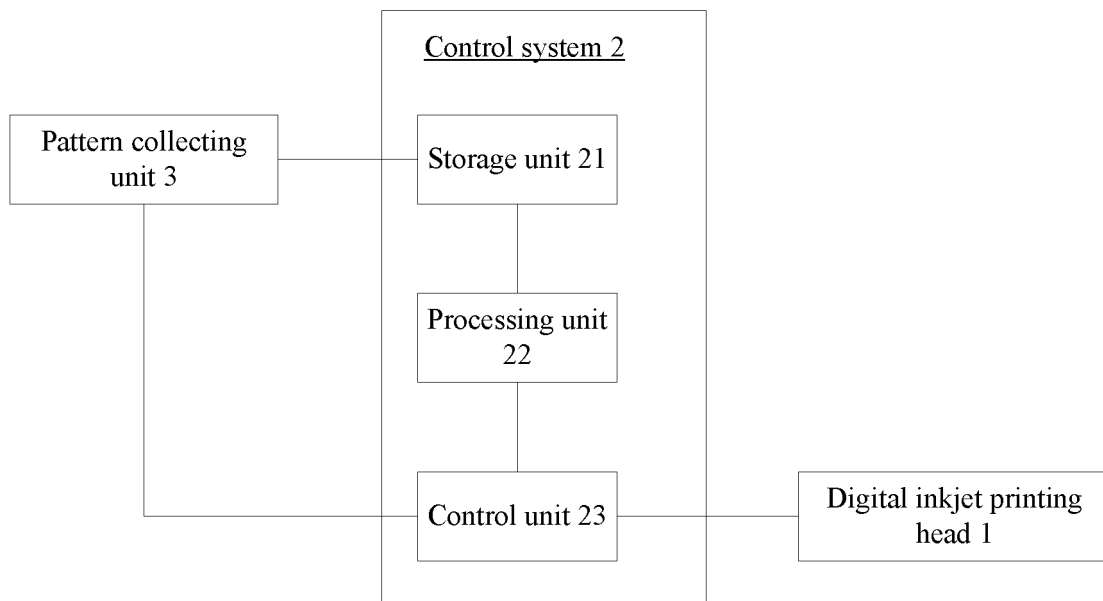


Figure 1

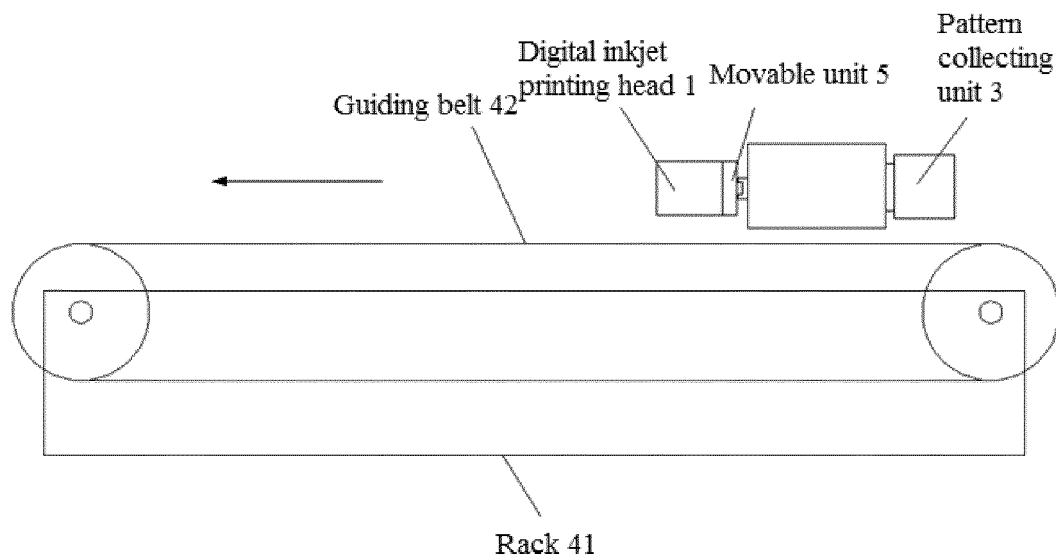


Figure 2

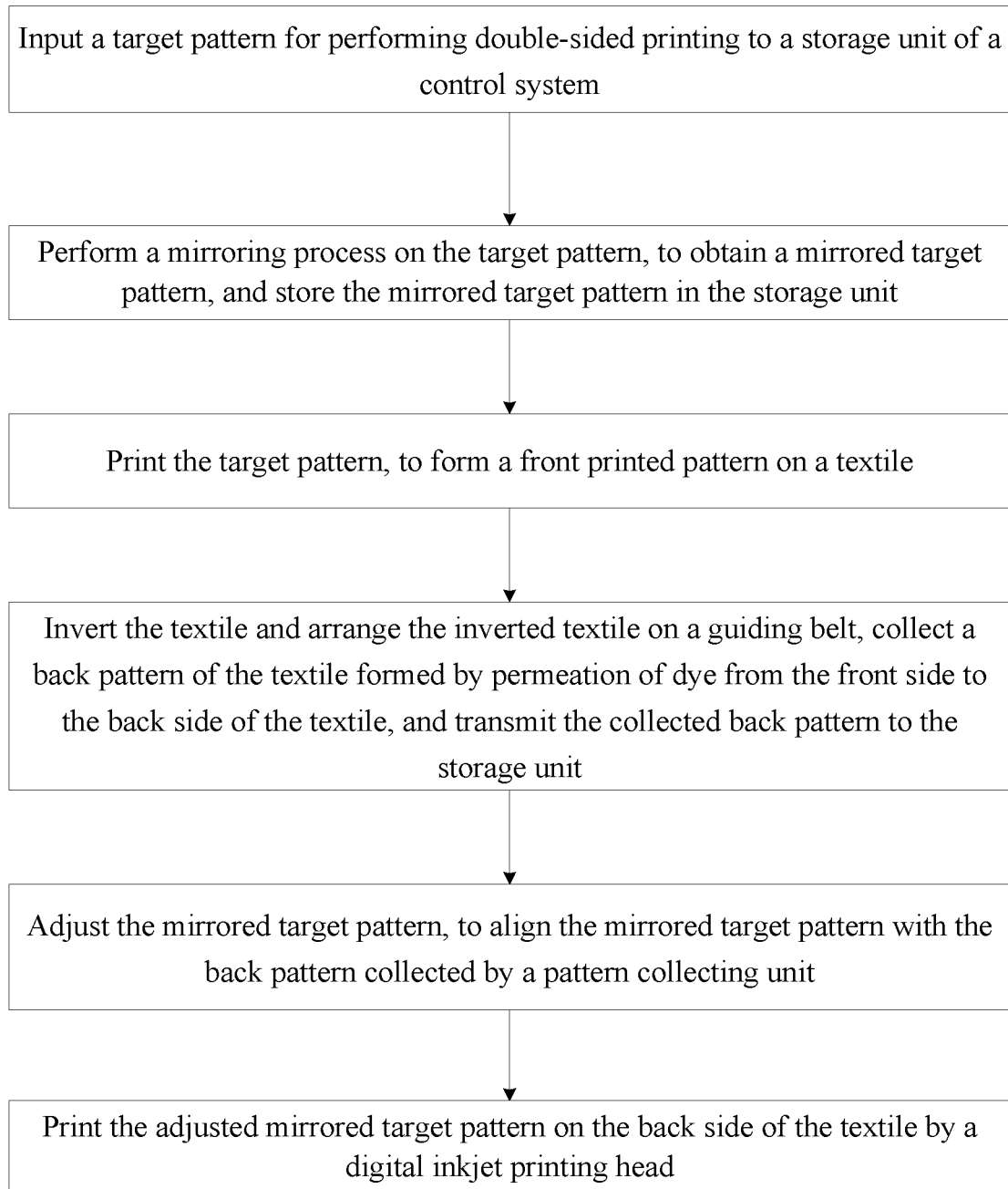


Figure 3

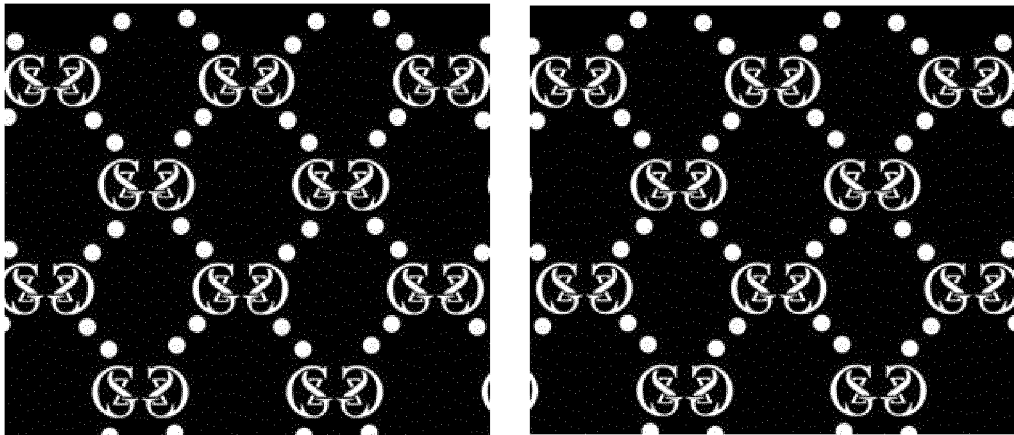


Figure 4

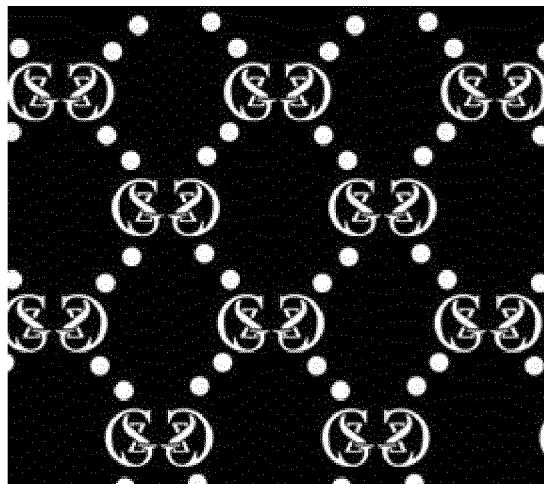


Figure 5

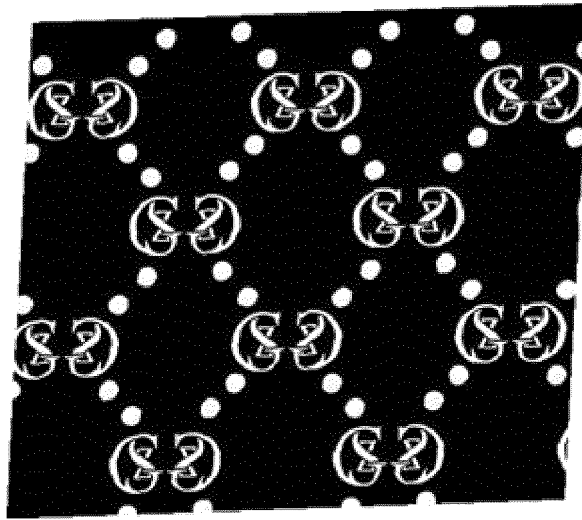


Figure 6

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2018/118878

A. CLASSIFICATION OF SUBJECT MATTER

B41J 2/01(2006.01)i; B41J 29/38(2006.01)i; D06P 5/30(2006.01)i

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)

B41J; 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)

CNABS, VEN, CNKI: 喷印, 喷墨, 印花, 印染, 打印, 纺织, 织物, 双面, 正反, 镜像, 翻转, 反面, 反向, 校准, 对准, ink?jet+, print+, spray+, textile, fabric, cloth, double?side?, two?side?, mirror?, revers+, align+, match+

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PX	CN 108032620 A (HANGZHOU HONGHUA DIGITAL TECHNOLOGY STOCK CO., LTD.) 15 May 2018 (2018-05-15) description, paragraphs [0030]-[0048], and figures 1-6	1-12
A	CN 102729627 A (SHENZHEN RUNTIANZHI DIGITAL EQUIPMENT CO., LTD.) 17 October 2012 (2012-10-17) description, paragraphs [0052]-[0092], and figures 1-6	1-12
A	CN 106696482 A (PEKING UNIVERSITY FOUNDER GROUP CO., LTD. ET AL.) 24 May 2017 (2017-05-24) entire document	1-12
A	CN 1438120 A (LIANG, JIAN) 27 August 2003 (2003-08-27) entire document	1-12
A	CN 101164791 A (LIANG, JIAN) 23 April 2008 (2008-04-23) entire document	1-12
A	CN 205255775 U (HANGZHOU HONGHUA DIGITAL TECHNOLOGY STOCK CO., LTD.) 25 May 2016 (2016-05-25) entire document	1-12

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

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"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

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"&" document member of the same patent family

Date of the actual completion of the international search

03 March 2019

Date of mailing of the international search report

12 March 2019

Name and mailing address of the ISA/CN

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INTERNATIONAL SEARCH REPORT

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PCT/CN2018/118878

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C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 2015139463 A1 (LIANG, JIAN) 24 September 2015 (2015-09-24) entire document	1-12
A	EP 3056348 A1 (MIMAKI ENGINEERING CO., LTD.) 17 August 2016 (2016-08-17) entire document	1-12

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

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Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
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REFERENCES CITED IN THE DESCRIPTION

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