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(54) Title: A TEXTURING MACHINE AND A METHOD FOR ASSOCIATING SPINNING END PRODUCT DATA WITH TEXTURING END PRODUCT DATA THEREON

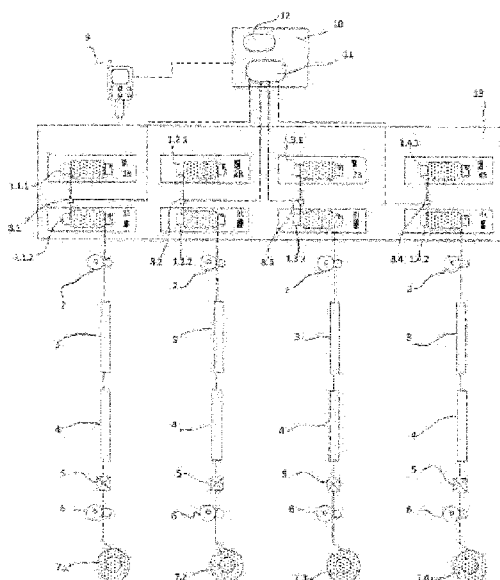


Fig.1

(57) Abstract: Present invention discloses a texturing machine, including a machine controller for controlling a texturing machine and a precursor fiber frame for placing multiple spinning end products. The texturing machine further includes an association system which is used to associate spinning end product data with texturing end product data; wherein, the association system includes: a recognition equipment electrically connected with the machine controller so as to input positional data of the spinning end products; a detection device electrically connected with the machine controller so as to detect connecting knots among adjacent said spinning end products; a matching module embedded inside the machine controller so as to match positional data of texturing end products with positional data of the spinning end products; wherein, the detection device communicates with the matching module. On such a basis, complete original source of texturing end products can be obtained and recorded.

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A texturing machine and a method for associating spinning end product data with texturing end product data thereon

Technical field

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Present invention relates to a texturing machine including an association system capable of associating spinning end product data with texturing end product data, and a method for achieving the same on the texturing machine.

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Background art

Melt spinning and winding apparatus spins out and quenches melt into filaments, which are to be drawn and wound into spinning end product as so-called “pre-oriented yarn”. Texturing apparatus heats, cools and false-twists spinning end product, until winding it into a texturing end product as so-called “draw-textured yarn”.

Multiple factors can be found throughout the process from melt spinning winding to texturing formation, that influence quality of resultant yarn, including influencing factors with each process device of texturing apparatus as well as influencing factors with each process device of melt spinning winding apparatus.

25 Known existing technology, such as WO2016120187, describes a method and an apparatus able to associate texturing apparatus with melt spinning and winding apparatus, so that end data group of texturing end product demonstrates whole manufacturing history.

While achieving method and system of above-mentioned kind, it is necessary to consider corresponding relation between spinning end product and texturing end product in actual production.

5 Contents of Invention

Based on aforementioned technical problem with existing technology, present invention discloses a texturing machine and a method to associate spinning end product data and texturing end product data, so as to configure an apparatus and a method able to associate spinning end product data and texturing end product data in an updating fashion. Technical solutions are as following:

As the first technical solution, a texturing machine, includes a machine controller for controlling a texturing machine and a precursor fiber frame for placing multiple spinning end products, the texturing machine further includes an association system which is used to associate spinning end product data with texturing end product data; wherein, the association system includes: a recognition equipment electrically connected with the machine controller so as to input positional data of the spinning end products; a detection device electrically connected with the machine controller so as to detect connecting knots among adjacent said spinning end products; a matching module embedded inside the machine controller so as to match positional data of texturing end products with positional data of the spinning end products; wherein, the detection device communicates with the matching module.

As starting point of whole texturing treatment flow, spinning end products are placed on precursor fiber frame, and are turned into texturing end prod-

uct after being treated in texturing machine. In order to ensure production continuity multiple spinning products are placed adjacently and have their yarn heads/tails connected successively, to achieve uninterrupted yarn supply. After input of spinning end product positional data and matching of the
5 matching module, initially one texturing end product corresponds to one spinning end product. With detection of connecting knot by the detection device, the matching module updates matching relation, by which, one texturing end product corresponds to multiple spinning end products. On such a basis complete original source of texturing end products are to be ob-
10 tained and recorded.

Further, as preferred data of the spinning end product positional data, the second technical solution is, the positional data of spinning end product includes original positional data of spinning end product and placing data of
15 each spinning end product on the precursor fiber frame. The spinning end product original positional data is information concerning generation of the spinning end product, for instance, the spinning end product is produced at a certain time at a certain spinning factory. The placing data is information about where the spinning end product is placed on precursor fiber
20 frame, namely position of each precursor fiber position of each precursor fiber frame. The matching module matches position of precursor fiber position of precursor fiber frame with winding position of texturing machine.

For the sake of easy input of said data, as the third technical solution, each
25 said spinning end product corresponds to one spinning end product recognition tag; each precursor fiber position of the precursor fiber frame for placing the spinning end products corresponds to one position recognition tag. The recognition equipment is able to directly recognize and input the recognition tag.

As the fourth technical solution, the machine controller is equipped with a display interface able to display the matched data. The display interface is able to visually present matching relation between the spinning end product
5 and the texturing end product, which makes such an data easier for operators to obtain.

Likewise, in order to solve technical problem with existing technology, the fifth technical solution provides a method to associate spinning end product
10 data and texturing end product data on texturing machine, wherein, a recognition equipment communicated with a machine controller is used to recognize and input data, the associating method successively includes following steps: firstly, the recognition equipment inputs positional data of the spinning end products; secondly, the input positional data of the spinning end
15 products is transferred to the machine controller; thirdly, after texturing end product starts production, the machine controller establishes matching between positional data of texturing end products and positional data of spinning end products; fourthly, a detection device communicated with the machine controller detects connecting knots between adjacent spinning end
20 products, and transfers connecting knots data to the machine controller; fifthly, basing on the connecting knots data, the machine controller updates matching relationship between positional data of texturing end products and positional data of spinning end products.

25 Method of this technical solution enables the machine controller to establish matching relation between the spinning end product positional data and the texturing end product positional data and to update the matching relation. Corresponding relation between spinning end product and texturing end

product is real-time updated, so that complete original source of texturing end product is traceable.

5 As sixth technical solution, during execution of the first step, the scanning equipment recognizes and inputs placing data of each spinning end product on the precursor fiber frame and original positional data of spinning end product.

10 As seventh technical solution, before execution of the first step, each said spinning end product is stuck with a spinning end product recognition tag, each precursor fiber position of the precursor fiber frame is stuck with a position recognition tag.

Description of Figures

15

Figure 1 schematically shows structural diagram of texturing machine of present invention;

Figure 2 schematically shows partial diagram of precursor fiber position of precursor fiber frame placing spinning end product.

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Modes for Carrying out the Invention

25 The function to be achieved by texturing machine is to treat yarns of spinning end product with necessary processes, and to finally wind yarns into texturing end product. The spinning end product, as raw material of texturing machine, is produced by a spinning apparatus at upstream of texturing technology. The spinning apparatus filters, spins out and quenches melts into filaments, which are then lubricated and wound into spinning end product. The spinning end product needs to be further processed in the tex-

turing machine so that yarns are given with a characterized property directly applicable at downstream weaving technology. Each set of texturing machine has several hundreds of working positions, each of which singularly processes one yarn.

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Figure 1 schematically shows texturing machine seeking protection by present invention, and also schematically shows an association system for associating spinning end product data and texturing end product data. Embodiment shown in figure 1 only shows four working positions. Reference sign 10 13 represents precursor fiber frame whose structure is shown only for schematic purpose. The precursor fiber frame 13 has multiple precursor fiber positions 1L, 1R, 2L, 2R, 3L, 3R, 4L, 4R, each of which is for placement of one spinning end product. Yarn of the spinning end product is drawn out by active delivery of the first delivery device 2, which, in present embodiment, is configured as a clamping structure. Yarn is delivered between 15 two clamping rollers. The drawn yarn then enters into a heat treatment device 3 for purpose of heat treatment, after which the yarn enters into a cooling treatment device 4 for cooling treatment. A false-twist treatment device 5, which is at downstream side of the cooling treatment device 4, imposes 20 false-twist treatment onto the yarns. Under joint effect of the heat treatment device 3, the cool treatment device 4 and the false-twist treatment device 5, the yarn is given a crimping characteristic. Subsequently, the yarn enters into a second delivery device 6 which has a similar structure as the first delivery device 2. Due to that the second delivery device 6 has a faster speed 25 than the first delivery device 2 the yarn is drawn. In the end the yarn is wound into formation on a winding device. Structure and principle of above-listed yarn treatment devices are already known in texturing field, therefore no detailed descriptions are necessary to be provided.

In order to improve continuity of texturing treatment and avoid unnecessary repetitive operations, multiple spinning end products have their yarn head and yarn tail connected successively to form continuous yarn output from spinning end products. As shown in figure 1, yarn tail of spinning end product 1.1.2 is connected with yarn head of spinning end product 1.1.1. The spinning end product 1.1.1 is placed on precursor fiber position 1R and the spinning end product 1.1.2 is placed on precursor fiber position 1L. The connecting position between the spinning end product 1.1.1 and the spinning end product 1.1.2 is formed with a connecting knot. Yarn of the spinning end product 1.1.2 at precursor fiber position 1L will be firstly unwound, then enters into first delivery device 2 and following treatment devices. As soon as spinning end product 1.1.2 finishes unwinding, spinning end product 1.1.1 on precursor fiber position 1R follows to be unwound, whereby raw materials are uninterruptedly provided to produce texturing end product 7.1. Due to above-mentioned circumstance it is often seen that one texturing end product is produced by several different spinning end products. In the case of tracing original source of texturing end product, it is critical to consider such a situation so that complete historic data can be obtained.

20

Basing on above-mentioned technical background, texturing machine of present invention further has a machine controller 10 and an association system for associating spinning end product data and texturing end product data. What is not explicitly indicated in the figure is that, as main control end of one set of texturing machine, the machine controller 10 is able to control and monitor all yarn treatment devices of texturing machine in a singular and/or sectional manner. The association system includes a recognition equipment 9 and a detection device 8.1-8.4 which are electrically

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connected with the machine controller 10, and a matching module 11 embedded within the machine controller 10.

Figure 2 schematically shows partial schematic diagram of precursor fiber position of precursor fiber frame placed with spinning end product. During phase of production finish of spinning end product, inner side of tube of spinning end product is stuck with an exclusive spinning end product recognition tag 15. The spinning end product recognition tag 15 encodes original positional data of the spinning end product, such as factory information including manufacturer and finish time information. Such kind of spinning end product original positional data can be immediately readable by the recognition equipment 9. Each precursor fiber position of the precursor fiber frame 13 is stuck with an exclusive position recognition tag 14. The position recognition tag 14 encodes positional data of the precursor fiber position. For example, 1L is first working position's precursor fiber position placing a spinning end product which unwinds yarn firstly, 1R is first working position's precursor fiber position placing a spinning end product connected with a spinning end product on 1L; 2L and 2R are precursor fiber positions on second working position; 3L and 3R are precursor fiber positions on third working position; 4L and 4R are precursor fiber positions on fourth working position.

The recognition equipment 9 is preferably chosen as being portable, able to have wireless communication with the machine controller 10 via internet. After the spinning end product is placed onto precursor fiber position of the precursor fiber frame 13, the recognition equipment 9 is able to recognize and input the spinning end product recognition tag 15 and the position recognition tag 14, then transfer spinning end product positional data to the machine controller 10.

Upon receipt of the spinning end product positional data, the matching module 11 of the machine controller 10 establishes a match between texturing end product positional data and the spinning end product positional data so as to obtain corresponding relation between texturing end product and a spinning end product, for instance, currently, only spinning end product 1.1.2 is used to produce texturing end product 7.1. If the spinning end product 1.1.2 is sufficient to sustain production of two texturing end products, in event of low quality grade of the texturing end product 7.1 and another texturing end product, the problem can be traced back to the spinning end product 1.1.2 historic data such as factory information.

Further, each working position is assigned with a detection device 8.1, 8.2, 8.3, 8.4, which is disposed between two connected spinning end products. The detection device 8.1 is disposed between the spinning end product 1.1.1 and the spinning end product 1.1.2. According to yarn advancing direction, connecting knot between the spinning end product 1.1.1 and the spinning end product 1.1.2 is positioned at upper stream side of the detection device 8.1. Yarn travels through the detection device 8.1 so that the detection device 8.1 performs real-time detection of the connecting knot. At the occasion of detected connecting knot by the detection device 8.1, the detection device 8.1 sends an electric signal to the matching module 11 of the machine controller 10, by means of which the matching module updates matching relation between the spinning end product positional data and the texturing end product positional data, further leading to obtainment of new corresponding relation between texturing end product and spinning end product. For example, when the detection device 8.1 detects the connecting knot between the spinning end product 1.1.1 and the spinning end product 1.1.2, it is obtainable that the spinning end product 1.1.1 and the spinning

end product 1.1.2 are jointly used to produce the texturing end product 7.1. In case of quality problem found with texturing end product 7.1, respective historic data including factory information of both spinning end products 1.1.1, 1.1.2 are traceable. Similarly, spinning end products 1.2.1, 1.2.2 are jointly used to produce texturing end product 7.2, spinning end products 1.3.1, 1.3.2 are jointly used to produce texturing end product 7.3, spinning end products 1.4.1, 1.4.2 are jointly used to produce texturing end product 7.4.

- 10 In order to visually display corresponding relation between the spinning end product and the texturing end product, the machine controller 10 is configured with a display interface 12.

Recognizing principle of the recognition equipment 9 could adopt a barcode or QR code scanning method, or a Near Field Communication method.

Additionally, steps to achieve method for associating spinning end product data and texturing end product data are as following.

- 20 As first step, inner side of the spinning end product is stuck with a spinning end product recognition tag 15, which is often done in spinning production area. The spinning end product recognition tag 15 encodes its spinning end product original positional data including factory information. Meanwhile, each precursor fiber position of the precursor fiber frame 13 is stuck with position recognition tag 14 which encodes positional data of precursor fiber position to define sequence of the precursor fiber position in one set of texturing machine. Different precursor fiber positions for providing yarns to the same working position are defined as belonging to the same group. Taking 2L and 2R for example, spinning end product 1.2.2 on 2L firstly sup-

plies yarns to second working position, then spinning end product 1.2.1 on 2R rallies to supply yarns to second working position after prior spinning end product 1.2.2 finishes unwinding.

- 5 As second step, the recognition equipment 9 in communication with the machine controller is used to successively recognize the spinning end product recognition tag 15 and the position recognition tag 14 corresponding to the precursor fiber position placing the spinning end product, then to input the spinning end product positional data. The spinning end product positional data includes spinning end product original positional data, namely
10 factory information, as well as placement data of each spinning end product on the precursor fiber frame, namely precursor fiber position data.

- As third step, after production of texturing end product starts, matching
15 module 11 of the machine controller 10 establishes matching relation between texturing end product positional data and the spinning end product positional data, so as to establish corresponding relation between the texturing end products and the spinning end products used to produce the texturing end products.

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As fourth step, the detection device 9 communicating with the machine controller 10 performs real-time detection of connecting knot between two adjacent spinning end products, and transfers the connecting knot information to the machine controller 10;

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As fifth step, basing on the information of connecting knot, the matching module 11 of the machine controller 10 updates matching relation between texturing end product positional data and the spinning end product positional data, which leads to updating further corresponding relation between the

texturing end product and the spinning end product used to produce said texturing end product.

As sixth step, display interface 12 of the machine controller 10 displays
5 corresponding relation between the spinning end product and the texturing end product which is produced out of the spinning end product.

Establishment of above-mentioned matching relation and real-time update
of the matching relation can help to trace back yarn's complete historic da-
10 ta, then possible source of problem can be found.

Claims

1. A texturing machine, including a machine controller for controlling a
texturing machine and a precursor fiber frame for placing multiple spin-
5 ning end products,
characterized in that,
the texturing machine further includes an association system which is
used to associate spinning end product data with texturing end product
data;
10 wherein, the association system includes:
a recognition equipment electrically connected with the machine con-
troller so as to input positional data of the spinning end products;
a detection device electrically connected with the machine controller so
as to detect connecting knots among adjacent said spinning end prod-
15 ucts;
a matching module embedded inside the machine controller so as to
match positional data of texturing end products with positional data of
the spinning end products;
wherein, the detection device communicates with the matching module.
20
2. The texturing machine of claim 1,
characterized in that,
the positional data of spinning end product includes original positional
data of spinning end product and placing data of each spinning end
25 product on the precursor fiber frame.
3. The texturing machine of claim 2,
characterized in that,
each said spinning end product corresponds to one spinning end product

recognition tag;

each precursor fiber position of the precursor fiber frame for placing the spinning end products corresponds to one position recognition tag.

- 5 4. The texturing machine of either one from claim 1 to claim 3,
characterized in that,
the machine controller is equipped with a display interface able to display the matched data.
- 10 5. A method for associating spinning end product data with texturing end product data on a texturing machine, wherein, a recognition equipment communicated with a machine controller is used to recognize and input data,
characterized in that,
- 15 the associating method successively includes following steps:
firstly, the recognition equipment inputs positional data of the spinning end products;
secondly, the input positional data of the spinning end products is transferred to the machine controller;
- 20 thirdly, after texturing end product starts production, the machine controller establishes matching between positional data of texturing end products and positional data of spinning end products;
fourthly, a detection device communicated with the machine controller detects connecting knots between adjacent spinning end products, and
- 25 transfers connecting knots data to the machine controller;
fifthly, basing on the connecting knots data, the machine controller updates matching relationship between positional data of texturing end products and positional data of spinning end products.

6. The method of claim 5,
characterized in that,
during execution of the first step, the scanning equipment recognizes
and inputs placing data of each spinning end product on the precursor
5 fiber frame and original positional data of spinning end product.
7. The method of claim 6,
characterized in that,
before execution of the first step, each said spinning end product is stuck
10 with a spinning end product recognition tag, each precursor fiber position of the precursor fiber frame is stuck with a position recognition tag.

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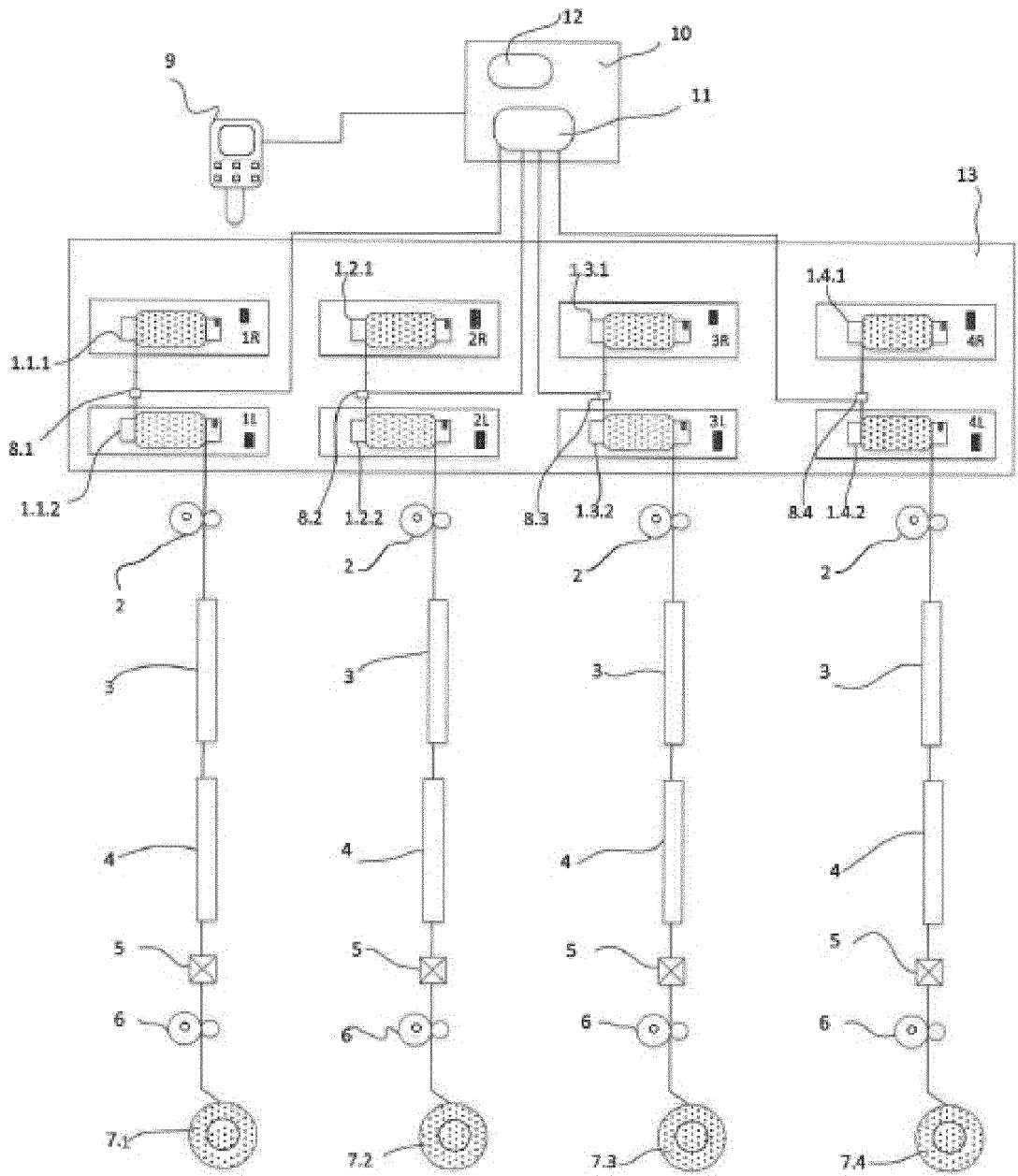


Fig.1

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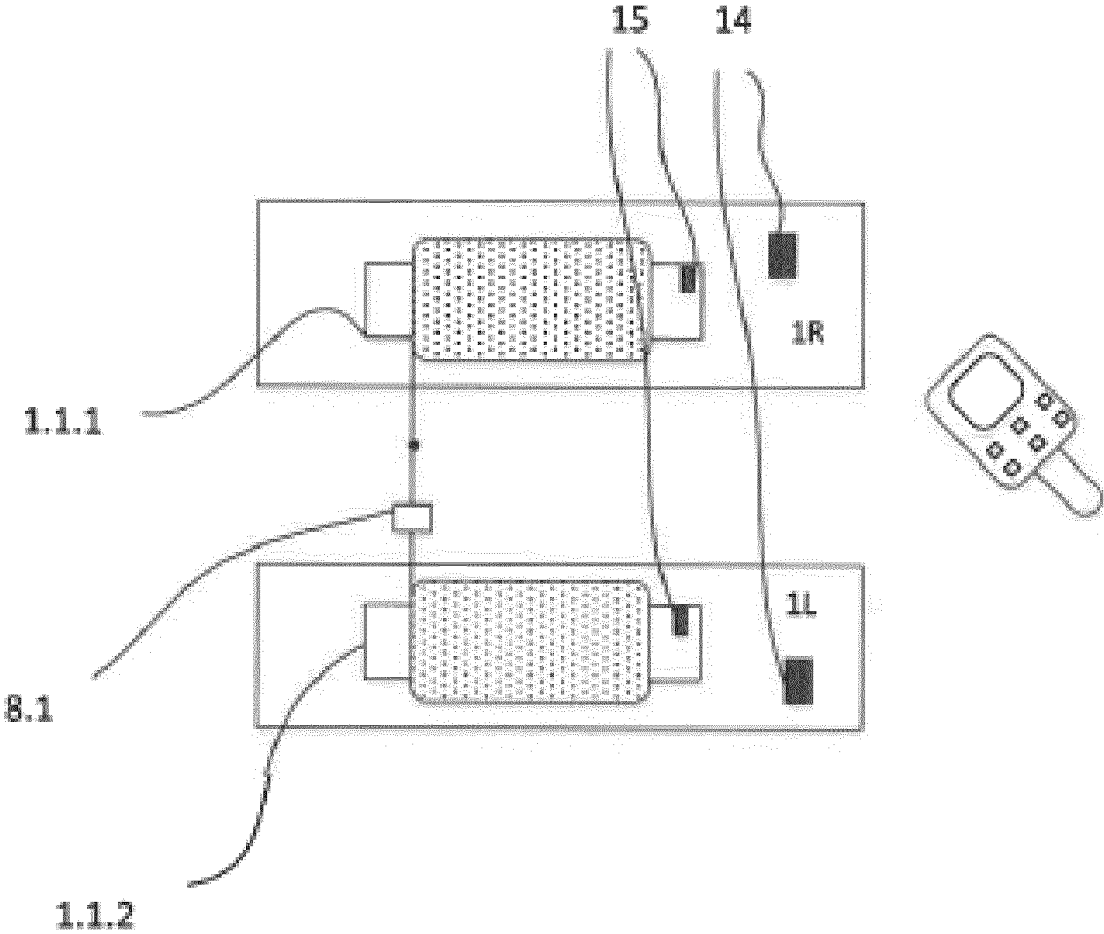


Fig.2

INTERNATIONAL SEARCH REPORT

International application No

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A. CLASSIFICATION OF SUBJECT MATTER
 INV. G05B23/02
 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)

G05B B65H D01H

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, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 2016/120187 A1 (OERLIKON TEXTILE GMBH & CO KG [DE]) 4 August 2016 (2016-08-04) cited in the application page 1, line 21 - page 2, line 15 page 3, line 22 - page 4, line 6 page 5, line 26 - page 7, line 7 page 7, line 20 - page 8, line 6 page 8, line 26 - page 14, line 14 page 15, lines 1-22 figures 1,2 ----- -/-	1-7



Further documents are listed in the continuation of Box C.



See patent family annex.

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INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2019/085959

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
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INTERNATIONAL SEARCH REPORT

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