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(54) **A MACHINE FOR THE CONTINUOUS DECATISING OF FABRICS**

(57) A machine for the continuous decatizing of fabrics (T) comprising at least one decatizing cylinder (3), at least one transport unit (14) and at least one treatment container (4) partially wrapped around the decatizing cylinder (3) and adapted at least to distribute steam under pressure for the processing of the fabric (T). The container (4) has at least one concave surface portion (7) that identifies with at least one respective outer surface portion (8) of the decatizing cylinder (3) a processing channel (11) in which the fabric (T) is treated with the

distributed steam under pressure. This processing channel (11) being open laterally so as to allow the outflow of the steam out of the processing channel (11). The treatment container (4) is further wrapped around the decatizing cylinder (3) so that the processing channel (11) of the fabric (T) develops along the outer surface (8) of the decatizing cylinder (3) substantially for an arc of circumference subtending an angle at the centre of the decatizing cylinder (3) greater than 180°.

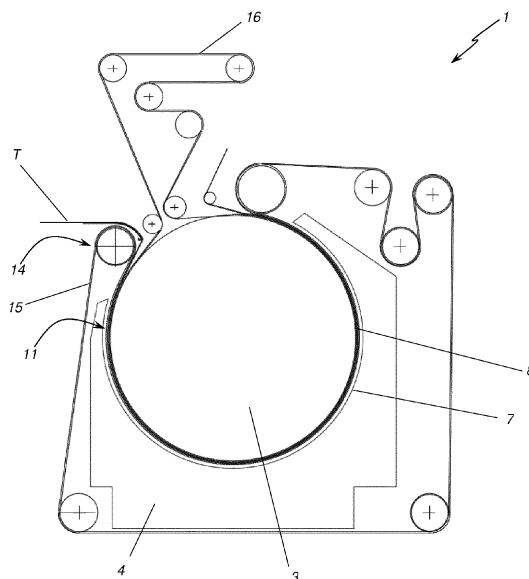


FIG. 1

Description

Field of application

[0001] The present invention is generally applicable to the textile sector and it particularly relates to a machine for the continuous decatizing of fabrics.

Prior art

[0002] In the field of fabric treatment, the decatizing technique, also called blowing, is known, which consists in exposing the fabrics to water steam.

[0003] In the fabric production cycle, this technique therefore fulfils the ironing task. In particular, the decatizing operations involve wrapping the fabrics around a decatizing cylinder, typically with the aid of a sub-piece, and at the same time exposing them to steam for ironing.

[0004] Decatizing is a fundamental operation for the surface and the packaging of the fabrics, it then allows to remove the starch from the fabric in order to obtain supporting characteristics such as softness, crease-resistance and discreet shine. In addition, through this process the fabrics are stabilized and are also more robust, unshrinkable and less prone to creases.

[0005] The process variables that are involved in a decatizing operation are: fundamental physical variables (time, temperature, moisture content in the fabric), mechanical pressure and other operating modes such as, for example, nature of the sub-piece, direction of the steam passage and thermal shock.

[0006] In addition to this, the effects produced on the fabrics following the decatizing operation vary depending on the different types of machinery that are generally divided into two fundamental types: discontinuous decatizing and continuous decatizing.

[0007] Discontinuous decatizing is generally carried out in an autoclave and involves processing one piece of fabric at a time. Thanks to the high temperatures, the "setting" effect on the fabric is decidedly more permanent than with operations at atmospheric pressure.

[0008] However, discontinuous decatizing is a very slow and, consequently, expensive process and also has the major fault of head-tail irregularity, i.e. of obtaining a fabric whose initial portion is treated differently from the final one. In other words, by discontinuous decatizing there is no uniform treatment of the entire processed piece of fabric.

[0009] As far as continuous decatizing is concerned, it allows the fabric to be processed in a continuous cycle with a faster speed and, therefore, at a lower cost than the discontinuous process.

[0010] However, the processing speed is dictated by a path useful for the limited treatment that does not allow to treat the fabrics adequately. In fact, by continuous decatizing the processing is less effective and the treated fabric is of a lower quality.

Presentation of the invention

[0011] Aim of the present invention is to make available a machine for the continuous decatizing that allows to at least partially overcome the drawbacks highlighted above.

[0012] In particular, aim of the present invention is to make available a machine for the continuous decatizing adapted to decatize fabrics in a uniform manner.

[0013] Another aim of the present invention is to make available a machine for the continuous decatizing that allows to treat the fabrics so as to obtain a better result than the known equivalent devices.

[0014] In particular, aim of the present invention is to make available a machine for the continuous decatizing that allows to improve the stability of the fabrics by limiting the treatment times and, consequently, the costs with respect to what is obtained with devices present in the prior art.

[0015] The aforementioned purposes, as well as others that will appear more clearly hereinafter, are achieved by a machine for the continuous decatizing of fabrics in accordance with the claims that follow which are to be considered an integral part of the present patent.

[0016] In particular, it comprises at least one decatizing cylinder and at least one treatment container that is partially wrapped around the cylinder itself.

[0017] This treatment container is adapted to distribute steam under pressure for the processing of the fabric and has at least one concave surface portion that identifies with at least a respective outer surface portion of the decatizing cylinder a processing channel in which the fabric is treated with the steam under pressure.

[0018] Furthermore, the aforesaid processing channel is open laterally, typically but not necessarily on two sides, so as to allow the outflow of the steam out of the channel itself.

[0019] According to another aspect of the invention, the decatizing machine also comprises at least one transport unit shaped to move the fabric through the processing channel.

[0020] According to a further aspect of the invention, the treatment container wraps the cylinder so that the processing channel of the fabric develops along the outer surface substantially for an arc of circumference subtending an angle at the centre of the cylinder itself greater than 180°.

[0021] In other words, the processing channel formed by the concave surface of the treatment container and by the outer surface of the cylinder defines a path, in which the fabric is treated by the distributed steam, which develops for a surface of the cylinder that is greater than half of its semiperimeter.

[0022] According to what has been said, it appears that the processing channel of the machine of the invention is advantageously longer than the known equivalent devices which, in fact, generally have a treatment tank that develops so as to define a processing surface that iden-

tifies an arc of circumference subtending an angle at the centre equal to or less than 180°.

[0023] Consequently, the treatment time of the fabric increases and advantageously improves the surface and the stability compared to the fabrics processed with known equivalent devices.

[0024] Moreover, since the decatizing is of the continuous type, the machine of the invention still advantageously allows processing within limited times and, therefore, at lower costs than treatments with machines for discontinuous decatizing.

[0025] In addition to this, the lateral openings still advantageously allow the outflow of the steam in order to limit any stagnation.

[0026] On closer inspection, therefore, the machine of the invention is characterized by a longer processing channel of the fabric than the known technique which advantageously allows a fabric to be treated continuously for a longer time. Consequently, the treated fabric will have a greater surface and stability than is the case with the known machines for the continuous decatizing, but maintaining a production speed such as to limit the times and costs compared to what happens with the known discontinuous type machines.

[0027] From what has been said so far it is evident that the described purposes are also achieved by an execution method of a machine for the continuous decatizing.

[0028] In particular, it comprises at least the following steps:

- providing at least one treatment container adapted to distribute steam under pressure for the processing of a fabric, the treatment container having a concave surface portion that develops substantially for an arc of circumference subtending an angle at the centre greater than 180°;
- inserting laterally a decatizing cylinder into the treatment container so that its concave surface portion identifies with at least a respective outer surface portion of the decatizing cylinder a processing channel of the fabric.

Brief description of the drawings

[0029] Further characteristics and advantages of the invention will become more apparent in the light of the detailed description of some preferred, but not exclusive, embodiments of a machine for the continuous decatizing according to the invention, illustrated by way of non-limiting example with the aid of the accompanying drawing table, wherein FIG. 1 represents a diagram of a portion of the machine for the continuous decatizing according to the invention.

Detailed description of an example of preferred embodiment

[0030] With reference to the cited figure, a machine for

the continuous decatizing 1 of fabrics T according to the invention is described. In particular, it comprises a decatizing cylinder 3 and a treatment container 4 that is adapted to distribute steam under pressure and partially wrapped around the cylinder 3 itself.

[0031] Similar to what generally happens in known decatizing machines, according to the embodiment of the invention being described, the steam is produced by the boiler of the plant in which the machine 1 is arranged and is carried, after pressure and "count" adjustments, to the decatizing machine 1 itself. Obviously, this aspect should not be considered as limiting for different embodiments of the invention where, for example, the machine comprises a dedicated boiler.

[0032] According to one aspect of the invention, the container 4, typically but not necessarily a tank, has a concave surface portion 7 that identifies with a respective outer surface portion 8 of the decatizing cylinder 3 a processing channel 11, inside which the fabric T is carried by means of a transport unit 14.

[0033] This processing channel 11 is also open laterally so as to allow the outflow of the steam out of the channel 11 itself.

[0034] In other words, similar to what happens in the known machines for the continuous decatizing, the fabric T is guided inside the processing channel 11 where it is operatively guided by the decatizing cylinder 3 and at the same time is processed with the steam distributed by the treatment container 4.

[0035] Obviously, also the number of decatizing cylinders and of treatment containers is not to be considered limiting for different embodiments of the invention.

[0036] Still, according to the embodiment of the invention being described, the decatizing machine 1 also comprises a lower sub-piece 15 operatively interposed, inside the processing channel 11, between the treatment container 4 and the fabric T. In other words, the lower sub-piece 15 operatively is wrapped simultaneously with the fabric T around the decatizing cylinder 3.

[0037] Advantageously, the sub-piece 15 acts on the fabric T improving its transport, which will be free of creases and tensions when rolling and unwinding.

[0038] Moreover, still advantageously, the sub-piece 15 exerts on the fabric T a pressure that decreases its thickness and, consequently, improves its decatizing.

[0039] Typically, but not necessarily, the lower sub-piece 15 is characterized by good steam permeability so as to facilitate its diffusion into the fabric T during its passage in the processing channel 11. Obviously, the nature of the sub-piece is not to be understood as limiting for different embodiments of the invention.

[0040] Still according to the embodiment of the invention being described, the decatizing machine 1 also comprises a tensioner assembly, not represented in the figure, for tensioning the lower sub-piece 15. In particular, the tensioner assembly comprises a hydraulic control unit, also not represented in the figure.

[0041] Advantageously, the hydraulic control unit al-

lows the entire sub-piece **15** to be tensioned uniformly, avoiding slippage and the differential tensions that arise through the electrical tensioners present in the prior art.

[0042] Moreover, even advantageously, by means of the hydraulic control unit greater loads can be transmitted to the sub-piece than the known equivalent tensioners and, consequently, to imprint a greater pressure on the fabric **T**.

[0043] Obviously, this aspect is not to be considered limiting for different embodiments of the invention where, for example, the tensioner assembly comprises a pneumatic and/or electrical control unit.

[0044] In addition to this, again according to the embodiment of the invention being described, the decatizing machine **1** also comprises an upper sub-piece **16** which, inside the processing channel **11**, is operatively interposed between the decatizing cylinder **3** and the fabric **T**.

[0045] Advantageously, the upper sub-piece **16** improves the processing of the fabric **T** allowing a uniform treatment on both sides, as they rest on the same type of support during the treatment.

[0046] Obviously, the presence of the upper sub-piece is not to be considered as limiting for different embodiments of the invention where, for example, the upper sub-piece is not present.

[0047] According to another aspect of the invention, the treatment container **4** is wrapped around the decatizing cylinder **3** so that the processing channel **11** develops along the outer surface **8** substantially for an arc of circumference subtending an angle at the centre greater than 180°.

[0048] In other words, the processing channel **11**, that is where the fabric **T** is treated by means of the steam, develops for a length greater than the semiperimeter of the section of the decatizing cylinder **3**.

[0049] According to what has been said, the machine **1** of the invention comprises a longer processing channel **11** than the known equivalent machines, which generally limit themselves to treating the fabrics for a path at most equal to the semiperimeter of the decatizing cylinder.

[0050] This advantageously allows to increase the residence time of the fabric **T** in the processing channel and, consequently, to make the performed treatment more effective.

[0051] In fact, it is well known that the treatment time is one of the fundamental physical variables that affect decatizing, therefore, increasing the duration of the treatment thanks to a longer processing channel **11** improves the decatizing itself.

[0052] Therefore, compared to the known machines for the continuous decatizing, the machine **1** of the invention allows to improve the decatizing of the fabrics **T** thanks to the geometry of the treatment container **4** which, together with the decatizing cylinder **3**, identifies a longer processing channel **11**.

[0053] On closer inspection, the decatizing machine **1** of the invention allows to perform a treatment whose surface and stability results are substantially comparable to

those obtained by means of the machines for the continuous decatizing in autoclave. However, still advantageously, the machine **1** of the invention allows the fabrics to be transported at a higher speed and in a continuous cycle, moreover, the invention requires less complex mechanical components than the known discontinuous type machines.

[0054] Therefore, still advantageously, the decatizing machine **1** allows to treat fabrics **T** faster and at lower costs.

[0055] Moreover, as mentioned, in the machine **1** of the invention the processing channel **11** is open laterally so as to allow the outflow of the steam and avoid moisture stagnations and condensations typical of the machines for the continuous decatizing comprising an autoclave.

[0056] In addition, the opening of the processing channel **11** allows the generation of a greater steam flow and an improvement in the distribution of the dispensed steam. Consequently, the decatizing machine **1** allows the fabric **T** to be better treated as it undergoes a dynamic treatment.

[0057] According to a further aspect of the invention, the machine **1** also comprises two perimeter sealing elements, also not represented in the figure, removably coupled to the treatment container **4** so as to close the bases of the decatizing cylinder **3**.

[0058] Advantageously, the perimeter sealing elements allow to contain the steam flow inside the processing channel **11**.

[0059] Still advantageously, the perimeter seals allow the steam to penetrate between one or both of the sub-pieces **15** and **16**, which are breathable, and the fabric **T** so that they yield moisture and temperature and, consequently, the fabric **T** is allowed to exit the machine **1** condensate-laden.

[0060] According to another aspect of the invention, the machine **1** also comprises radial sealing elements, also not represented in the figure, removably coupled to the treatment container **4**.

[0061] Advantageously, the radial seals, being removably coupled, can also be disassembled with the decatizing cylinder **3** in place so as to allow, still advantageously, the lateral insertion of the decatizing cylinder **3**.

[0062] In addition to this, according to another aspect of the invention, the decatizing machine **1** also comprises a cooling unit, not represented in the figure, operatively arranged downstream of the processing channel **11** for cooling the decatized fabrics **T**.

[0063] Operationally, for the execution of the machine for the continuous decatizing **1** as described so far, it is proceeded as follows.

[0064] First of all, the treatment container **4** adapted to distribute steam under pressure for the processing of a fabric **T** and characterized by a concave surface portion **7** that develops substantially for an arc of circumference subtending an angle at the centre greater than 180° is provided.

[0065] Then, the decatizing cylinder **3** is inserted lat-

erally inside the concavity of the treatment container 4 so that the aforementioned concave surface 7 identifies, with a respective outer surface portion 8 of the decatizing cylinder 3, a processing channel 11 of the fabric T.

[0066] Advantageously, the lateral insertion of the decatizing cylinder 3 makes it possible to simplify the execution of the machine 1 of the invention. In fact, in known equivalent machines typically the coupling between the decatizing cylinder and the treatment container is executed through a vertical insertion, which would be impractical given the geometry of the container 4.

[0067] Moreover, the lateral insertion also facilitates any maintenance and cleaning interventions as for the removal of the decatizing cylinder 3 it is not necessary to disassemble tensioning rollers and/or returns present in the machine 1.

[0068] In addition to this, for the execution of the decatizing machine 1 it is also envisaged to arrange a lower sub-piece 15 so that it slides inside the processing channel 11. In particular, it is positioned so that it is operatively interposed between the treatment container 4 and the fabric T.

[0069] Then, the sub-piece 15 is operatively coupled to the tensioner assembly to be fully and uniformly tensioned so as to exert a pressure such that the fabric T is pushed towards the decatizing cylinder 3. As mentioned, the tensioner assembly comprises a hydraulic control unit.

[0070] Obviously, the operations of arranging the lower sub-piece and the tensioning thereof can be performed in any embodiment step.

[0071] According to a further aspect of the invention, the execution method also comprises a step in which the perimeter and/or radial seals are removably coupled to the treatment container 4.

[0072] A complete description of the execution method of the invention is omitted herein as it would be repetitive of what has already been written about it during the description of the machine for the continuous decatizing 1. What it can be observed is that it allows to achieve all the advantages mentioned above.

[0073] In light of the foregoing, it is therefore understood that the machine for the continuous decatizing of the invention achieves all the intended purposes.

[0074] In particular, the machine of the invention is conformed to perform a decatizing of the continuous type and, therefore, to treat the fabrics uniformly.

[0075] Furthermore, the machine of the invention has a processing channel, in which the fabric is treated with steam, longer than the known equivalent machines. Consequently, the decatizing performed with the machine of the invention will be better.

[0076] On closer inspection, therefore, the machine of the invention allows to limit the times and the costs with respect to the known machines for the continuous decatizing and also improves the treatment with respect to the continuous machines present in the state of the art.

[0077] The invention is susceptible to numerous mod-

ifications and variations, all falling within the appended claims. Moreover, all the details and steps may furthermore be replaced by other technically equivalent elements, and the materials may be different depending on needs, without departing from the protection scope of the invention defined by the appended claims.

Claims

1. A machine for the continuous decatizing of fabrics (T) comprising:

- at least one decatizing cylinder (3);
- at least one treatment container (4) partially wrapped around said at least one decatizing cylinder (3) and adapted at least to distribute steam under pressure for the processing of the fabric (T), said at least one treatment container (4) having at least one concave surface portion (7) that identifies with at least one respective outer surface portion (8) of said at least one decatizing cylinder (3) a processing channel (11) in which the fabric (T) is treated with the steam under pressure distributed by said at least one treatment container (4), said processing channel (11) being laterally open so as to allow the outflow of the steam out of said processing channel (11);
- at least one transport unit (14) shaped to move the fabric (T) through said processing channel (11),

said machine for the continuous decatizing (1) being **characterized in that** said at least one treatment container (4) wraps said at least one decatizing cylinder (3) so that said processing channel (11) of the fabric (T) develops along said outer surface (8) of said at least one decatizing cylinder (3) substantially for an arc of circumference subtending an angle at the centre of said at least one decatizing cylinder (3) greater than 180°.

2. Machine for the continuous decatizing according to claim 1, comprising at least one lower sub-piece (15) operatively interposed at least in said processing channel (11) between said at least one treatment container (4) and the fabric (T).

3. Machine for the continuous decatizing according to claim 2, comprising at least one tensioner assembly for the uniform tensioning of all said at least one lower sub-piece (15) so that said at least one lower sub-piece (15) exerts a pressure such as to push the fabric (T) towards said at least one decatizing cylinder (3), said at least one tensioner assembly comprising at least one hydraulic control unit.

4. Machine for the continuous decatizing according to

one or more of the preceding claims, comprising at least one upper sub-piece (16) operatively interposed at least in said processing channel (11) between said at least one decatizing cylinder (3) and the fabric (T).

5. Machine for the continuous decatizing according to one or more of the preceding claims, comprising at least a perimeter sealing element removably coupled to said at least one treatment container (4). 10

6. Machine for the continuous decatizing according to one or more of the preceding claims, comprising at least one radial sealing element removably coupled to said at least one treatment container (4). 15

7. Machine for the continuous decatizing according to one or more of the preceding claims, comprising at least one cooling group for the treatment of decatized fabrics. 20

8. Execution method of a machine for the continuous decatizing according to one or more of the preceding claims **characterized by** comprising at least the following steps: 25

- providing at least one treatment container (4) adapted at least to distribute steam under pressure for the processing of a fabric (T), said at least one treatment container (4) having a concave surface portion (7) that develops substantially for an arc of circumference subtending an angle at the centre greater than 180°; 30
- inserting laterally a decatizing cylinder (3) into said at least one treatment container (4) so that said concave surface portion (7) of said at least one treatment container (4) identifies with at least a respective outer surface portion (8) of said at least one decatizing cylinder (3) a processing channel (11) of the fabric (T). 40

9. Execution method of a machine for the continuous decatizing according to claim 8, also comprising the following steps: 45

- arranging at least one lower sub-piece (15) so that it slides inside said processing channel (11), said at least one lower sub-piece (15) being at least in said processing channel (11) operatively interposed between said at least one treatment container (4) and the fabric (T); 50
- operatively coupling said at least one lower sub-piece (15) to at least one tensioner assembly for the uniform tensioning of all said at least one lower sub-piece (15) so that said at least one lower sub-piece (15) exerts a pressure such as to push the fabric (T) towards said at least one decatizing cylinder (3), said at least one ten- 55

sioner assembly comprising at least one hydraulic control unit.

10. Execution method of a machine for the continuous decatizing according to claim 8 or 9, also comprising the following step:

- removably coupling at least one perimeter and/or radial sealing element to said at least one treatment container (4).

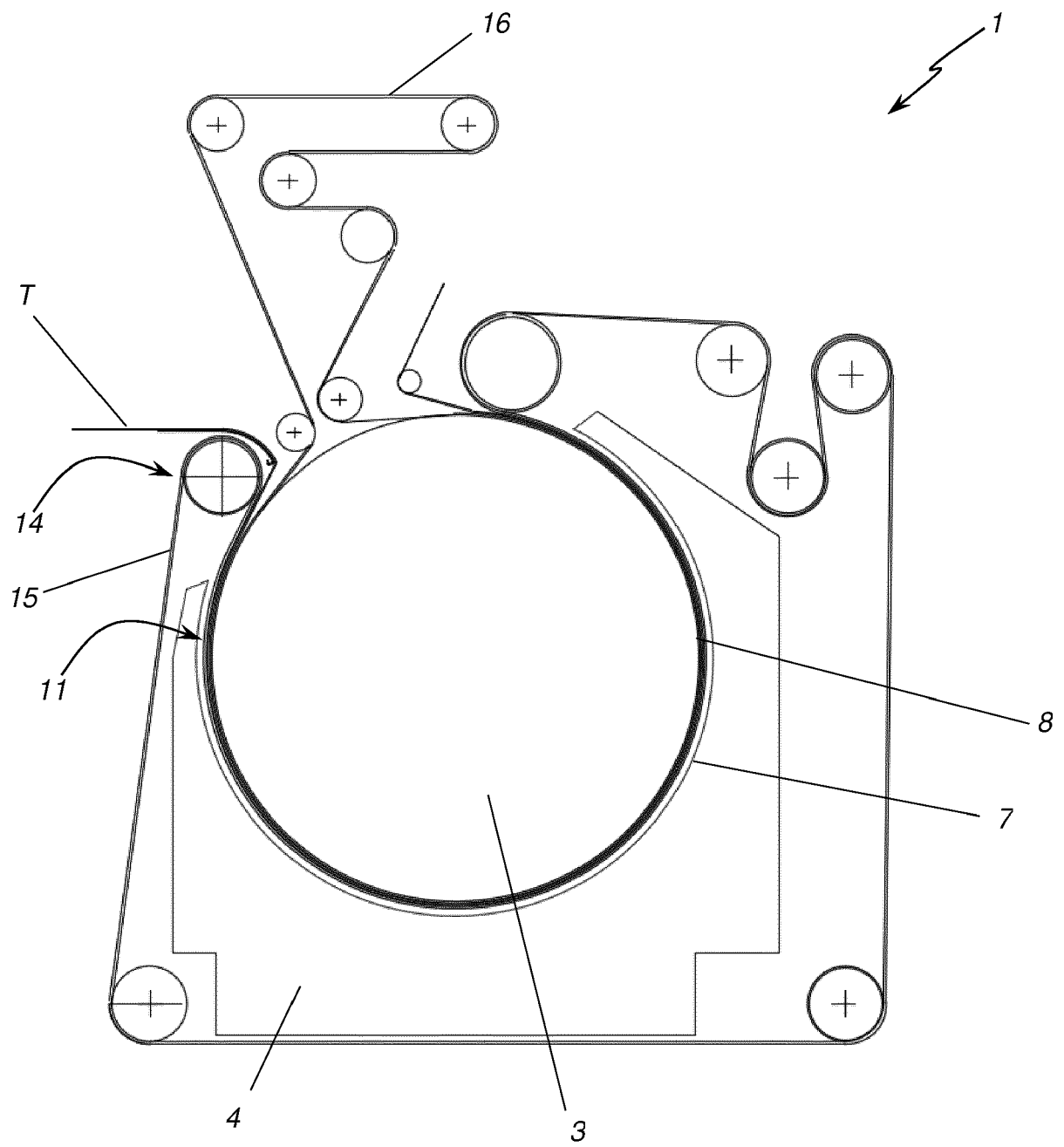


FIG. 1



EUROPEAN SEARCH REPORT

Application Number

EP 23 17 3548

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The present search report has been drawn up for all claims

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Place of search	Date of completion of the search	Examiner
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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO.

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