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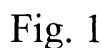
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(54) **Drier**

(57) The present invention relates to an industrial drier (1) for drying a piece of fabric (140). It comprises a heating chamber (100) which, in turn, comprises an air conditioning system (110). The drier further has a moving system (120) for the fabric (140) comprising at least two conveyor belts (121.b, 121.c) and means for moving

(124) the conveyor belts (121.b, 121.c). The belts define a pathway (141) developing along the heating chamber (100). Each of the moving means (124.b) is dedicated to an individual conveyor belt (121.b) and is suitable to move that conveyor belt (121.b) independently of any other conveyor belt (121.c).



Description

[0001] The present invention relates to a system for drying pieces of fabric during the industrial production cycle.

[0002] In the textile industry, particularly in the manufacture of woollen fabrics, driers, i.e. systems for drying the pieces of fabric, are known to be used. In fact, during the processing cycle, the pieces of fabric are subjected to treatments, such as washings, which require to be followed by drying.

[0003] Particularly, at the end of the production cycle, the drying requires to be carried out such as to comply with the characteristics of the fabric and not compromise the quality thereof.

[0004] Drying systems are known, which consist of a heating chamber in which there is a forced circulation of air, which is maintained hot. A part of this air is exhausted, during the drying process, in order to remove the evaporated water and thus keep a constant moisture level within the heating chamber, or to remove the fumes that may develop during the treatment within the heating chamber.

[0005] In these known systems, the piece of fabric is laid on a series of cross-bars, such that a vertically-arranged loop is formed between each cross-bar and the next one, which extends throughout the height of the heating chamber. Thereby, the longer pieces of fabric can be also housed in a heating chamber having a considerably small size. At the same time, the entire length of the piece of fabric can be reached by the hot air stream.

[0006] The method for using this known system provides that, after the wet piece has been housed on the cross-bars, the heating chamber is closed and the system is started. After a suitable preset time according to the particular conditions of the fabric, the system is stopped, the heating chamber is opened and the piece of fabric is withdrawn and sent to the subsequent steps of the production cycle.

[0007] These known driers however suffer from some drawbacks.

[0008] First, a problem arises with the hourly production rate of the system. This problem is typical with those systems that do not operate continuously. The requirement of loading the wet piece on the cross-bars, waiting for the operating time required for heating the heating chamber, drying and at least partially cooling the heating chamber, and finally the requirement of withdrawing the dried piece from the cross-bars, strongly limits the hourly production rate of this type of system.

[0009] Secondly, a problem arises with the conditions and ways according to which the fabric is dried. This problem is quite serious, because it can negatively affect the end quality of the manufactured fabric and the garments made therefrom. In fact, as the wet piece is arranged on vertical loops, a greater amount of water collects at the lowest points, by the action of gravity. This event implies two very negative consequences for the fabric. First, the

greater amount of water at the lowest points determines a non-uniform and non-simultaneous drying of the fabric. Secondly, the weight of the water collected in the lowest points generates a tensile stress in the fabric. Considerable residues of this tensile stress remain in the fabric fibres also when the fabric is dried and sent to the subsequent steps of the production cycle.

[0010] The residual stress in the fabric fibers affects its workability in a very negative manner. Upon changes in the environmental conditions, i.e. humidity and temperature, even after a garment has been made, the fabric will tend to release the residual stress, resulting in the clothing being deformed.

[0011] From what has been discussed above, it emerges how the need is felt to have an industrial drier which is capable of ensuring continuous operation and hence high productivity. The need is also felt to have an industrial drier allowing to dry the fabric without leaving any residual stress therein.

[0012] The object of the present invention is to provide an industrial drier having such structural and functional characteristics as to overcome said drawbacks cited with reference to the prior art.

[0013] These problems are solved by means of an industrial drier such as described in claim 1.

[0014] Further characteristics and the advantages of the industrial drier according to the invention will be apparent from the description below of some preferred embodiments thereof, which are merely illustrative and non-limiting, with reference to the annexed figures, in which:

Fig. 1 is a side elevational and partially sectional view of the drier assembly according to the invention;

Fig. 2.a is a side elevational schematic view of a detail of a drier according to the invention in a first operating condition;

Fig. 2.b is a side elevational schematic view of the detail from Fig. 2.a in a second operating condition;

Fig. 2.c is a side elevational schematic view of the detail from Fig. 2.a in a third operating condition;

Fig. 3.a is a side elevational schematic view of a detail of a drier according to the invention in a possible configuration;

Fig. 3.b is a side elevational schematic view of a detail of a drier according to the invention in an alternative configuration with respect to Fig. 3.a;

Fig. 4 is a side elevational schematic view of a detail of a drier according to the invention;

Fig. 5 is a schematic plan view of a detail similar to that of Fig. 3;

Fig. 6 is a side elevational schematic view of a detail of a drier according to the invention.

[0015] With reference to said figures, an industrial drier according to the invention has been generally designated with 1, which is placed on a floor 4.

[0016] An industrial drier 1 is considered herein below as being arranged as in Fig. 1, i.e. subjected to the gravity

force acting towards the floor 4.

[0017] To avoid ambiguity, by "low" is meant herein what is relatively proximate to the floor 4 and by "high" what is relatively far therefrom.

[0018] The drier 1 comprises a heating chamber 100. In the view of Fig. 1, the heating chamber 100 is arranged intermediate between a first technical chamber 10 and a second technical chamber 20.

[0019] In accordance with an embodiment, the drier 1 further comprises adduction means 2 to facilitate the introduction of the piece of fabric 140 within the inlet 21 of the drier 1 and abduction means 3 to facilitate the withdrawal of the piece of fabric 140 from the outlet 31 of the drier 1.

[0020] The operating core of the present invention is the heating chamber 100, which is provided with an air-conditioning system 110.

[0021] The drier 1 further comprises a fabric moving system 120 which comprises, in turn, a plurality of conveyor belts 121. Each of the conveyor belts 121 is shaped as a transport belt and comprises a web 122 tensioned by a system having at least two cylinders 123.

[0022] The conveyor belts 121 are arranged to form a pathway 141 for the piece of fabric 140 which develops along the heating chamber 100 such as to pass several times therethrough. The piece of fabric 140 is arranged along this pathway 141 by resting, along preferably horizontal tracts 142, on the conveyor belts 121 and creating a loop 143 in order to pass from each conveyor belt 121 to the subsequent one.

[0023] In accordance with a preferred embodiment, each belt is placed higher than the next one in the pathway 141, such that the piece of fabric 140 creates the joining loop 143 of the pathway 141 simply by gravity.

[0024] Alternatively, according to particular requirements, it may be provided that each conveyor belt 121 is placed lower than the next one in the pathway 141. In this case, the piece of fabric requires to be initially driven to create the loops 143 against the force of gravity.

[0025] In the embodiment of the drier as illustrated in Fig. 1, the pathway 141 develops from the inlet 21 such as described below:

- along a first joining loop 143.a,
- along a first horizontal tract 142.a that is rested on the upper surface of the belt 121.b,
- along a second joining loop 143.b,
- along a second horizontal tract 142.b that is rested on the upper surface of the belt 121.c,
- along a third joining loop 143.c, and
- along a third horizontal tract 142.c that is rested on the upper surface of the belt 121.d to the outlet 31.

[0026] In the case described above with reference to Fig. 1, the pathway 141 passes through the heating chamber 100 for three times. In other possible embodiments of the invention, the pathway 141 can pass through the heating chamber 100 for a different number of times,

such as two or four or five.

[0027] As those skilled in the art will readily appreciate, when the pathway 141 passes through the heating chamber 100 for an odd number of times, such as in the example from Fig. 1, the inlet 21 and outlet 31 of the drier 1 are on opposite sides of the heating chamber 100.

[0028] On the other hand, when the pathway 141 passes through the heating chamber 100 for an even number of times, the inlet 21 and outlet 31 of the drier 1 are on the same side of the heating chamber 100.

[0029] In accordance with a preferred embodiment of the invention, each horizontal tract of the conveyor belt 121 passing through the heating chamber 100 is overhung by another belt 126, which is called the "counter-belt".

[0030] With further reference to the particular example of drier 1 as depicted in Fig. 1, the counter-belts 126 are provided by the suitable arrangement of the backward tracts of the conveyor belts 121, i.e. their lower surfaces. More particularly, wherever this is feasible, each horizontal tract of a conveyor belt 121 is overhung by the backward tract of the conveyor belt immediately preceding in the pathway 141.

[0031] As those skill in the art will appreciate, this solution cannot be applied to the first conveyor belt 121.b, as this is overhung by the belt 126.a which is only intended to act as a counter-belt. More particularly, in case of Fig. 1, the upper surface of the belt 121.b is overhung by the lower surface of the belt 126.a, the upper surface of the belt 121.c is overhung by the lower surface 126.b of the belt 121.b, and finally, the upper surface of the belt 121.d is overhung by the lower surface 126.c of the belt 121.c.

[0032] In Fig. 1 are also indicated the moving directions of each individual tract of counter-belt. It may also be noted how each tract of conveyor belt and the respective tract of counter-belt which overhangs the same move in the same direction.

[0033] The tracts of counter-belt 126 are suitable to overhang the corresponding tracts of conveyor belt 121 and maintain a preset distance therefrom, which can be adjusted according to particular requirements.

[0034] The webs 122 of the belts 121 are preferably made of glass fiber or polyaramid fiber, such as Kevlar®.

[0035] The cylinders 123 supporting the webs 122, are preferably arranged within the two technical chambers 10 and 20 that are located immediately outside the heating chamber 100. Each of the cylinders 123 comprises, in fact, moving means 124, which may be subjected to early wear or malfunctioning if they are exposed to the high temperature that develops within the heating chamber 100 when the system is working.

[0036] Each of the conveyor belts 121 comprises moving means 124, which are self-contained and independent with respect to the moving means 124 of the other conveyor belts 121.

[0037] For example the first conveyor belt 121.b comprises moving means 124.b which are self-contained and

independent with respect to the moving means 124.c and 124.d of the other conveyor belts 121.c and 121.d.

[0038] In accordance with the embodiment providing counter-belts 126 as being separated from the conveyor belts 121, the moving means 124 of a particular conveyor belt 121 also move the relative overhanging counter-belt 126.

[0039] As those skilled in the art will certainly appreciate, in the case illustrated in Fig. 1 this solution can be adopted only with the counter-belt 126.a that overhangs the conveyor belt 121.b and which is not obtained from the backward branch of another conveyor belt 121.

[0040] The moving means 124 are suitable to move the respective conveyor belts 121, typically by causing at least one of the cylinders 123 to rotate, thereby determining the movement of the web 122. The speed of this movement, which is typically the rotational speed imposed to the cylinder 123 by the moving means 124, is not even throughout the drying cycle of an individual piece of fabric 140, but it may be changed during the drying cycle. Preferably, the moving speed of the belt 121 can be changed continuously.

[0041] In accordance with possible embodiments, the moving means 124 comprise motors 129, e.g. electric, and gear boxes 128. The variation in the moving speed of the conveyor belt 121 can be obtained either by changing the rotational speed of the motor 129 or changing the gear ratios obtained by the gear boxes 128.

[0042] As outlined in Fig. 2, 3, and 5, the moving means 124 also comprise, at the beginning of each of the horizontal tracts 141 in the pathway, a position sensor 130 suitable to localize the loop 143 formed by the running piece of fabric 140 when it rests on the conveyor belt 121.

[0043] Each of the moving means 124 comprising a position sensor 130, also comprises an operative connection 136 between the position sensor 130 and the motor 129 or the gear box 128.

[0044] According to an embodiment of the invention, each position sensor 130 is operatively connected to the moving means 124 of the conveyor belt 121 on which the controlled loop 143 is rested. For example, with reference to Fig. 3.a, the sensor 130.c is operatively connected to the moving means 124.c of the conveyor belt 121.c,

[0045] According to another embodiment of the invention, each position sensor 130 is operatively connected to the moving means 124 of the conveyor belt 121 which precedes that on which the controlled loop 143 is rested. For example, with reference to Fig. 3.b, the sensor 130.c is operatively connected to the moving means 124.b of the conveyor belt 121.b.

[0046] The operative connection 136 is provided such that it performs a feedback control of the relative speed of the two belts, according to the location of the loop.

[0047] Particularly, based on the location of the loop 143, which is determined via the sensor 130, a redistribution of the moving speeds of the two conveyor belts 121 is commanded by adjusting the moving means 124.

[0048] With reference for example to Fig. 2.a, the loop 143 is clearly excessively displaced outwards. This position of the loop 143 indicates that the fabric is locally too loose and tends to be paid out from the conveyor belt 121.b with an excessive speed relative to the speed with which it is moved by the belt 121.c. This condition may have very negative consequences on the quality of the fabric, since it can lead to the formation of a crosswise crease on the fabric.

[0049] In order to remedy the above condition, when the sensor 130 determines that the position of the loop 143 is excessively displaced outwards, it commands a redistribution of the moving speed of the two belts, such that the speed of the belt on which the loop 143 is rested is increased, or alternatively, such that the speed of the belt on which the loop 143 is formed is decreased.

[0050] With reference for example to Fig. 2.b, the loop 143 is clearly excessively displaced inwards. This position of the loop 143 indicates that the fabric is locally too tensioned and tends to be paid out from the conveyor belt 121.b at an insufficient speed relative to the speed with which it is moved by the belt 121.c. This condition may lead to very negative consequences on the quality of the fabric, since it generates a tensile stress within the fibers of the fabric.

[0051] In order to remedy the above condition, when the sensor 130 determines that the position of the loop 143 is excessively displaced inwards, it commands a redistribution of the moving speed of the two belts, such that the speed of the belt on which the loop 143 is rested is decreased, or alternatively, such that the speed of the belt on which the loop 143 is formed is increased.

[0052] With reference for example to Fig. 2.c, the loop 143 is properly positioned. This position of the loop 143 indicates that the fabric is locally in its ideal state because it is free of any kind of stress. When the sensor 130 determines that the position of the loop 143 is correct, it commands that the relative moving speeds of the two belts are maintained unchanged.

[0053] In accordance with a possible embodiment of the invention, the sensor 130 comprises an array of light emitters 131 and light receivers 132 that are coupled to each other.

[0054] Each receiver 132 is aligned with an emitter 131 such as to receive the ray of light 133 emitted therefrom when the sensor 130 is operating. An example of arrangement of the emitters 131, receivers 132 and relative suitably oriented rays of light 133 is shown in Fig. 5.

[0055] In a manner known per se, when a receiver 132 stops receiving the ray of light 133 emitted from the respective emitter 131, the sensor 130 signals that an opaque body is present in the space between the emitter-receiver pair.

[0056] By arranging an array of said emitter-receiver pairs along the operative range 135 in which the loop 143 formed by the piece of fabric 140 is more likely to be, one can constantly know where the loop 143 is located during the normal operation of the system 1.

[0057] In accordance with an embodiment, the sensor 130 is provided by arranging the light emitters 131 and the light receivers 132 in an alternating sequence within the operative range 135, which must be controlled by the sensor 130. In other words, such as outlined in Fig. 5, on a first side I of the operative range 135 there are sequentially arranged an emitter 131 followed by a receiver 132, then another emitter 131 and then a receiver 132, and so on. On the second side II, the sequence is reversed, as each emitter 131 placed on the first side I must be matched with a receiver on the second side II and vice versa.

[0058] The sensor 130 described above, with the arrangement of emitters 131 and receivers 132 in an alternating sequence offers great advantages as compared with a similar sensor having all the emitters on the one side and all the receivers on the opposite side. In fact, at the same distance between two adjacent rays of light 133 and hence with the same accuracy, this solution allows doubling the distance between two subsequent receivers 132. Thereby, the interference problems between the signals of adjacent emitter-receiver pairs are dramatically reduced. These interference problems cause a considerable decrease in the operating characteristics of an array of emitter-receiver pairs as compared with what would be expected from the operative characteristics of an individual isolated pair.

[0059] In accordance with an embodiment, the active components (designated with 131' and 132' in Fig. 5) of the emitters 131, as well as the receivers 132 are remotely located from the actual operative range 135. In this embodiment, the sensor 130 comprises two optical fibers 134 for each emitter-receiver pair. A first optical fiber is connected to the remote emitter 131' and brings the ray of light 133 produced therefrom to the operative range 135. A second optical fiber is connected to the remote receiver 132' and brings the ray of light 133 produced therefrom to the operative range 135.

[0060] The remote arrangement of the emitters 131 and receivers 132 allows dramatically reducing the problems connected with the operating temperature at which the sensors 130 have to work. In fact, even though they are placed in a technical chamber 10 or 20 rather than in the actual heating chamber 100, the sensors 130 must work at temperatures even as high as 70-80°C. At these temperatures, the commercially available light emitters and receivers are likely to be subjected to early wear or malfunctioning. With this configuration of the sensor 130 only the optical fibers 134 and, optionally, suitable lenses are exposed to the high temperatures in the operative range 135. With this configuration of the sensor 130, the active components 131' and 132' of the emitters 131, and the receivers 132 are arranged in an adjoining environment, in which the temperature is kept quite similar to standard temperatures.

[0061] In accordance with an embodiment of the invention, the sensor 130 is arranged such that each ray of light 133 creates an angle α with the surface of the

loop 143. This arrangement is shown in the schematic plan view of Fig. 5. Thereby, the fabric can be provided with a virtual thickness equal to its width multiplied by the sine of angle α . By suitably predetermining the angle α , one avoids the possibility that the position of the loop 143 is established intermediate of two rays of light 133 thus not being detected by any of the emitter-receiver pairs of sensor 130.

[0062] In accordance with possible embodiments of the drier 1 according to the invention, the cylinders 123 also comprise tensioning means 125 and an offset guiding system 126. The tensioning means 125 are suitable to ensure that the web 122 remains in a predetermined tensioned state, independently of the expansion or shrinkage due to the changes in the operating temperature.

[0063] The offset guiding system 126 is suitable to ensure that, during the operation of the system, the webs 122 are not excessively displaced along the cylinders 123 with the risk of being damaged by rubbing laterally against the side structure, both in the heating chamber 100 and technical chambers 10 and 20 for reversal, tensioning and motorization.

[0064] According to a possible embodiment (see Fig. 4), the conveyor belts 121 also comprise a vibrator 127 suitable, when required, to provide the web 122 with an oscillation having adjustable vertical direction, amplitude and frequency.

[0065] According to the embodiment outlined in Fig. 4, the vibrator 127 consists of a motor-driven cylinder 127.a to which rods 127.b are fixed, such as three rods arranged at 120° from each other. The rods 127.b have the same length as the cylinder, which is substantially equal to the width of the web 122. The cylinder 127.a is fixed at a distance from the web 122 that is equal to or slightly greater than its radius, such that when it is rotated, the rods 127.b hit the belt 121. The vibration frequency is adjusted by changing the rotational speed of the cylinder 127.a. The amplitude of the vibration can be reduced by moving the cylinder 127.a away from the belt 121 to a maximum distance at which the rods 127.b effectively touch the web 122 of the belt 121.

[0066] The air-conditioning system 110, which is known per se, comprises in its simplest embodiment at least one fan 111, at least one heat exchanger 112, at least one system of channels 113 and outlets 114 distributing the hot air in the heating chamber 100 and at least one recycle inlet 115 which recaptures the air from the heating chamber 100.

[0067] When there is provided more than one of the above elements, it is advantageous that they are arranged such as to be a sub-system 117, which forms the air-conditioning system 110 by modularly repeating itself for a plurality of times.

[0068] The fan 111 is suitable to ensure the forced circulation of an air stream throughout the system 110 or sub-system 117. Predetermined pressure, speed and flow rate characteristics must be ensured to the air stream

being generated and supplied by the fan 111, such as to meet the particular design requirements.

[0069] The heat exchanger 112 is suitable to provide the air stream with the required amount of heat to maintain the predetermined temperature such as to meet the particular design requirements.

[0070] The channels 113 and the outlets 114 distribute the hot air and are preferably arranged such that the air is blown through those tracts of the pathway 141 which are comprised within the heating chamber 100 with jets substantially perpendicular to the surface of the conveyor belt 121.

[0071] In accordance with a preferred embodiment, the channel 113 and the outlets 114 are arranged such that the air is blown through the tracts of the pathway 141 with counter-posed jets. As can be clearly seen in the diagram from Fig. 6, each tract in the pathway 141 is reached by jets of air 117 that are directed from the top down which tend to press the fabric on the conveyor belt 121. Each tract in the pathway 141 is also reached by jets of air 116 that are directed from the bottom up, which pass through the web 122, and tend to lift the fabric from the conveyor belt 121 and cause the same to come in contact with the counter-belt 126. The jets of air directed downwards 117 and the jets of air directed upwards 116 alternate along each of the tracts of the pathway 141 run by the fabric.

[0072] Due to this particular arrangement of the jets of air 117 and 116, the fabric 140 adopts a delicately undulated configuration. The profile of the fabric as outlined in Fig. 6 can be roughly approximated with a sinusoid, the period of which depends on the distance between two subsequent jets of air directed downwards 117 or, similarly, between two subsequent jets of air directed upwards 116. The maximum amplitude of the sinusoid is finally limited by the predetermined distance at which the conveyor belt 121 and counter-belt 126 are arranged.

[0073] The air-conditioning system 110 must be dimensioned, in a manner known per se, such as to allow the fabric to be perfectly dried along the pathway 141.

[0074] From what has been discussed above, it may be appreciated how the industrial drying system according to the present invention overcomes the drawbacks of the prior art. Particularly, the drier according to the invention operates continuously and does not cause the development of any stress in the fabric.

[0075] From the above description, those skilled in the art will appreciate how the feeding of wet fabric and the withdrawal of the dry fabric are carried out continuously while the machine is operating.

[0076] The continuous operation of the drier according to the invention also allows the trailing edge of a first piece of fabric and the leading edge of a second piece of fabric to be stitched to each other, such that both can be dried without interruptions.

[0077] This solution is particularly useful when the same drying conditions are required by two pieces of fabric, mainly in terms of temperature in the heating

chamber.

[0078] When a subsequent piece of fabric requires different drying conditions with respect to the immediately preceding piece, a blank, i.e. a fake piece can be interposed, which can travel in the heating chamber during the relatively long transient state. The other drying conditions (such as time of stay in the heating chamber, flow rate, pressure and speed of the air stream) can be more promptly modified.

[0079] The use of a blank or fake piece can also be useful when the system requires to be restarted following maintenance operations or other events that are likely to stain or however damage the piece of fabric being processed.

[0080] From the above description, those skilled in the art will further appreciate that the fabric is never subjected to any type of stress during the drying cycle.

[0081] Particularly, the control of the position of the loop formed by the fabric plays the role of an actual control of the tensioning state of the fabric. This control avoids that tensioning conditions may be generated, which are due to discrepancies occurring in the drawing speeds of two subsequent belts.

[0082] Those skilled in the art will have certainly noted how the control is carried out without contact, thus without the risk of bringing about a stress - though minimum - by means of the common devices used for controlling the tensioning, such as the idle cylinders connected to a load cell or the so called "dancer cylinders" (which are idle cylinders mounted on an oscillating rod connected to a potentiometer).

[0083] The drier according to the invention also avoids that tensioning conditions may be generated, which are due to the piece of fabric being adhered to the conveyor belt. In fact, the web-like belt, the air streams passing through this web and, if required, the vibrator tend to keep the fabric separated from the belt in a continuous manner.

[0084] This type of dryer can be as effectively used in dry thermal fixing processes for fabrics containing elastomers or Lycra®. By means of this type of system, in fact, these elastic fabrics can be processed with all the residual stresses due to previous working being released.

[0085] To the preferred embodiments of the drier described above, those skilled in the art, aiming at satisfying contingent and specific needs, may carry out a number of modifications, adaptations and replacements of elements with others functionally equivalent, without however departing from the scope of the claims below.

Claims

1. An industrial drier (1) for drying a piece of fabric (140), comprising:
 - a heating chamber (100) comprising an air-conditioning system (110), and

- a fabric moving system (120) comprising:
- at least two conveyor belts (121.b, 121.c) for said piece, which define a pathway (141) that develops along said heating chamber (100), and
- moving means (124) for said conveyor belts (121.b, 121.c),

characterized in that each of said moving means (124.b) is dedicated to an individual conveyor belt (121.b) and is suitable to move said conveyor belt (121.b) independently of any other conveyor belt (121.c).

2. The drier (1) according to claim 1, wherein said moving means (124) are suitable to vary the speed of said conveyor belts (121) in a continuous manner.
3. The drier (1) according to any preceding claim, wherein said pathway (141) comprises tracts (142) resting on said conveyor belts (121.b, 121.c) and a joining loop (143) being provided between said resting tracts (142).
4. The drier (1) according to the preceding claim, wherein each of said moving means (124) comprises a position sensor (130) suitable to localize said loop (143).
5. The drier (1) according to claim 3, wherein each of said moving means (124) comprises a position sensor (130) suitable to detect the location of said loop (143) without contact with the piece of fabric (140).
6. The drier (1) according to claim 4 or 5, comprising an operative connection (136) between said moving means (124) and said position sensor (130) that is suitable to operate a control of the relative speed of said conveyor belts (121.b, 121.c), said control being of a feedback-type, based on the position of said loop (143) as detected by said position sensor (130).
7. The drier (1) according to any preceding claim, wherein each of said conveyor belts (121) is shaped as a transport belt and comprises a web (122) being tensioned by a system of at least two cylinders (123).
8. The drier (1) according to any preceding claim, wherein said pathway (141) passes several times through said heating chamber (100).
9. The drier (1) according to any preceding claim, wherein each of said conveyor belts (121.b) is placed higher than the following one (121.c) in said pathway (141).
10. The drier (1) according to any preceding claim, wherein said pathway (141) passes three times through said heating chamber (100).

11. The drier (1) according to any preceding claim, wherein each of said conveyor belts (121) is overhanging by a counter-belt (126).
12. The drier (1) according to the preceding claim, wherein said counter-belts (126) are obtained from the suitable arrangement of the backward tracts of said conveyor belts (121), i.e. their lower surfaces.
13. The drier (1) according to claim 11 or 12, wherein each conveyor belt (121) and the respective overhanging counter-belt (126) move in the same direction.
14. The drier (1) according to any claim 11 to 13, wherein said counter-belt (126) is suitable to overhang said conveyor belt (121) by maintaining a predetermined distance therefrom, which can be adjusted according to the particular requirements.
15. The drier (1) according to any claim 11 to 14, wherein said moving means (124) of a conveyor belt (121) also move the relative overhanging counter-belt (126).
16. The drier (1) according to claim 7, wherein said web (122) is made of glass fiber or poly-aramide fiber.
17. The drier (1) according to any preceding claim, wherein said heating chamber (100) is flanked by a first technical chamber (10) and a second technical chamber (20).
18. The drier (1) according to the preceding claim, wherein said moving means (124) are placed in said technical chambers (10, 20).
19. The drier (1) according to any preceding claims, wherein said sensor (130) comprises an array of light emitters (131) and light receivers (132), which are matched to each other and arranged along an operative range (135).
20. The drier (1) according to the preceding claim, wherein said light emitters (131) and said light receivers (132) are arranged in alternating sequence within said operative range (135).
21. The drier (1) according to claim 19 or 20, wherein said light emitters (131) and said light receivers (132) comprise active components (131' and 132') that are remotely located relative to said operative range (135) and optical fibers (134), which connect said active components (131' and 132') to said operative range (135).
22. The drier (1) according to any claim 19 to 21, wherein a ray of light (133) which is produced by one of said

light emitters (131) and collected by one of said light receivers (132) creates an angle (α) with a surface of said loop (143).

23. The drier (1) according to any preceding claim, wherein said moving means (124) comprise tensioning means (125) suitable to ensure that said web (122) is held in a predetermined tensioning condition. 5
24. The drier (1) according to any preceding claim, wherein said moving means (124) comprise an offset guiding system (126) suitable to ensure that said webs (122) are not excessively displaced along said cylinders (123), which may result in damages due to the contact with the side structures. 10
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25. The drier (1) according to any preceding claim, wherein at least one of said conveyor belts (121) comprises a vibrator (127) suitable to cause said web (122) to oscillate in the vertical direction. 20
26. The drier (1) according to any preceding claim, wherein said air-conditioning system (110) comprises at least one fan (111), at least one heat-exchanger (112), at least one system of channels (113) and outlets (114) distributing the hot air in said heating chamber (100), and at least one recycle inlet (115) which recaptures the air from said heating chamber (100). 25
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27. The drier (1) according to the preceding claim, wherein said air-conditioning system (110) comprises a sub-system (117) which is modularly repeated for a plurality of times. 35
28. The drier (1) according to claim 26 or 27 wherein said channels (113) and said outlets (114) distribute hot air with jets (116, 117) that are substantially perpendicular to said conveyor belt (121). 40
29. The drier (1) according to the preceding claim, wherein each tract (142) of the pathway (141) is reached by jets of air (117) that are directed from the top down and counter-posed jets of air (116) that are directed from the bottom up. 45
30. The drier (1) according to the preceding claim, wherein said jets of air directed downwards (117) and said jets of air directed upwards (116) alternate along each of the tracts (142) of said pathway (141). 50
31. The drier (1) according to any preceding claim, comprising adduction means (2) to facilitate the inlet of said wet piece of fabric (140) and abduction means (3) to facilitate the withdrawal of said dry piece of fabric (140). 55

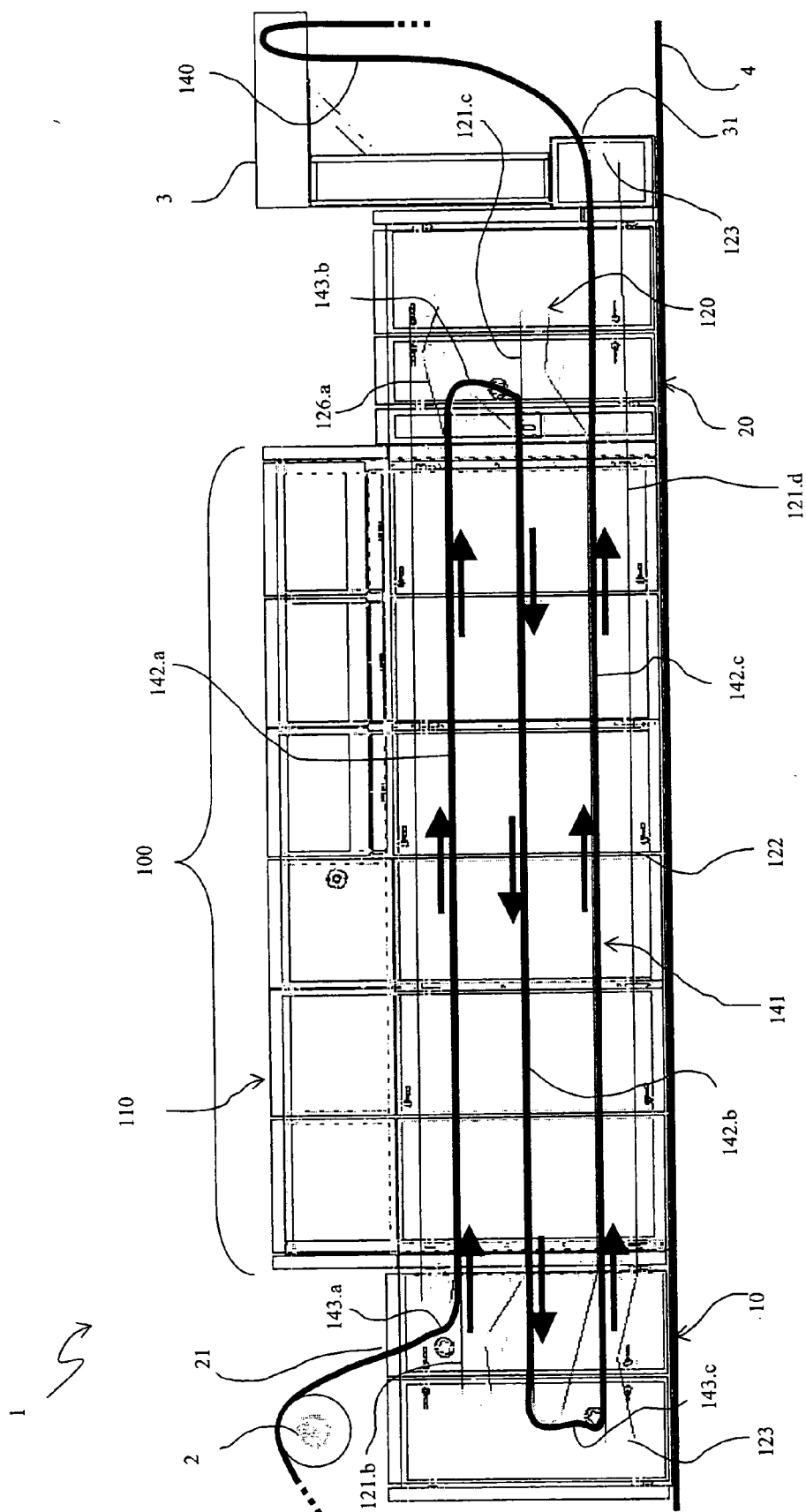


Fig. 1

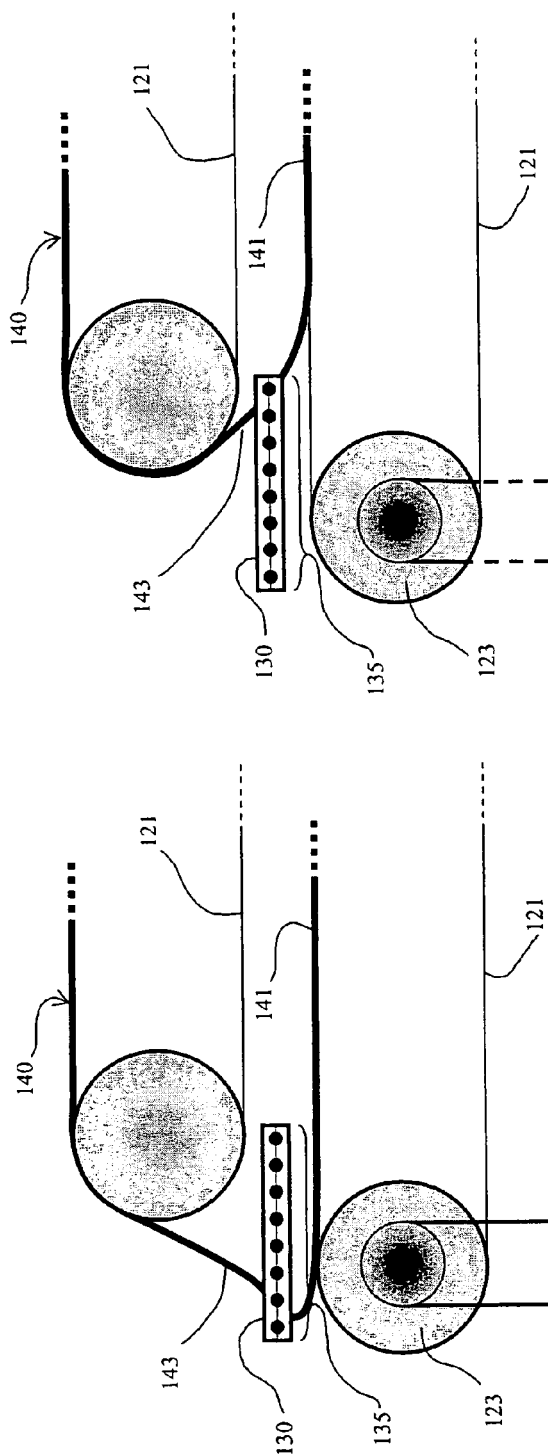


Fig. 2.a

Fig. 2.b

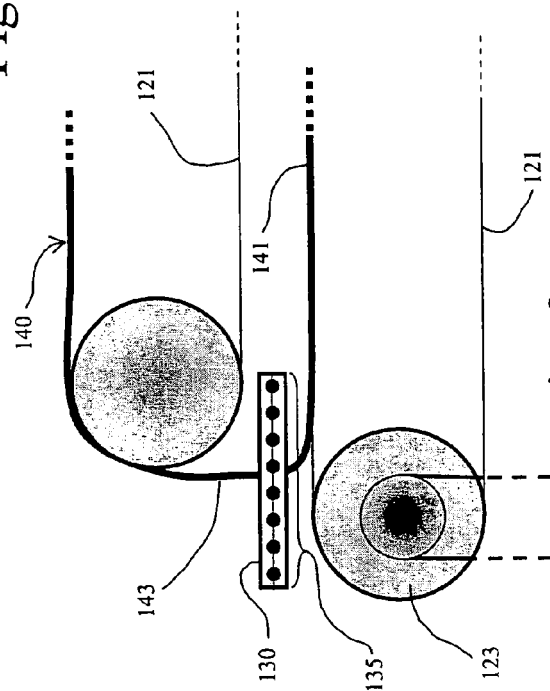


Fig. 2.c

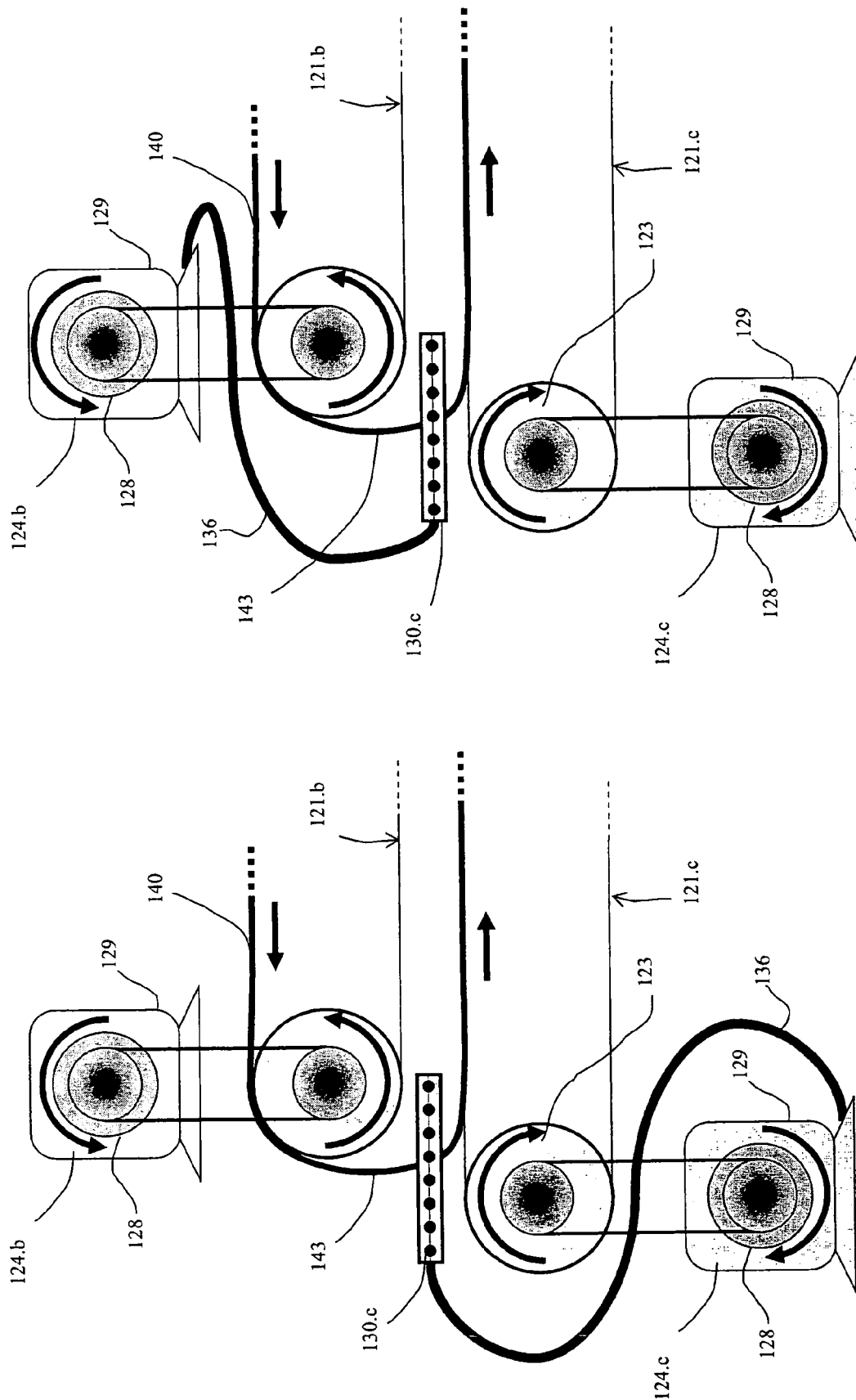


Fig. 3.b

Fig. 3.a

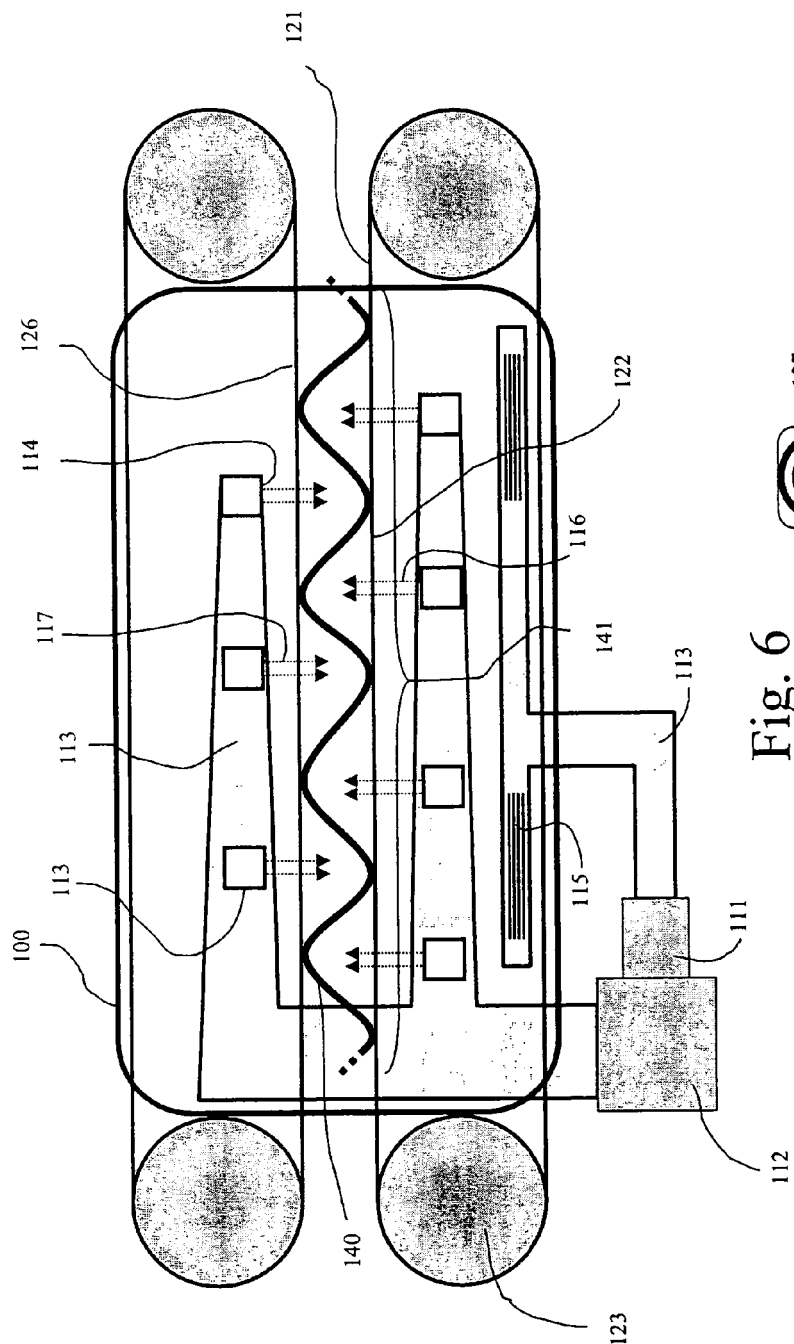


Fig. 6

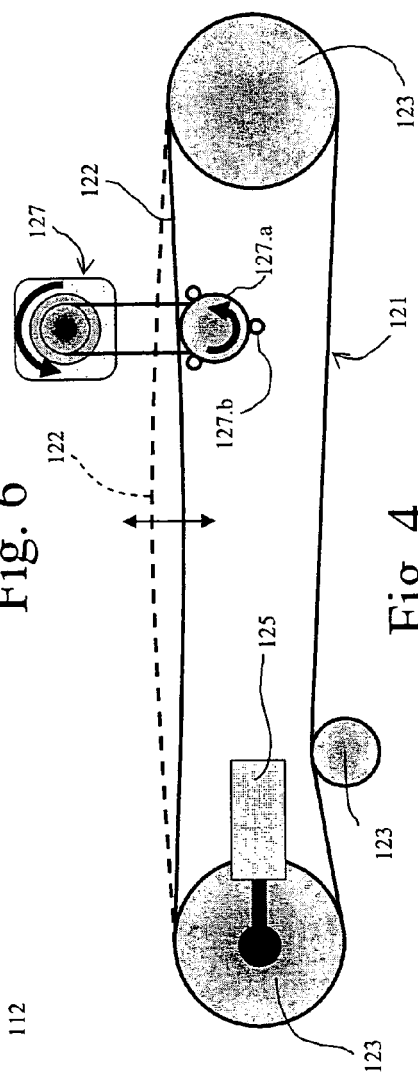


Fig. 4

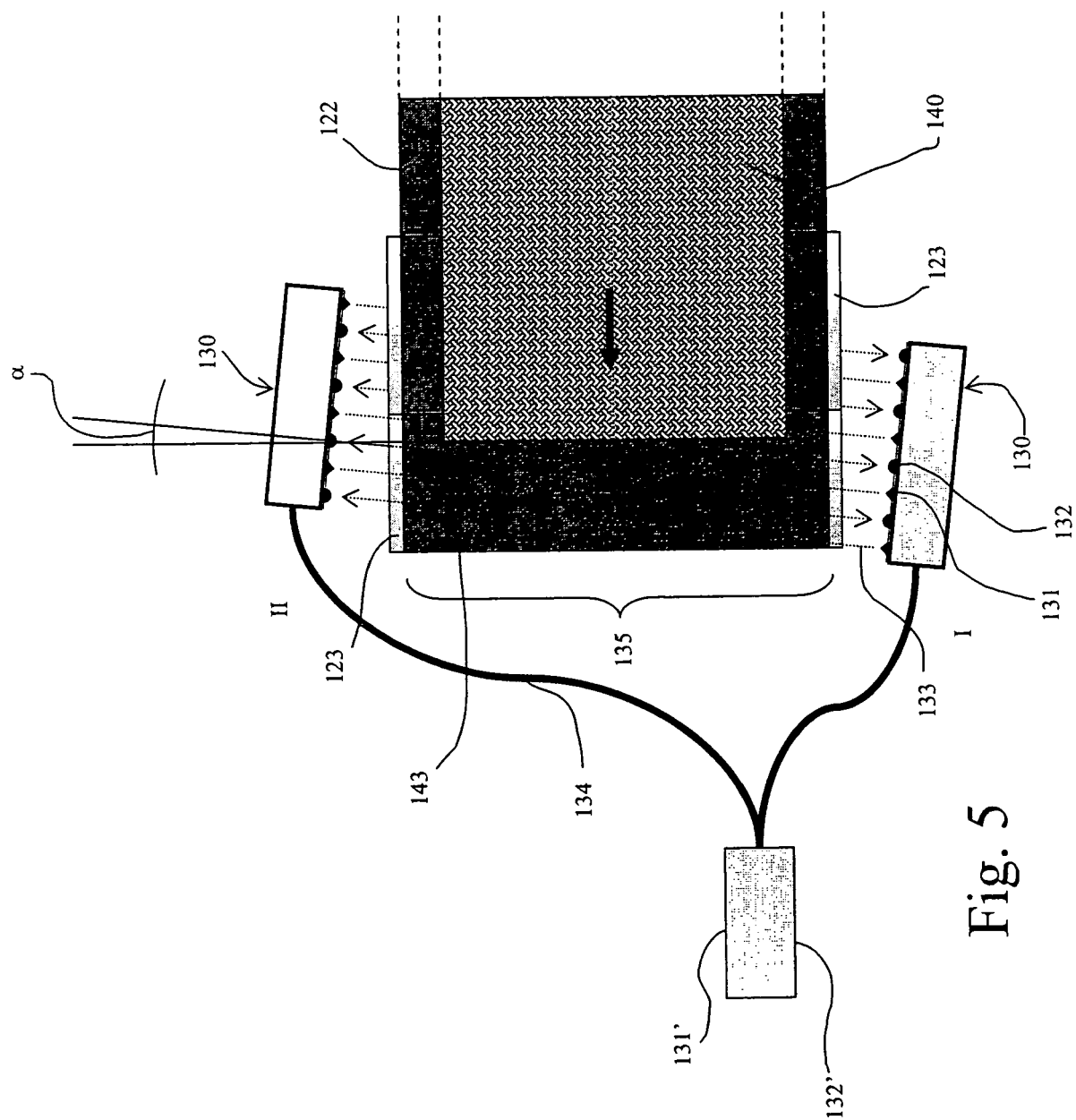


Fig. 5