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(54) Weaving device

(57) The invention relates to a weaving device comprising means for forming a shed of warp yarns, wherein a launching device is disposed on one side of the shed for inserting a carrier which envelopes a weft yarn in the form of a packed clew of yarn, which clew of yarn unwinds from the carrier into an elongated weft yarn upon insertion of the carrier into the shed, and wherein guide means are provided, which guide the carrier during its passage through the shed.

Weaving devices of the kind referred to in the introduction are generally known and described in Dutch patent application No. 73/09850, for example. With weaving devices of this type, a weft yarn from a supply bobbin is connected to a projectile, also called shuttle, which projectile is launched by the launching means disposed on either side of the shed, using a medium under pressure, for example compressed air, and carried through the shed via guides disposed in the shed.

The object of the invention is to provide a weaving device of the above-described kind, which enables weaving with a carrier which is made of a lightweight material and which has dimensions barely larger than those of the clew of yarn to be inserted into the shed, and which does not have the complex construction of the prior art but which enables higher weaving speeds with fewer weaving flaws.

According to the invention, the guide means comprise guide elements which are provided with a recess having an opening larger than the carrier, such that the carrier is movable with respect to the guide during operation in a direction transversely to the insertion direction, and wherein the guide means further comprise blowers, which blowers are at least partially arranged for blowing air jets in the direction of the recess of the guide elements for the purpose of keeping the carrier in the recess during its passage through the shed.

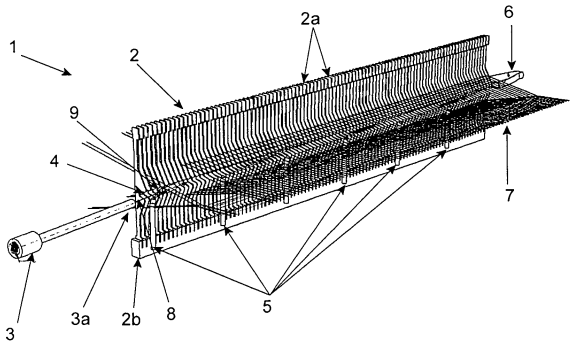

Fig. 1

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Description

[0001] The invention relates to a weaving device comprising means for forming a shed of warp yarns, as well as a lay, wherein a launching device is disposed on one side of the shed for inserting a carrier which envelopes a weft yarn in the form of a packed clew of yarn, which clew of yarn unwinds from the carrier into an elongated weft yarn upon insertion of the carrier into the shed, and wherein guide means are provided, which guide the carrier during its passage through the shed.

[0002] Weaving devices of the kind referred to in the introduction are generally known and described in Dutch patent application No. 73/09850, for example. With weaving devices of this type, a weft yarn from a supply bobbin is connected to a projectile, also called shuttle, which projectile is launched by the launching means disposed on either side of the shed, using a medium under pressure, for example compressed air, and carried through the shed via guides disposed in the shed.

[0003] In Dutch patent application No. 1023943 in the name of the present applicant, the carrier is made of a lightweight material, whose dimensions are barely larger than those of the clew of yarn to be transported through the shed.

[0004] Because of the erratic nature of the carrier during its passage through the shed, NL-73/09850 uses a guide, which envelopes the carrier during its passage through the shed. Such a weaving machine has drawbacks from a weaving point of view, however: the carrier is constantly in contact with the guide, which, in addition to extra wear, results in a loss of energy and thus a loss of velocity. To prevent extra wear and a loss of velocity of the carrier with the yarn and the guide, the guide must be practically stationary during insertion, which leads to high mechanical loads on the weaving machine during high-speed operation.

[0005] The object of the invention is to provide a weaving device of the above-described kind, which enables weaving with a carrier which is made of a lightweight material and which has dimensions barely larger than those of the clew of yarn to be inserted into the shed, and which does not have the complex construction of the prior art but which enables higher weaving speeds whilst avoiding weaving flaws.

[0006] According to the invention, the guide means comprise guide elements which are provided with a recess having an opening larger than the carrier, such that the carrier is movable with respect to the guide during operation in a direction transversely to the insertion direction, and wherein the guide means further comprise blowers, which blowers are at least partially arranged for blowing air jets in the direction of the recess of the guide elements for the purpose of keeping the carrier in the recess during its passage through the shed.

[0007] Thus, the carrier is prevented from undesirably moving out of the recess as a result of the erratic flight behaviour of the lightweight carrier during its passage through the shed.

[0008] In a first embodiment, the guide elements are movable along with the lay in a direction transversely to the direction of movement of the carrier through the shed upon insertion of the carrier. This enables a further increase of the weaving speed, whilst the occurrence of weaving flaws is reduced.

[0009] In various embodiments, at least some of the blowers are oriented at an angle to the guide elements, seen in the direction of movement of the carrier through the shed, or transversely to the guide elements or parallel to the guide elements. With these embodiments an effective guidance of the carrier moving through the shed at a high velocity (with the weft yarn formed into a clew of yarn) is realised, wherein, in addition to an additional propulsion of the carrier through the guide elements (by the blowers with the oblique or parallel orientation), a retainment of the moving carrier in the guide elements is effected (by the blowers with the transverse orientation), thereby preventing undesirable movement of the carrier out of the guide elements (and thus a malfunction in the weaving process).

[0010] In one embodiment, the guide elements comprise several lamella-like elements arranged between successive warp yarns, which are each provided with a recess, such that the recesses of lamellae disposed adjacent to each other form an open guide channel, through which the carrier can move freely.

[0011] In yet another embodiment, the guide elements at least partially form part of the reed of the weaving device.

[0012] In yet another embodiment, the outlet opening of the launching device and the guide elements are not aligned near the insertion side of the shed at the moment when the carrier exits the outlet opening during operation. In this way, too, a faster operation of the weaving devices is realised.

[0013] The launching device may in that case be disposed in such a manner that the insertion direction extends at an angle to the guide elements.

[0014] The invention will now be explained in more detail with reference to a drawing, in which:

Figure 1 shows a first embodiment of a weaving device according to the invention;
Figure 2 is a detail view of figure 1;
Figures 3a-3c are plan views of figure 1;
Figures 4a-4c are perspective views of figure 1;
Figure 5 is another detail view of figure 1; and
Figures 6a-6c show other embodiments of a detail view of figure 1.

[0015] For a better understanding of the invention, like parts are indicated by the same numerals in the description of the figures below.

[0016] Figure 1 shows an embodiment of a weaving device according to the invention. The weaving device 1 comprises a shed formed by warp yarns 7, whilst launch-

ing means 3 are disposed on one side (or both sides) of the shed 7 for inserting a weft yarn 8 in the form of a packed clew of yarn, which weft yarn is at least partially enveloped by a carrier 9.

[0017] The launching means 3 consist of a launching tube 3, through which the carrier 9 with the clew of yarn 8 is accelerated by means of a medium under pressure, for example compressed air. Although this is not relevant for a correct understanding of the invention, clamping means (not shown) are furthermore provided, which hold the free end of the clew of yarn, so that the clew of yarn extends from the moving carrier 9 to the weft yarn 8 during the flight of the carrier 9 through the shed 7.

[0018] The length of the weft yarn 8 is such that the front end thereof is substantially in line with the right-hand side (in figure 1) of the shed 7. Receiving means 6 are disposed near the exit side of the shed 7 for receiving the carrier 9, which is empty at that stage, for example for reuse thereof.

[0019] The carrier 9 is made of a very light material and constructed so that the dimensions of the carrier substantially correspond to those of the clew of yarn. Such a lightweight carrier 9 is difficult to control during its passage through the shed and in order to influence the movement of the carrier 9 through the shed - in order to avoid weaving flaws - the weaving device 1 is provided with a guide 4, which forms part of the reed 2 in this embodiment. The reed 2 is built up of a large number of lamellae 2a extending parallel to each other, which are connected to the lay 2b.

[0020] Figures 3a-3c in conjunction with figures 4a-4d show various operating situations of the weaving device according to the invention. As is shown in the figures, the guide means 2, 2a, 5 are arranged for moving along with the lay 2b upon passage through the shed 7 of the carrier 9 with the weft yarn 8 in the form of a clew of yarn. The launching device 3 is stationary with respect to the weaving device in these situations, such that the insertion direction of the launching device extends parallel to the guide elements 2a (figure 3a).

[0021] Upon insertion of a carrier 9 with the clew of yarn 8 into the shed by the launching device 3, the position of the lay 2b with the guide means 2, 2a, 5 with respect to the weaving device is as shown in figures 3a and 4a.

[0022] To keep the carrier within the passage formed by the individual recesses 4 during its movement through the shed 7, auxiliary blowers 5 are provided, which blow a medium under pressure, for example air, in the direction of the recess 4 via a jet orifice 5a. In this way the carrier 9 is prevented from undesirably moving out of the recess 4 as a result of the erratic flight behaviour of the lightweight carrier during its passage through the shed. Thus a force transversely to the insertion direction is exerted on the carrier 9.

[0023] This is shown in subfigures 3b and 3c (figures 4b and 4c, respectively). This ensures an improved control of the movement of the carrier 9 together with the weft yarn 8 in the form of a clew of yarn through the weaving device. In one embodiment, the lay 2b with the frame 2, 2a, 5 returns to its starting position in figure 3c (figure 4c) after insertion of the clew of yarn 8 and extension thereof into a weft yarn, such that the outlet opening 3a of the launching device 3 and the open guide elements 2a or the guide channel formed by the recess 4 are not aligned near the insertion side of the shed 7 at the moment when the carrier 9 exits the outlet opening.

[0024] In another embodiment, said forward movement of the lay 2b with the frame 2, 2a, 5 can take place at a moment when the carrier 9 is still present in the recess 4 of the guide elements 2a that functions as a guide, as is clearly shown in figure 4c (and figure 4d). Thus the weaving device can be prepared more quickly for the next stroke, thereby realising a higher weaving speed.

[0025] As is shown in figures 6a-6c, the lamella-like elements 2a each have a recess 4 provided with an opening 4a, such that the recesses 4 of adjacent lamella-like elements 2a form a guide channel 4 which is open on one side of the shed 7. The carrier 9 can be guided through said guide channel, so that a more stable movement through the shed 7 is realised and the occurrence of weaving flaws is prevented or at least minimised.

[0026] In the embodiment that is shown in figure 1, the launching means and in particular the launching tube 3 are arranged parallel to the direction of movement of the carrier 9 through the shed 7. In another embodiment, however, as shown in figure 5, the launching tube 3 may include an angle a with the launching direction through the shed 7. By making said angle a adjustable, a velocity component that is not parallel to the direction of movement of the carrier 9 through the shed 7 can be imparted to the carrier.

[0027] The movement of the carrier through the guide 4 and the shed 7 may be further supported by using the auxiliary blowers 5 shown in figures 1 and 2, which are disposed beside the reed 2 in the shed 7. Said auxiliary blowers 5 direct a medium under pressure, for example an air jet, in the direction of movement of the carrier and thus impart an additional velocity and direction component to the carrier 9. On the one hand it is thus possible to bridge a comparatively large distance in the shed 7 with the carrier 9, so that a simple and less robust construction may be used for the launching means 3. On the other hand it is possible to correct the movement of the carrier 9 through the shed 7 by means of the auxiliary blowers 5 by imposing a direction component on the carrier, resulting in a better retainment of the carrier in the guide 4.

[0028] The auxiliary blower 5 may have a curved nozzle end 5a, if desired, for directing an compressed air jet at the guide 4.

[0029] Figures 5a-5c likewise show various operating situations of the carrier 9 being moved through the recesses 4 of the lamella-like elements 2a together with the weft yarn 8. The lamella-like guide elements 2a of which the reed 2 is built up comprise two flange parts 11

a-11 b, in which a recess 4 is formed, which recess is open on one side (numeral 4a). The recess 4 of an individual lamella-like guide element 2a and the other recesses 4 of the adjacent lamella-like elements 2a jointly form the guide channel 4 for the carrier 9 and the weft yarn 8. The recess 4 has an open dimension at least larger than the diameter of the carrier 9.

Claims

1. A weaving device comprising means for forming a shed of warp yarns, as well as a lay, wherein a launching device is disposed on one side of the shed for inserting a carrier which envelopes a weft yarn in the form of a packed clew of yarn, which clew of yarn unwinds from the carrier into an elongated weft yarn upon insertion of the carrier into the shed, and wherein guide means are provided, which guide the carrier during its passage through the shed, **characterised in that** the guide means comprise guide elements which are provided with a recess having an opening larger than the carrier, such that the carrier is movable with respect to the guide during operation in a direction transversely to the insertion direction, and wherein the guide means further comprise blowers, which blowers are at least partially arranged for blowing air jets in the direction of the recess of the guide elements for the purpose of keeping the carrier in the recess during its passage through the shed.

2. A weaving device according to claim 1, **characterised in that** the guide elements are movable along with the lay in a direction transversely to the direction of movement of the carrier through the shed upon insertion of the carrier.

3. A weaving device according to claim 1 or 2, **characterised in that** at least some of the blowers are oriented at an angle to the guide elements, seen in the direction of movement of the carrier through the shed.

4. A weaving device according to any one or more of the preceding claims, **characterised in that** at least some of the blowers are oriented transversely to the guide elements, seen in the direction of movement of the carrier through the shed.

5. A weaving device according to any one or more of the preceding claims, **characterised in that** at least some of the blowers are oriented parallel to the guide elements, seen in the direction of movement of the carrier through the shed.

6. A weaving device according to any one or more of the preceding claims, **characterised in that** the guide elements comprise several lamella-like elements arranged between successive warp yarns, which are each provided with a recess, such that the recesses of lamellae disposed adjacent to each other form an open guide channel, through which the carrier can move freely.

7. A weaving device according to any one or more of the preceding claims, **characterised in that** the guide elements at least partially form part of the reed of the weaving device.

8. A weaving device according to any one or more of the preceding claims, **characterised in that** during operation the outlet opening of the launching device and the guide elements are not aligned near the insertion side of the shed at the moment the carrier exits the outlet opening.

9. A weaving device according to any one or more of the preceding claims, **characterised in that** the launching device may is so disposed that the insertion direction extends at an angle to the guide elements.

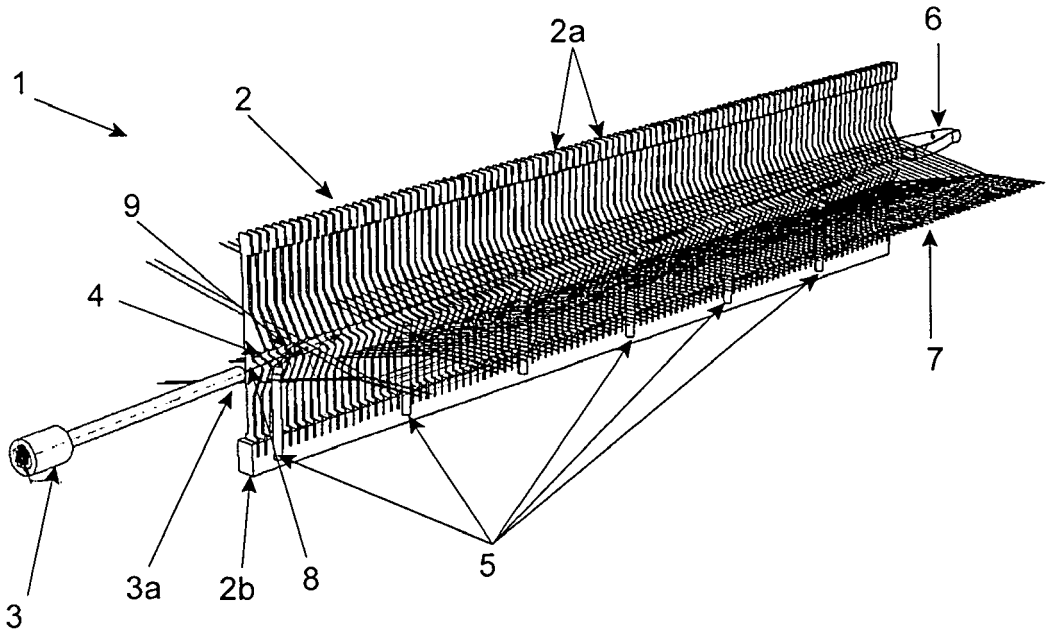

Fig. 1

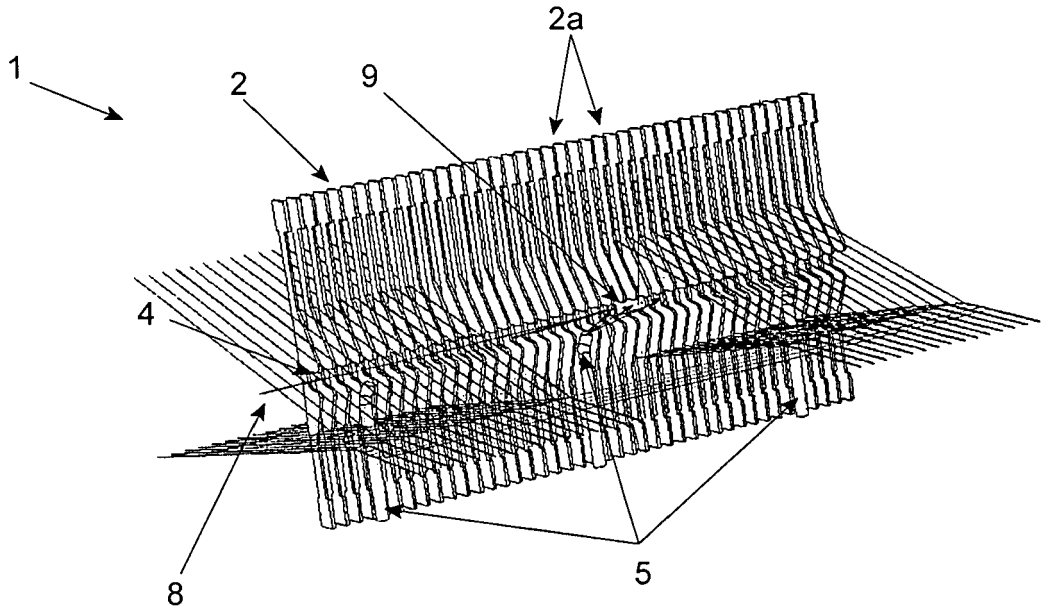

Fig. 2

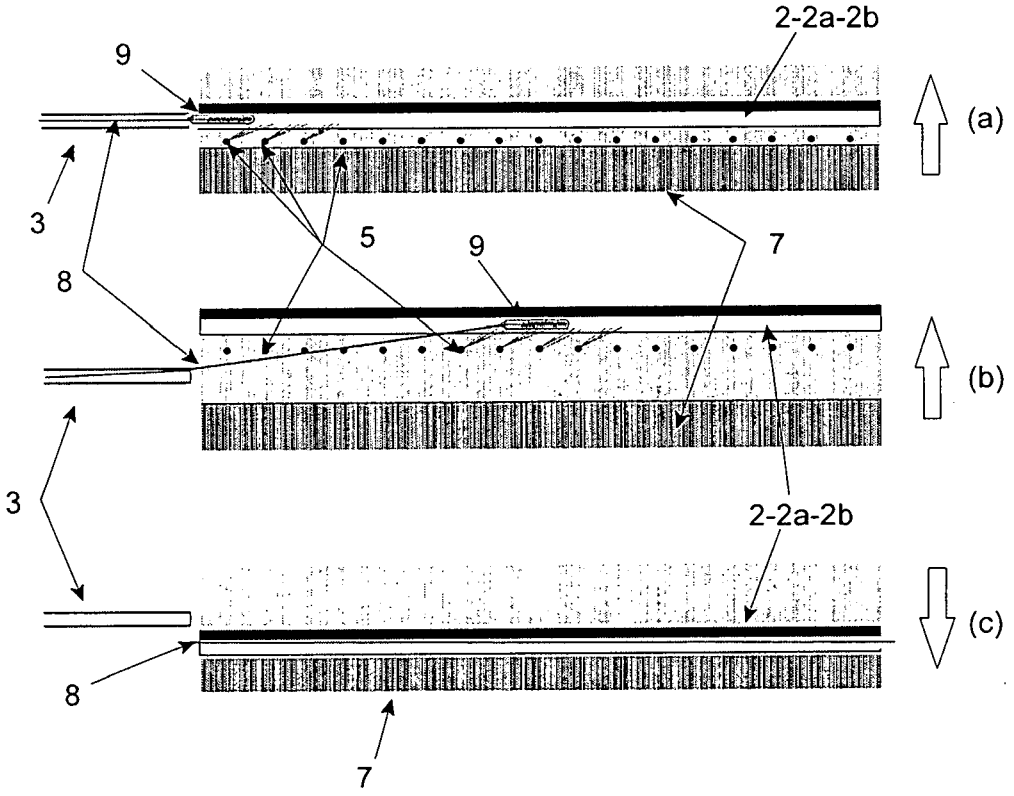

Fig. 3

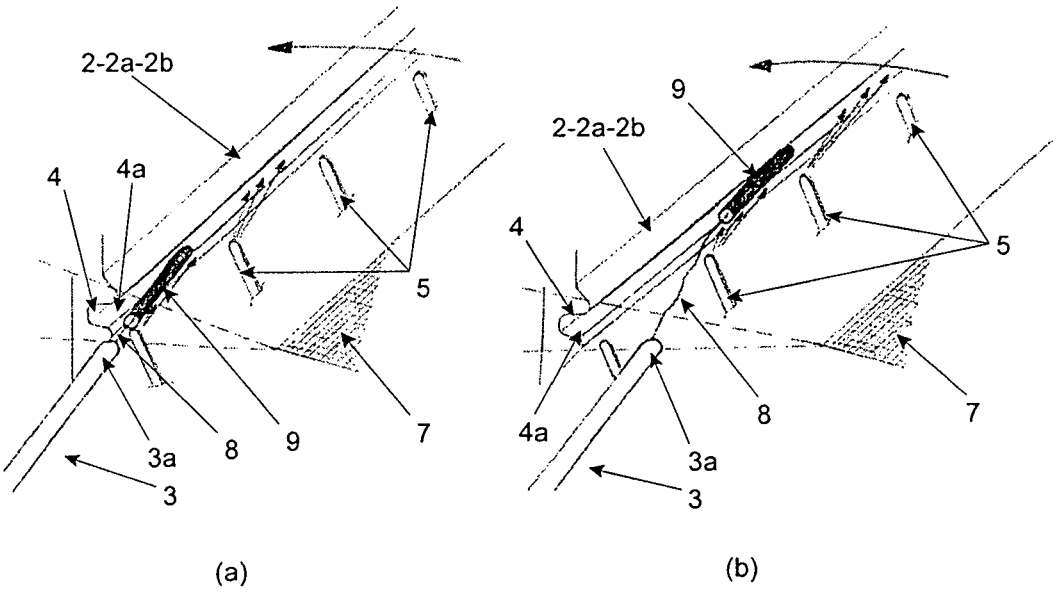

Fig. 4

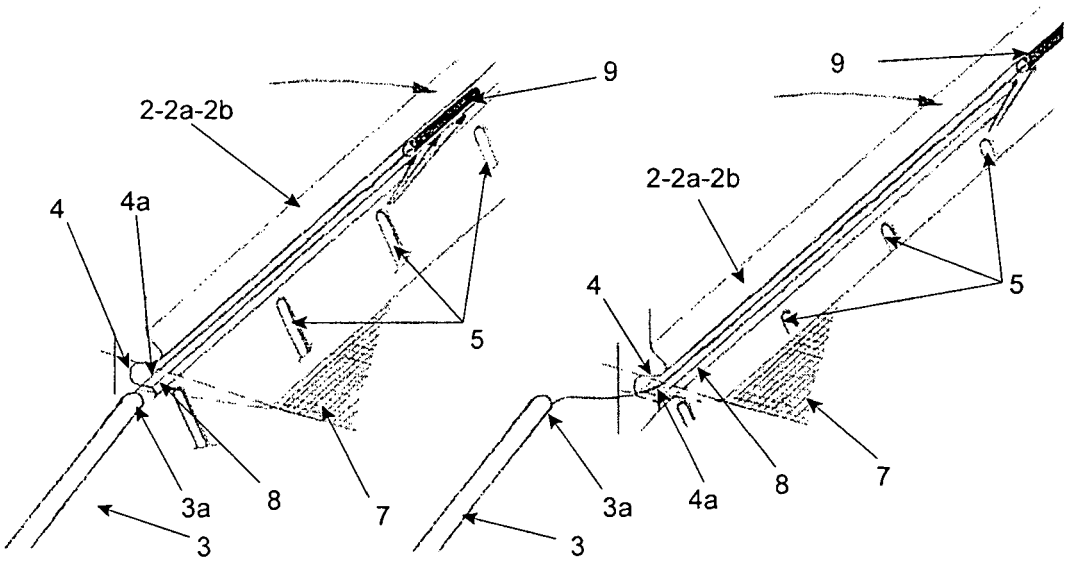

Fig. 4

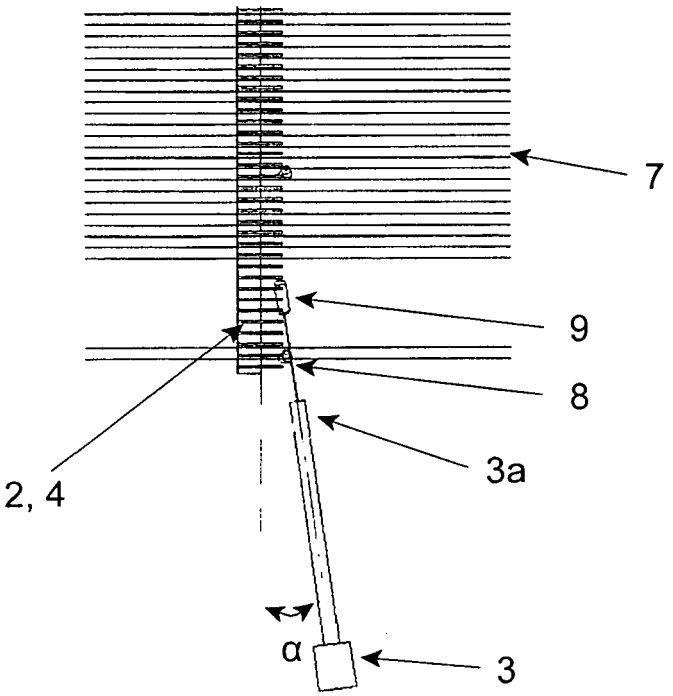

Fig. 5

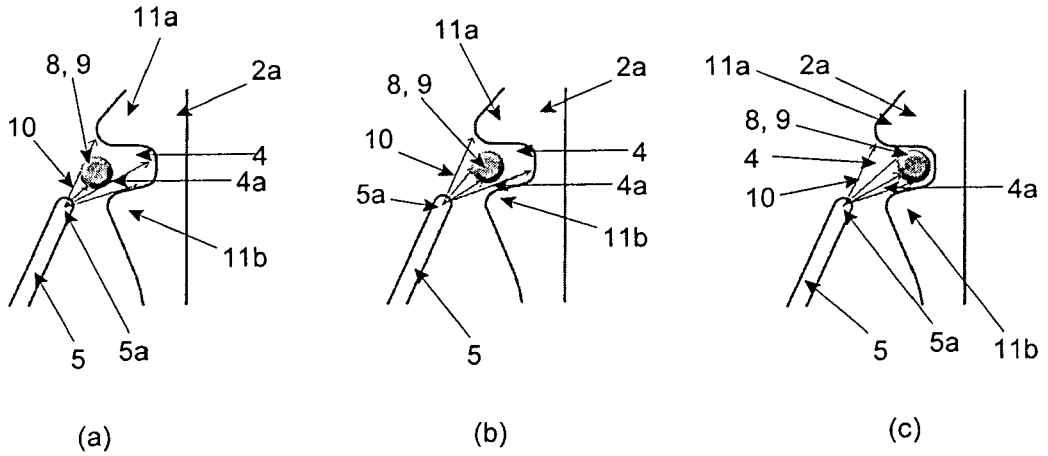
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Fig. 6

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 07 00 6259

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A,D	WO 2005/012610 A (TE STRAKE TEXTILE B V [NL]; GORRIS JOANNES JOSEPHUS HENRIC [NL]; HIEMS) 10 February 2005 (2005-02-10) * page 5, line 28 - page 6, line 30; figures 1,2 *	1-9	INV. D03D49/42 D03D47/30
A	US 4 354 533 A (SUZUKI HAJIME ET AL) 19 October 1982 (1982-10-19) * abstract; figures 1-8 *	1-9	
			TECHNICAL FIELDS SEARCHED (IPC)
			D03D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	13 July 2007	Louter, Petrus

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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13-07-2007

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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- NL 1023943 **[0003]**