

(19)



(11)

EP 2 115 195 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention
of the grant of the patent:
09.03.2011 Bulletin 2011/10

(51) Int Cl.:
D03D 47/40 *(2006.01)* **D03D 49/04** *(2006.01)*
D03J 1/22 *(2006.01)*

(21) Application number: **08707614.7**

(86) International application number:
PCT/EP2008/000969

(22) Date of filing: **05.02.2008**

(87) International publication number:
WO 2008/095717 (14.08.2008 Gazette 2008/33)

(54) **A DEVICE FOR MAINTAINING THE FABRIC WIDTH OF A FABRIC ON A WEAVING MACHINE**
VORRICHTUNG ZUR BEIBEHALTUNG DER BREITE EINER FASER IN EINER WEBMASCHINE
DISPOSITIF PERMETTANT DE MAINTENIR LA LARGEUR D'UN TISSU SUR UN MÉTIER À TISSER

(84) Designated Contracting States:
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR
HR HU IE IS IT LI LT LU LV MC MT NL NO PL PT
RO SE SI SK TR**

(30) Priority: **05.02.2007 BE 200700046**

(43) Date of publication of application:
11.11.2009 Bulletin 2009/46

(73) Proprietor: **Picanol
8900 Ieper (BE)**

(72) Inventors:
• **VAN WASSENHOVE, Veerle
B-8700 Aarsele (BE)**
• **PEETERS, Jozef
B-8900 Leper (BE)**

(74) Representative: **Bird, William Edward et al
Bird Goën & Co
Klein Dalenstraat 42A
3020 Winksele (BE)**

(56) References cited:
EP-A1- 0 430 321 DE-A1- 2 539 421
GB-A- 336 920 US-A- 3 465 792

EP 2 115 195 B1

Note: Within nine months of the publication of the mention of the grant of the European patent in the European Patent Bulletin, any person may give notice to the European Patent Office of opposition to that patent, in accordance with the Implementing Regulations. Notice of opposition shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

Description

Technical field of the invention

[0001] The present invention relates to a device for maintaining the fabric width of a fabric on a weaving machine.

State of the art

[0002] When weaving fabric on a weaving machine, it is known that the fabric contracts in the weft direction from the beat-up line, that is the line which is formed by the weft thread of the fabric which was last beaten up by the reed.

[0003] Currently, devices for maintaining the fabric width of a fabric on a weaving machine are known, e.g. from EP 0 430 321. Such devices serve to reduce the contraction of the fabric. Devices of this type are often designed as temples, which operate according to the principle of a mandrel which is arranged parallel to the weft direction. By means of needle-like projections which hook into the fabric or by means of friction of the mandrel with the surface of the fabric, the rotating mandrel exerts a lateral force on the fabric in the direction towards the edge of the fabric near which the temple is arranged.

[0004] Such temples have a number of drawbacks. Due to their shape, the temples have to be positioned at a distance from the beat-up line in the warp direction, as a result of which the fabric can still contract at least over this distance. The temples contact the fabric over a contact zone starting from the edge of the fabric in the width direction of the fabric, this is a contact zone in the weft direction. The interaction between the temples and the fabric depends on the type of contact between the temple and the fabric and is consequently not matched to the fabric.

[0005] The use of temples has the drawback that the zones in the width direction of the fabric which contact the temples have to travel a greater distance than the zones where the fabric does not contact the temples. This results in strips of fabric lagging at the lateral sides of the fabric over a certain width in the weft direction with respect to strips in the centre of the fabric. This lagging results in the weave in these strips at the lateral sides of the fabric being distorted. This cannot be completely fixed during the further processing of the fabric. This is a particular drawback in the case of fabrics with weaving patterns.

[0006] Furthermore, a difference in tension of the warp threads across the width of the fabric is constantly measured. Warp threads which are situated closer to the centre of the fabric or the warp beam typically show a higher warp thread tension than warp threads which are situated closer to the edge of the fabric or the warp beam. The warp thread tension measured in relation to the position along the width of the fabric or the warp beam results in a typical bell-shaped curve. A difference in warp thread

tension of 50% can be measured between a warp thread in the centre of the fabric or the warp beam with respect to a warp thread situated on the edge of the fabric or the warp beam.

[0007] This has various drawbacks. Thus, a difference in warp thread tension may result in warp threads and weft threads being woven into the fabric differently locally. Warp threads with reduced or relatively little warp thread tension, also referred to as slack warp threads, may also form an impediment for inserted weft threads. This hampers, for example, the flight of weft threads if they are inserted using air or water. Slack warp threads are often broken by the passing gripper or projectiles if the weft threads are inserted by these grippers or projectiles. In addition, the maximum warp thread tension is determined by the warp thread tension which is established in the centre of the bell-shaped curve. However, the warp thread tension at this maximum warp thread tension in the centre of the curve should not cause any warp threads in the centre to break. In addition, this maximum warp thread tension in the centre should be sufficiently great to prevent slack warp threads along the edge. Particularly with warp threads having a relatively low tensile strength, the adjustment of the warp thread tension may consequently be a problem.

Summary of the invention

[0008] It is the object of embodiments of the present invention to provide a device for maintaining the fabric width of a fabric on a weaving machine, more particularly a device which reduces or even eliminates a difference in distance between beat-up line and cloth beam, over which the edge of the fabric and the centre of a fabric have to travel.

[0009] The above object is achieved by the device for maintaining the fabric width of a fabric on a weaving machine according to the present invention.

[0010] According to embodiments of the invention, a device is provided for maintaining the fabric width of a fabric on a weaving machine. The device comprises at least one guide element for exerting a force on a fabric strip of the fabric in the weft direction, for example a force towards the edge of said fabric strip, intended to maintain the fabric width. The device for maintaining the fabric width furthermore comprises a longitudinal profile which produces a contact surface at the level of the fabric surface which is designed so that said force can be exerted by the guide element. The longitudinal profile is intended to be provided on the fabric strip, for example worked into or woven into the fabric strip, in order to provide a contact surface at the fabric surface on at least one of either the front or the back of the fabric at the level of said fabric strip. Preferably, said force can be exerted over a certain distance in the warp direction, with the longitudinal profile at least being provided over this distance and with said force preferably being exerted starting from the beat-up line, that is to say immediately be-

hind the beat-up line. The guide element extends over at least this distance in the warp direction of the fabric. The guide element can, preferably over this distance, exert said force on the contact surface, for example over the entirety of this distance, by means of a tangent line or tangent surface of contact which extends over this length, or by means of a number of points of contact which are, optionally, evenly distributed over this distance. The contact surface thus extends at least over this distance in the warp direction of the fabric. The fabric strip may be a fabric edge, for example a waste edge. The distance over which said force is exerted is preferably 50 mm or more, such as more than 150 mm, or even more than 200 mm, even 300 mm or more, with a distance in the range of 150 mm to 250 mm being preferred.

[0011] The distance over which the guide element exerts a force, i.e. guides the fabric, is adjusted in such a manner that the weaving of weft threads into the fabric is not, or hardly, affected by the constriction which occurs or can occur in the fabric immediately behind the beat-up line. The next weft thread which is woven into the fabric is hardly, or even not at all, affected by the forces acting on the weft thread when weaving or tying the weft thread into the fabric at the level of the beat-up line. These forces may result in a contraction or constriction of the fabric in the weft direction, more particularly at the level of the beat-up line and a zone in the weft direction of the fabric, immediately behind the beat-up line. The resulting fabric is made more stable by providing the guide elements closely behind the beat-up line and by the guidance by means of these guide element, that is to realise the cooperation of the guide element and the longitudinal profile, over a distance as mentioned above.

[0012] The use of a device for maintaining the fabric width of a fabric on a weaving machine according to embodiments of the invention has as an advantage that lagging of strips of fabric at said fabric strips, in which one or more longitudinal profiles have been provided, for example by working them in or weaving them in, can be partially or completely prevented. One longitudinal profile can be provided near one of the two edges of the fabric in the fabric strips in the warp direction and can provide a contact surface, a longitudinal profile can be provided near both edges of the fabric or a longitudinal profile can be provided at any position in the fabric. The one or more contact surfaces formed by means of the longitudinal profile may be in the form of a thickening of the fabric surface. The one or more longitudinal profiles may form a contact surface, such as thickenings, on either the front or the back of the fabric. The one or more longitudinal profiles may form on both sides of the fabric, i.e. on the front and back side of the fabric, contact surfaces, for example thickenings.

[0013] The contact surface or the contact surfaces, for example the thickening or thickenings, is or are designed to interact with the guide element(s).

[0014] Thus, the longitudinal profile can be dimensionally adapted to produce a thickening in the fabric, on

which the guide element can exert force in the weft direction. The longitudinal profile may form a profiled contact surface.

[0015] The profiled contact surface may comprise perforations or openings, or may be profiled according to a substantially regular or irregular profile, for example serrated or toothed. The longitudinal profile may be a strip, such as for example a perforated strip or a profiled strip. A profiled strip may be profiled in the longitudinal direction, for example a toothed, serrated or perforated strip, or may be a strip provided with a profiled cross section. For example, if the longitudinal profile is a strip, the strip may be profiled along the long side, parallel to the weaving surface. The longitudinal profile may be a hollow or solid plastic duct optionally provided with perforations, or may be a thread or filament with a round, rectangular, wedge-shaped or drop-shaped profiled cross section. The longitudinal profile may be a strand, which may optionally consist of several partial strands. The longitudinal profile may be a steel wire or steel cord.

[0016] The guide elements may be rotating elements, for example wheels or shafts, optionally provided with protuberances, profiles or teeth which mesh with the profiled contact surface, for example in the openings, perforations, the profile or the teeth of the contact surface, i.e. which are designed to interact with the contact surface formed by the longitudinal profile, for example the strip.

[0017] The device according to embodiments of the invention also has as an advantage that it makes an improved, more uniform warp thread tension across the entire width of the fabric possible. As the contact surface formed by the longitudinal profile is designed to interact with the guide element, the guidance, i.e. the application of force in the weft direction by the guide element, is less dependent on the properties of the thread or fabric or on the characteristics of the thread or fabric at the contact surface where the force in the weft direction is exerted.

[0018] If none or one or more temples currently known are used when weaving a fabric, for example when weaving with a warp beam, a difference in tension on the individual warp threads can be measured. Usually, the various warp threads form a bell-shaped tension profile along the width direction of the warp beam, in which the warp threads which are positioned near the edge have a lower warp thread tension than the warp threads which are positioned at the centre of the fabric or at the centre of the warp beam. Likewise, the weft threads, after insertion, do not have a uniform tensile tension in the weft direction along their length as inserted. At the lateral sides of the fabric, the weft threads have a relatively low tensile tension in the weft direction.

[0019] In order to be able to produce a good and uniform fabric, a certain warp thread tension, more particularly a certain tensile tension, is required on the warp threads. In any case, it is desirable for the warp threads to be taut when the shed is formed. In addition, it is necessary to provide tension on each warp thread when each weft thread is beaten up at the beat-up edge formed by

the beat-up line of the fabric, in particular when dense fabrics are being produced.

[0020] The differences in tension between the warp threads not only result in the fabric shrinking or contracting inwards more readily at certain fabric strips, for example fabric edges such as waste edges, but also result in a different weave and different fabric properties in certain fabric strips, for example fabric edges such as waste edges, and even in wider strips of fabric in the weft direction and/or warp direction, adjacent to the fabric strips, for example fabric edges such as waste edges.

[0021] The device according to embodiments of the invention, when used in a weaving machine, results in the contraction of the fabric being prevented near the edges, more particularly at certain fabric strips, for example fabric edges such as waste edges, where the longitudinal profile, for example a thickening, is provided, for example woven in, in order to form a contact surface. This longitudinal profile, which is provided, worked in or woven in, together with the guide element, implies the exertion of a tensile tension on the weft threads in the weft direction, across the entire width of the fabric. If two longitudinal profiles are provided, one near each edge of the fabric, the tensile tension is applied more specifically between both longitudinal profiles, for example thickenings, provided on the fabric. As a tension in the weft direction is provided across substantially the entire width of the fabric, the tension distribution on the warp threads in the warp direction becomes more uniform. It should be noted that the typical bell-shaped tension distribution of warp thread tensions across the width of the fabric and the warp beam at least can be prevented partially or even completely by applying a weft tension on the weft threads or yarns by means of the guide elements. A more uniform tension distribution between the warp threads in the width direction of the fabric can be achieved by using a device according to embodiments of the present invention.

[0022] The use of the device according to embodiments of the invention therefore results in a fabric which, compared to fabrics according to the prior art, has more uniform fabric properties and characteristics across the entire width of the fabric. In addition, as the setting of the warp thread tension depended mainly on the lowest warp thread tension measured, it is possible to weave at a lower general warp thread tension, which is advantageous when weaving warp threads which have a relatively low tensile tension at break. Weaving at a relatively low warp thread tension results in fewer breaks of warp threads during weaving. On the other hand, it allows manufacture of more packed, dense fabrics across the entire width of the weaving machine.

[0023] According to an embodiment of the device according to the invention, the longitudinal profile provided, preferably woven in, can produce or form a thickening on the fabric surface on at least one of either the front or the back of the fabric at said fabric strip, for example the fabric edge, such as the waste edge.

[0024] According to an embodiment of the device ac-

cording to the invention, the longitudinal profile woven in can produce or form a thickening on the fabric surface on the front of the fabric at said fabric strip, for example the waste edge, and/or the longitudinal profile can produce or form a thickening on the fabric surface on the back of the fabric at said fabric strip, for example the waste edge.

[0025] According to an embodiment of the device according to the invention, the guide element may comprise a first, for example bottom, component and a second, for example top, component which are fitted on top of one another and with the first component touching the back of the fabric and the second component touching the front of the fabric. At least one of either the first component or the second component can have at least one point of contact with the contact surface at the longitudinal profile for exerting the force on the longitudinal profile, for example on a woven-in thickening. In particular cases, this is a contact between the first, for example bottom, component and a thickening on the underside or back of the fabric and/or between the second, for example top, component and a thickening on the upper side or front of the fabric.

[0026] According to an embodiment of the device according to the invention, the first, for example bottom, component may have at least one point of contact for exerting the force on said contact surface at the level of the longitudinal profile, for example a thickening, on the back of the fabric, and the second, for example top, component may simultaneously have at least one point of contact for exerting the force on said contact surface at the level of the longitudinal profile, for example a thickening, on the front of the fabric.

[0027] According to an embodiment of the device according to the invention, the first, for example bottom, component and the second, for example top, component may be solid elements.

[0028] According to an embodiment of the device according to the invention, the guide element can touch said contact surface at the longitudinal profile, for example said thickening, along a tangent line or a tangent surface of contact.

[0029] Optionally, the surface of the guide element, which forms said contact surface at the longitudinal profile, may be provided with a coating which lowers the coefficient of friction at the tangent surface of contact or the tangent line between the guide element and the fabric.

[0030] According to an embodiment of the device according to the invention, the guide element can touch said contact surface at the longitudinal profile by means of at least one contact wheel.

[0031] Optionally, more than one contact wheel can be provided which are preferably aligned according to an alignment which is substantially parallel to the warp direction. The contact wheels can be designed as bearings, for example ball bearings, pivot bearings or cylinder bearings. According to alternative embodiments, contact

wheels may be provided, over which a belt, for example a steel belt, may be guided, which contacts the fabric at the longitudinal profile. Contact wheels which form part of the first, for example bottom, and the second, for example top, component may be arranged in a slanted manner in the warp direction.

[0032] According to an embodiment of the device according to the invention, the longitudinal profile may comprise at least one thread element.

[0033] The thread element may be a cable, cord, strand, yarn, thread or filament.

[0034] The longitudinal profile may be a strip having a substantially rectangular cross section. The strip may provide a contact surface by means of the long side of the rectangular cross section, in which said long side can be woven in parallel to the fabric surface. According to an embodiment of the device according to the invention, the substantially rectangular cross section of the strip may have a long rectangle side which is substantially oriented parallel to the front and the back of the fabric. The longitudinal profile, for example the long rectangle side of the strip, may be provided with openings, in which case the guide element may then be provided with protuberances which are designed to engage with the openings. According to an embodiment of the device according to the invention, the longitudinal profile may be provided with a toothed profile, in which case the guide element is provided with a profile which is designed to engage with the toothed profile of the longitudinal profile. According to an embodiment of the device according to the invention, the longitudinal profile may be provided with a serrated profile, in which case the guide element may be provided with a profile which is designed to engage with the serrated profile of the longitudinal profile. These embodiments are advantageous for guiding, by means of the guide element, the fabric at the contact surface produced by the longitudinal profile. The guide element can touch said contact surface by means of at least one contact wheel, which preferably has a profile which engages with the profile and/or the openings of the longitudinal profile, preferably in the form of a strip.

[0035] According to an embodiment of the device according to the invention, the longitudinal profile may be a continuous longitudinal profile.

[0036] According to an embodiment of the device according to the invention, the longitudinal profile may be a link-shaped longitudinal profile.

[0037] According to an embodiment of the device according to the invention, the device may comprise at least one control unit for controlling the position and/or the force exerted by the guide element on said contact surface at the longitudinal profile. Optionally, the control unit can comprise at least one adjusting screw.

[0038] According to an embodiment of the device according to the invention, the device may comprise at least one cutting facility for removing the longitudinal profile from the fabric, more in particular for cutting the fabric strip comprising the longitudinal profile from the remain-

ing fabric.

[0039] The cutting facility is preferably situated downstream of the guide element. The cutting facility is preferably fixedly attached to the guide element.

[0040] According to an embodiment of the device according to the invention, the device may comprise a tensioning unit for exerting a tensile tension in the warp direction on the longitudinal profile. The tensioning unit may be positioned upstream of the beat-up line of the fabric in the warp direction, more particularly in a position near the warp beam. Additionally or alternatively, the device may comprise a tensioning unit to exert a tensile tension in the warp direction on the longitudinal profile, which is positioned behind the beat-up line of the fabric in the warp direction, more in particular in a position near the position where the manufactured fabric is wound up.

[0041] According to an embodiment of the device according to the invention, the longitudinal profile can be woven into the fabric by means of a leno weave or by means of a classic weave or a border weave which is used, for example, for tying up the border warp threads of a fabric.

[0042] According to the invention, the weaving machine comprises at least one and preferably two or even more devices according to the invention.

[0043] Optionally, more than two devices according to the invention may be provided which are arranged along the width of the weaving machine, for example for maintaining the width of two or more fabrics which are produced simultaneously next to one another on the weaving machine. In this case, it is possible not only to provide longitudinal profiles at the fabric strips which are situated near the side sections of the weaving machine, but additionally it is also possible to provide longitudinal profiles at fabric strips which are not situated near the side sections of the weaving machine, the latter being longitudinal profiles in fabric strips which are somewhere in the centre of the weaving machine.

[0044] According to an embodiment of the weaving machine according to the invention, the weft thread can be inserted in the shed by means of a jet of air, a jet of water, projectiles, grippers, a fly shuttle or the like. According to an embodiment of the weaving machine according to the invention, the guide element may exert a force on said contact surface caused by the longitudinal profile immediately behind the beat-up line. According to an embodiment, the guide element extends over a distance in the warp direction in order to be able to exert a force on the fabric via the contact surface which is produced by the longitudinal profile. According to a preferred embodiment, the guide element, which is designed to interact with the longitudinal profile which is provided at a fabric strip of the fabric, extends from the beat-up line of this fabric over a certain distance in the warp direction of this fabric.

[0045] The part of the guide element which is situated closest to the beat-up line is preferably positioned at a distance in the order of magnitude of 0.5 mm to 10 mm.

In the case of a flat reed, the guide element is, for example, positioned at a distance in the order of 0.5 mm to 1 mm from the beat-up line, while in the case of a tunnel reed, this distance is in the order of 0.5 mm to 5 mm. This distance is measured as the shortest distance between the beat-up line and the point of the guide element which is situated closest to the beat-up line. This distance is preferably as small as possible so that weaving weft threads into the fabric is hardly, if at all, affected by a constriction which can occur in the fabric, closely behind the beat-up line.

[0046] Separate and preferential aspects of the invention are described in the attached independent and dependent claims. Features of the dependent claims can be suitably combined with features of the independent claims and with features of other dependent claims, and not only as explicitly described in the claims.

[0047] The reference numerals as used below refer to the attached drawings. Other features, properties and advantages of the present invention will become clear from the following detailed description in combination with the attached figures which, by way of example, illustrate the principles of the invention.

Brief description of the figures

[0048]

Fig. 1 is a top view of a device for maintaining the fabric width of a fabric on a weaving machine according to an embodiment of the present invention. Figure 2 is a cross section of the device in Figure 1 along the line A-A.

Figure 3 represents a perspective view of warp threads and a fabric provided with longitudinal profiles.

Figure 4 represents a cross section of a fabric according to Figure 3.

Figure 5 shows a top view of an alternative device for maintaining the fabric width of a fabric on a weaving machine according to an embodiment of the present invention.

Figures 6 and 7 show a cross section along line VI-VI and line VII-VII in Figure 5.

Figure 8 shows a top view of an alternative device for maintaining the fabric width of a fabric on a weaving machine according to an embodiment of the present invention.

Figure 9 is a cross section of the device in Figure 8 along the line B-B.

Figures 10 to 13 show a number of alternative arrangements of contact wheels which form part of a device according to an embodiment of the present invention.

Figure 14 is a top view of a fabric in which a device according to Figure 1 is arranged on each lateral side.

Figure 15 is a diagrammatic representation of a lon-

gitudinal profile in a fabric, in which the longitudinal profile is a strip according to an embodiment of the present invention.

Figure 16 diagrammatically shows a cross section of an alternative embodiment of a device according to the invention for maintaining the fabric width of a fabric on a weaving machine.

Figure 17 diagrammatically shows an alternative strip, which can be used as a longitudinal profile for a device according to an embodiment of the present invention, in which the longitudinal profile is worked into the fabric.

Figure 18 diagrammatically shows a longitudinal profile incorporated into the fabric by means of a leno weave, according to an embodiment of the present invention.

Figure 19 shows a top view of an alternative device for maintaining the fabric width of a fabric on a weaving machine according to an embodiment of the present invention.

Figure 20 diagrammatically shows a continuous longitudinal profile which can be used as longitudinal profile for a device according to an embodiment of the present invention.

Figure 21 diagrammatically shows a compensator for applying a tensile tension in the warp direction to a longitudinal profile according to an embodiment of the invention.

Figure 22 is a top view of a fabric and several devices according to the invention which have been arranged with respect to the fabric.

[0049] In the figures, identical or analogous elements are denoted by the same reference numerals

Embodiment

[0050] The present invention will be described by means of specific embodiments and with reference to specific drawings; however the invention is not limited thereto, but only limited by the scope of protection of the claims. The drawings and figures are only diagrammatical and non-limiting. In the drawings and figures, the dimensions of some elements may have been enlarged and not drawn to scale for illustrative purposes. The dimensions and relative dimensions do not necessarily correspond to the actual dimensions of physical embodiments.

[0051] Furthermore, the terms first, second, third and similar terms are only used to distinguish between various identical elements and these terms do not necessarily indicate a specific sequence, be that in time, in space, order, succession or in any other way. It will be clear that the terms are interchangeable under suitable circumstances and that the embodiments of the invention which are described herein can work in a sequence which differs from that described or illustrated here.

[0052] Furthermore, the terms top, bottom, upper and

lower, front and back and similar terms in the description and the claims are used for descriptive purposes, and do not necessarily indicate positions relative to one another. It will be clear that the terms are interchangeable under suitable circumstances and that the embodiments of the invention described herein can work in a relative position to one another which differs from that described or illustrated herein.

[0053] It should be noted that the term "comprise" should not be interpreted as being limited to the elements, parts, components or the like which are mentioned thereafter. This term does not exclude any further steps, elements, parts, components or the like. It indicates the presence of elements, parts, components or the like, but does not exclude the presence of one or more elements, parts, components or the like, or groups of elements, parts, components or the like. Thus, the scope of the expression "a device comprising A and B" is not limited to a device which only consists of A and B. It means that, in the light of the present invention, the components or elements which are relevant to the invention are the devices A and B.

[0054] A reference to "one" or "an" embodiment means that specific features, characteristics or structures described in connection with this embodiment are at least incorporated in at least one embodiment according to the invention. Therefore, references to "in an embodiment" or "in one embodiment" in various parts of the description do not necessarily refer to the same embodiment, although they may indeed refer to the same embodiment. Furthermore, the specific features, characteristics or structures may be combined in one or more embodiments, as will be clear to a person skilled in the art.

[0055] Analogously, it should be understood that in the description of embodiments given by way of example, different features of the invention are sometimes gathered under one embodiment, figure or part of the description with the aim of providing a clear description in order to illustrate the various features of the invention. However, this manner of representation does not mean that the invention comprises more features than the manner in which the invention has been defined in the claims. Rather, as will be apparent from the following claims, the inventiveness of the invention is made up of less than all the features of one single previous embodiment as described. Thus, the claims following the description are hereby explicitly incorporated in the detailed description of the invention, with each of the claims per se being a separate embodiment of the invention.

[0056] Furthermore, although some embodiments which have been described herein comprise certain features and not others, combinations of features of the various embodiments are intended to be within the scope of the invention, as will be understood by the person skilled in the art. For example, all the embodiments below may be combined in any kind of possible combination.

[0057] Furthermore, each element of an embodiment of an object or device should be understood as an ex-

ample of a means for carrying out a specific function, which function is achieved by the use of the element with the aim of achieving the invention.

[0058] The attached description describes and illustrates numerous details. However, it should be clear that the invention can be achieved without these specific details. In other cases, well-known methods, structures, elements and the like are not illustrated in order not to render the description unnecessarily unclear in the light of the invention.

[0059] The following terms and definitions are solely intended to aid understanding of the invention.

[0060] The term "longitudinal profile" indicates an object which is provided or woven-in in the longitudinal direction of the fabric, i.e. the warp direction of the fabric. The longitudinal profile has features which differ from those of the warp threads, which features are designed to produce the contact surface of the fabric with the guide element. The dimensions of the longitudinal profile, for example the thickness and/or the profile in cross section along a plane at right angles or in the longitudinal direction, may be designed to provide an advantageous contact surface.

[0061] A "weave-in element" is a longitudinal profile which is provided to the fabric by being woven-in in the longitudinal direction of the fabric together with the warp threads. This weaving-in may be effected by weaving-in the weave-in element with weft yarns of the fabric, or the weave-in element may be woven in by using more specific weave-in weaves, for example a leno weave.

[0062] "Side of the fabric" is either the upper side of the fabric or the underside of the fabric. The front of the fabric is that side of the fabric on the weaving machine which is typically directed upwards in the horizontal plane. The back of the fabric is that side of the fabric on the weaving machine which is directed downwards in the horizontal plane.

[0063] The term "lateral side" is, viewed in the weft direction, the left-hand or right-hand fabric strip of a fabric, which fabric strip extends in the warp direction.

[0064] The "edges" of the fabric extend in the warp direction and are formed by the points of the fabric which form the outermost limit of the fabric in the weft direction.

[0065] The term "fabric strip" is a portion of the fabric in the warp direction, that is the longitudinal direction of the fabric. The fabric strip preferably comprises one of the edges of a fabric, as well as, optionally, a part of the fabric immediately adjacent to said edge. In this case, the fabric strip may also be referred to as the fabric edge. Such a fabric edge is often a waste edge, i.e. a strip of the fabric which is removed after weaving and which is regarded as not being useful as fabric. The fabric strip typically has a width of 2 mm to 30 mm, measured from the edge of the fabric. Alternatively, the fabric strip may also be a strip in the longitudinal direction of the fabric, that is to say in the warp direction, somewhere across the width of the fabric. Such a fabric strip extends in the warp direction and comprises a longitudinal profile ac-

cording to the invention which is provided in the fabric strip in the warp direction.

[0066] The "waste edge" of the fabric is a possible embodiment of a fabric strip, more particularly of a fabric edge. The waste edge of the fabric is a portion of the fabric in longitudinal direction, that is to say the warp direction, which comprises one of the edges of a fabric, as well as a part of the fabric immediately next to said edge. This waste edge is provided in order to be removed during further processing of the fabric. The waste edge typically has a width of 2 mm to 30 mm, measured from the edge of the fabric.

"Solid" means made in one piece.

[0067] The term "thread element" means a cable, yarn, cord, for example a twisted filament strand, or a filament or thread, which filament or thread has a round, oval or profiled shape in cross section, for example a flat, hollow, wedge-shaped, drop-shaped or other suitable cross section.

[0068] The term "strip" means an element having a substantially rectangular cross section. The height of the rectangular cross section of the strip can also be small, so that it has a sheet-like, flat cross section. The strip may, optionally, be perforated in the longitudinal direction or be provided with a profile in the longitudinal direction, for example a toothed or serrated profile, or may have a cross section which is profiled in a different way.

[0069] The invention will now be described with reference to a detailed description of various embodiments of the invention. It will be clear that other embodiments may be configured in accordance with the knowledge of the person skilled in the art without departing from the technical contribution according to the spirit of the invention. The invention is only limited by the terms of the attached claims.

[0070] Figure 1 shows a top view of a first embodiment of a device 100 according to the invention for maintaining the fabric width of a fabric 200 on a weaving machine.

[0071] Figure 2 shows a cross section of device 100 along line A-A. The device 100 comprises:

- At least one longitudinal profile 110 which is intended to be woven into the fabric 200 in the warp direction 210 at one of the fabric strips 225, in the case illustrated into a waste edge 230, thereby forming a contact surface in the form of a thickening 251 and 252 of the fabric surface 240 on at least one of either the front 241 or the back 242 of the fabric 200 at said waste edge 230. In this embodiment, the woven-in longitudinal profile 110 produces thickenings 251 and 252 on both sides, more particularly the front 241 and back 242. As illustrated in Figures 3 and 4, longitudinal profiles 110 may be woven into the fabric 200 and serve as weave-in element. In this case, the longitudinal profile 110 moves, for example, together with one of the planes of warp threads 272, 273 dur-

ing weaving-in in order to then be woven into the fabric 200. Similar to warp threads 272 or 273 the longitudinal profile 110 is in this case woven-in using weft threads 271.

- A guide element 120 for exerting a force on said thickenings 251 and 252 in the weft direction 220 towards the edge 250 of said waste edge 230. The contact surfaces 151 and 161 produced by the longitudinal profile 110, that is to say by the thickenings 251 and 252 of the fabric 200, are designed to allow the guide element 120 to exert a force on the fabric strip 225 at the waste edge 230 towards the edge 250.

The guide element 120 has a first, bottom, component 140 and a second, top, component 130 which are fitted on top of one another. In this case, the top and bottom component 130, 140 form a substantially U-shaped element which clamps laterally over the waste edge 230. The bottom component 140 touches the back 242 of the fabric 200, more particularly touches the thickening 252 on a surface of contact 141. The top component 130 touches the front 241 of the fabric 200, more particularly the thickening 251 on a surface of contact 131. The bottom component 140 and the top component 130 thus have at least one point of contact with the fabric 200 at the longitudinal profile 110 or weave-in element, but in this case more than one point of contact, i.e. a surface of contact 141, 131, respectively, for exerting the force on the thickening 252, 251, respectively, with the force having at least one force component in the weft direction 220 towards the edge 250 of the waste edge 230.

Each of the top and bottom components 130 and 140 comprises a contact element 132, 142, respectively, which provides the surface of contact 131, 141 which touches the thickening 251, 252. The surface of contact 131 or 141 exerts a lateral force on the thickening 251, 252, which force has at least one force component in the weft direction 220 towards the waste edge 230. Each of the top and bottom components 130 and 140 comprises at least one control unit, in this case a pair of adjusting screws 133 and 143 for adjusting the position and/or the force exerted by the guide element 120 on said thickening 251, 252.

The device 100 furthermore possibly comprises one cutting facility 300 for removing the longitudinal profile 110 from the fabric 200. In this case, the longitudinal profile 110 is cut from the fabric 200 together with the waste edge 230. Relative to the beat-up line 180, this cutting facility 300 is positioned downstream of the spot where the surfaces of contact 131, 141 of the guide element 120 exert a force on the fabric 200 at the level of the longitudinal profile 110. As can be seen in Figure 1, the cutting facility 300 is arranged at a distance from the beat-up line 180

in the warp direction 210 which is determined by the dimensions of the guide element 120.

[0072] The fact that the longitudinal profile 110 produces a contact surface 251, 252 which is adapted so that the guide element 120 can exert a force over a certain distance L in the warp direction 210 from the beat-up line 180 in the direction of travel of the fabric 200, more particularly in which the guide element 120 immediately behind the beat-up line 180 and over this specific distance can exert a force on the contact surface by means of the longitudinal profile 110 which extends at least over this distance, offers the advantage that the local weaving-in of warp threads and weft threads at the level of a fabric strip 225 which is situated near an edge 250 hardly differs from the local weaving-in at the centre of the fabric 200. In order to achieve a uniform fabric, it is advantageous to select the distance L to be in the order of magnitude from 200 mm, and even greater than 300 mm.

[0073] An alternative device 2100 is shown in Figures 5 to 7. Identical reference numerals refer to elements which are identical or functionally similar to those in Figure 1. This device 2100 differs from the one in Figure 1 in that the top and bottom component 130 and 140, in this embodiment coupled to one another by means of a bolt connection 2101, can be displaced simultaneously in the weft direction 220 adjustably by means of one adjusting screw 2133. The two components 130 and 140 are secured with respect to the weaving machine by means of a holder 2102. Both the top and the bottom component 130, 140 each have a part 2130 and 2140, respectively, which is directed to the edge 250 of the fabric 200, where the guide element 120 is only present on the side of the thickening 251 and 252 directed to the centre of the fabric 200, that is to say away from the edge 250. Optionally, the holder 2102 can extend up to these parts 2130 and 2140. Similarly to the top and bottom component 130, 140, respectively, of the device 100 from Figure 1, the top and bottom component 130, 140 contact the thickening 251, 252, respectively, in which case a force is exerted on the longitudinal profile 110 serving as weave-in element which has at least one force component in the weft direction 220 towards the edge 250 of the waste edge 230.

[0074] Figure 8 shows a top view of an alternative embodiment of a device 500 according to the invention for maintaining the fabric width of a fabric 200 on a weaving machine. Figure 9 shows a cross section along line B-B of device 500. Identical reference numerals refer to identical or similar elements. The device 500 comprises:

- A longitudinal profile 510 serving as weave-in element which is woven into the fabric 200 in the warp direction 210 at the level of one of the fabric strips 225, in the illustrated example being the waste edges 230. This longitudinal profile 510 produces a contact surface in the form of a thickening 251 and 252 of the fabric surface 240 on at least one of either the

front 241 or the back 242 of the fabric 200 at said waste edge 230. In this embodiment, the longitudinal profile 510 produces a thickening 251 and 252 on both sides, more particularly the front 241 and back 242, of the fabric 200.

- A guide element 520 for exerting a force on said thickening 251 and 252 in the weft direction 220 towards the edge 250 of said waste edge 230. In this case, the longitudinal profile 510 is again designed to allow the fabric 200 to interact with the guide element 520.

[0075] The guide element 520 has a first, bottom, component 540 and a second, top, component 530 which are fitted on top of one another. In this case, the top and bottom component 530, 540 form an substantially U-shaped element which clamps laterally over the waste edge 230. The bottom component 540 touches the back 242 of the fabric 200, more particularly touches the thickening 252 by means of a number of (in this example three) contact wheels 541, for example bearings which are rotatably mounted on a shaft 544, so that the contact wheels 541 roll against the thickening 252 and thereby exert a lateral force which is defined by a surface of contact 141 between the contact wheel 541 and thickening 252. The top component 530 touches the front 241 of the fabric 200, more particularly the thickening 251, by means of a number of (in this example three) contact wheels 531, for example bearings which are rotatably mounted (on a shaft 534) so that the contact wheels 531 roll against the thickening 251 and thereby exert a lateral force which is defined by a surface of contact 131 between the contact wheel 531 and thickening 251. The bottom component 540 and the top component 530 thus each have three points of contact or surfaces of contact for exerting the force on the thickening 252, 251, respectively.

[0076] Examples of suitable bearings are ball bearings which comprise an inner ring and an outer ring between which balls are provided. The inner and outer rings are attached to a common shaft so as to be rotatable with respect to one another. The inner ring may be securely mounted on the shaft 534 or 544. The outer ring can remain in a rotational arrangement and act as contact wheel or running wheel, in which case it contacts the fabric at the longitudinal profile 510. The running wheels or contact wheels of top and bottom components 530, 540 may be mounted in different ways, as is clearly illustrated in Figures 10 to 13. As illustrated in Figure 10, the rotation shafts 534 and 544 may, for example, enclose an angle of at most 20° with a plumb line to the fabric surface 240 of the fabric 200. The term plumb line is intended to mean the line which is perpendicular to the fabric surface 240. Alternatively, as illustrated in Figure 11, the rotation shafts 534 and 544 may be oriented substantially parallel to the fabric surface 240. According to an alternative (not illustrated), the rotation shafts 534 and 544 may be oriented at substantially right angles to the

fabric surface 240.

[0077] The successive contact wheels 531 and 541 above and below the fabric 200 may be arranged in a slanted or displaced manner, in which case the fabric 200 is virtually not undulated, as represented in Figure 12. Alternatively, the successive contact wheels 531 and 541 above and below the fabric 200 may be arranged in a slanted manner and moved towards one another in a direction at right angles to the weaving surface, so that the fabric 200 is undulated between successive contact wheels, as represented in Figure 13.

[0078] Each of the top and bottom components 530 and 540 comprises a support element 532 and 542, respectively, which supports the contact wheels 531, 541 and positions the contact wheels 531, 541. Each of the top and bottom components 530 and 540 comprises at least one control unit, in this case a pair of adjusting screws 533 and 543 for adjusting the position or the force exerted by the guide element 520 on said thickening. Adjusting the force exerted by the guide element 520 on said thickening is effected by adjusting the position of the support elements 532, 542 and thereby the position of the contact wheels 531, 541.

[0079] The device 500 furthermore possibly comprises one cutting facility 300 for removing the longitudinal profile 510 from the fabric 200. Relative to the beat-up line 180, this cutting facility 300 is situated downstream of the spot where the surfaces of contact 531, 541 of the guide element 520 exert a force on the woven-in longitudinal profile 510.

[0080] Reducing the friction force between the fabric and the surface of contact, tangent line, points of contact or contact wheels can slightly improve the operation of the device according to embodiments of the invention.

[0081] It has been found that if the series of points of contact, for example the points of contact of the contact wheels, or the tangent lines or tangent surfaces of contact, is made to taper slightly towards the centre of the fabric in the warp direction for discharging the fabric, this results in improved control of the progress of the fabric and improved control of the force exerted in the weft direction by the contact surfaces.

[0082] As illustrated in Figure 14, the fabric 3000 may be provided with a guide element 3010 which interacts with a longitudinal profile 3011 on the right-hand fabric strip 3001 of the fabric 3000. The fabric 3000 may furthermore be provided with a guide element 3020 which interacts with a longitudinal profile 3021 on the left-hand fabric strip 3002 of the fabric 3000. The guide elements 3010 and 3020 are both directed towards the centre of the fabric 3000 according to the direction of travel 3003 of the fabric 3000, so that the tangent lines or tangent surfaces for each of the guide elements 3010, 3020 form an angle H with the direction of travel 3003 of the fabric 3000. The angle H may, for example, be one to five degrees. From near the beat-up line 180, each guide element 3010 and 3020 extends over a certain distance in the direction of travel 3003 of the fabric 3000.

[0083] The longitudinal profile 110, 510, 3010, 3020 serving as weave-in element is preferably subjected to a tensile tension in the warp direction, which tensile tension will compensate for the friction force between the fabric, more particularly the thickenings in the fabric, and the point of contact or the series of points of contact with the fabric at the level of the longitudinal profile 110, 510, 3010, 3020, for example the points of contact of the contact wheels, the tangent lines or tangent surfaces of contact.

[0084] The devices 100, 2100 and 500 have similar advantages. The contact elements 132, 142 or the contact wheels 531, 541 ensure that, following the weaving-in of the longitudinal profile 110, 510 into the fabric, for example similarly to one of the warp threads of the fabric, the worked-in or woven-in longitudinal profile remains positioned in the weft direction in a position controlled along the weft direction, for example relative to the reed 181 of the weaving machine. Although the fabric will tend to shrink or contract in the weft direction, the contact with the guide elements will prevent the thickening from moving inwards, that is to say in the direction towards the centre of the fabric or away from the edge of the fabric in the width direction or weft direction. In other words, the guide elements will exert a force on the thickening, that is to say on the longitudinal profile, in the weft direction at the level of the fabric strip provided with the longitudinal profile, in this case the waste edge, in order to keep the thickening, and consequently the fabric strip, in this case the waste edge of which the thickening forms part, in position along the width. As the fabric cannot shrink or contract in an uncontrolled manner, the fabric will run relatively straight from the beat-up line in the warp direction. The lateral sides or strips on the lateral side of the fabric will also lag less or even no longer with respect to the centre of the fabric. Furthermore, in view of the fact that the tension of the fabric in the weft direction is maintained over a relatively long distance, for example the distance L as illustrated in Figure 1, the warp thread tension will also be kept up more readily towards the edges and the weaving-in at the level of the fabric strips, in this case waste edges, will proceed more identically compared to the weaving-in at the level of the centre of the fabric, and the fabric characteristics and features will not, or hardly, change towards the lateral sides of the fabric as a result of the position along the width of the fabric.

[0085] Various longitudinal profiles serving as weave-in elements are possible for the devices 100, 2100 and 500. The longitudinal profiles may, on the one hand, be thread elements, for example a cable, yarn, cord, filament or thread, which thread elements have a round, oval, profiled, flat, hollow, wedge-shaped, drop-shaped or other suitable cross section. Alternatively, the thread element may also be a twisted strand. Such a thread element may have a cross section of, for example, 3 mm. The thread element may, optionally, also be perforated, serrated or toothed if the transverse profile permits this.

[0086] On the other hand, substantially profiled, pref-

erably flat, strips may be used as longitudinal profile. The strips, which preferably have a substantially rectangular cross section, have the advantage that they can be rolled up in a simple manner around a shaft parallel to the long side of the rectangular cross section, which is advantageous when supplying the longitudinal profile to the shed and/or winding up following the removal of the longitudinal profile from the fabric strip by cutting, for example the waste edge.

[0087] A strip can, for example, be guided in known healds for forming the shed. Alternatively, as illustrated in Figure 15, a longitudinal profile 603 in the form of a relatively rigid strip can be moved up and down in a bistable form. The longitudinal profile 603 is guided via a small fork 602. The small fork is, for example, formed by a slot 604 in the shaft of a motor which turns to and fro in a synchronous manner with the motor of the weaving machine. When the motor rotates, the strip will turn over at a certain position of the small fork 602 from a position 600 illustrated by a dashed line to the position of the longitudinal profile 603 illustrated by a full line. Together with the other warp threads 610, a shed 611 will be formed, in which a weft yarn or thread will be inserted in order to form a fabric 620, more particularly a fabric 620 into which the longitudinal profile 603 in the form of a strip is woven.

[0088] The longitudinal profile 603 in the form of a strip may be provided with perforations, which are equidistant from one another. A lateral force can be exerted by means of toothed wheels or rollers, which may optionally be driven rotationally.

[0089] Figure 16 shows a cross section of an alternative embodiment of a device 1400 according to the invention for maintaining the fabric width of a fabric 200 on a weaving machine. Identical reference numerals refer to elements which are identical or similar to those of previous embodiments. The device 1400 comprises:

- A longitudinal profile 1410 which is woven into the fabric 200 in the warp direction 210 at one of the fabric strips 225, in this case waste edges 230, in which case a perforated strip 1410 which comprises a part serving as contact surface 1411 is woven into the fabric 200 at said waste edge 230. In this embodiment, the longitudinal profile 1410 does not produce any significant thickening. The contact surface 1411 is formed at perforations 1412 in the longitudinal profile 1410.
- A guide element 1420 for exerting a force on the contact surface 1411 in the weft direction 220 towards the edge 250 of said waste edge 230. In this case as well, the longitudinal profile 1410 is designed to interact with the guide element 1420.

[0090] The guide element 1420 has a bottom component 1440 and a top component 1430 which are fitted on top of one another. In this case, the top component 1430

forms a support for one or more contact wheels 1450 which are provided with protuberances 1451, which engage in perforations 1412 of the perforated longitudinal element 1410. The protuberances 1451 which engage in the perforations 1412 ensure that the fabric 200 is unable to move to any significant degree, more particularly to shrink or contract in the weft direction 220. As a result, the guide element 1420 exerts a force on the longitudinal profile 1410 and thus on the fabric 200 in the weft direction 220 towards the edge 250.

[0091] The bottom component 1440 is in this case designed as a flat surface over which the back 242 of the fabric 200 slides. In an alternative embodiment, the bottom component 1440 is similar to the top component 1430 and also comprises contact wheels having protuberances which fit into the perforations 1412 or into additional perforations or openings of the longitudinal profile 1410.

[0092] The thickness of the strip, which may, for example, be a polymer strip, can be, for example, between 0.1 mm and 10 mm, in a preferred embodiment for example 0.5 mm. The contact wheels 1450 which engage in the perforations 1412 by means of the protuberances 1451 (for example protuberances with rounded ends) can rotate freely at the same time as, that is to say rotate on, the fabric, or may be driven by means of a suitable motor. The latter has the advantage that the longitudinal profile 1410 is tensioned in the warp direction, which further limits shrinking or contracting of the fabric 200 in the weft direction 220.

[0093] The protuberances 1451, optionally provided with blunt pointed tips, penetrate into the perforations 1412 between the weft yarns in order to thus exert a lateral force on the contact surface of the strip 1410.

[0094] The device 1400 has advantages which are similar to those of the devices 100, 2100 and 500.

[0095] The contact elements, for example the contact wheels, ensure that, once the longitudinal profile has been worked into the fabric, for example as one of the warp elements of the fabric, the longitudinal profile remains in a controlled position in the weft direction with respect to the reed of the weaving machine. Although the fabric will tend to shrink or contract in the weft direction, the contact with the guide elements will prevent the longitudinal profile from moving inwards, that is to say in the direction towards the centre of the fabric in the width direction or weft direction. In other words, the guide elements will exert a force on the longitudinal profile which has at least one force component in the weft direction towards the edge of the fabric in order to keep the longitudinal profile and consequently the fabric strip, in this case the waste edge in which the longitudinal profile has been worked into, in position across the width.

[0096] As the fabric cannot shrink or contract in an uncontrolled manner, the fabric will run relatively straight from the beat-up line 180 in the warp direction. The lateral sides or fabric strips on the lateral side of the fabric will also lag less or even no longer with respect to the centre

of the fabric. Furthermore, in view of the fact that the tension of the fabric in the weft direction is maintained over a relatively long distance, more particularly over the distance over which the guide element contacts the fabric at the level of the longitudinal profile worked into or provided in the fabric in the warp direction, the warp thread tension will also be kept more leveled towards the edges and the weaving-in at the level of the fabric strips, in this case for example the waste edges, will be more identical compared to the weaving-in at the centre of the fabric, and the fabric characteristics and features will not, or hardly, change towards the lateral sides of the fabric as a result of the position along the width.

[0097] An alternative for the longitudinal profile used in the embodiment of Fig. 16 and designed as a flat strip is a longitudinal profile 700 in the form of a laterally toothed strip, as illustrated in Figure 17. Such a longitudinal profile 700 is provided in the warp direction, for example in such a manner that the teeth 701 are situated between two warp threads 710. The weft yarns or threads may arrange themselves around or between the teeth 701. In this case, some weft threads 720 may be in the incisions 703, 704 of the teeth 701, so that the longitudinal profile 700 is worked or incorporated into the fabric and becomes attached to the fabric. In this case, the worked-in longitudinal profile 700 has a specific position relative to the fabric. A guide element 120 provided with a contact element 132 can exert a lateral force on the projecting teeth 702 which protrude from the fabric. According to a variant, the strip 700 may also be a T- or L-shaped profile, optionally with interruptions in the T- or L-edge.

[0098] According to an alternative embodiment, the longitudinal profile is designed as a link-shaped longitudinal profile, for example a chain comprising a series of links, for example substantially flat links. Each pair of successive links is connected to one another so that the links can pivot relative to one another about a hinge pin.

[0099] All the hinge pins of each pair of links are preferably substantially parallel and perpendicular to the longitudinal direction of the chain formed. When such a chain is woven-in, the longitudinal direction of the chain is parallel to the warp direction of the fabric, and the direction of the hinge pins is substantially parallel to the weft direction of the fabric. The longitudinal profile in this embodiment is very flexible in order to be able to bend around a shaft parallel to the weft direction of the fabric. The longitudinal profile may at the same time be difficult to bend or may not bend in a direction perpendicular to the warp direction and perpendicular to the weft direction of the fabric. This ensures that forces in the weft direction via the longitudinal profile can be passed on to the edge of the fabric by means of this longitudinal profile, while the longitudinal profile can readily move along during shed-forming in order to form the fabric. This facilitates weaving-in of the longitudinal profile. In addition, a longitudinal profile designed as a chain can readily be subjected to tensile load.

[0100] Another alternative embodiment of a longitudinal

profile is a rigid rod which is supported by means of a guide element relative to the weaving machine and which is concomitantly woven-in into the fabric strip, for example the waste edge of the fabric. During weaving, the fabric will move in the warp direction relative to this rigid rod which is positioned at a fixed distance from the beat-up line. The weft yarns, which are present above and below the rod as a result of the rod being woven in, will displace relative to the rod in the warp direction. The weft yarns will slide off the beat-up line of the rod, as it were over the rod. At a distance from the beat-up line, the weft threads can be cut at the rod by a cutting facility 300 in order to allow the rod to be removed from the fabric. The longitudinal profile, i.e. the rod, may interact with a guide element which exerts a force on the longitudinal profile in the weft direction of the fabric.

[0101] Alternatively, as is illustrated in Figure 18, the longitudinal profile 800 is woven into the fabric in the form of a leno weave 801. In this case, with a fabric made from warp threads 810 and weft threads 820 which are woven in in accordance with a weaving pattern, a longitudinal profile 800 is woven-in in the warp direction with the aid of a leno weave 801 by means of leno warp threads 802 and 803, each of which is swung around the longitudinal profile 800, in which case all weft threads 820 extend below the longitudinal profile 800. The longitudinal profile 800 is woven-in by means of such a leno weave 801 at a certain fabric strip, for example a waste edge.

[0102] The force exerted on the longitudinal profile by the guide element, for example by means of the thickening of the fabric produced by the longitudinal profile or by means of the worked-in longitudinal profile itself, is preferably adjustable, as an excessively great force may cause excessive friction with the guide element, which may cause renewed lagging of lateral fabric strips of the fabric.

[0103] The control units for controlling the force may be one or more adjusting screws, but may also comprise actuators which position the points of contact, surfaces of contact or contact wheels of the guide element. The controller may operate to adjust a predetermined position or to adjust a predetermined force. They may comprise position actuators or force actuators, optionally with sensors which measure the tension and/or the force on the guide elements. Figure 19 illustrates an embodiment in which guide elements 120 are provided which are arranged so as to be rotatable about a shaft 310 and can be rotated between two stops 320 and 330. The guide element 120 is forced against the stop 320 by means of, for example, a spring 340. On account of the force of the fabric, the guide element 120 is able to move counter to the force of the spring 340 in order to limit the force exerted on the fabric. The movement of the guide element 120 counter to the force of the spring 340 can be limited by the stop 330. According to an embodiment, it is also possible to provide adjusting means to adjust the force exerted by the spring. The stop 320 is provided in order to limit the movement of the guide element 120 when the

fabric tension is absent. This not only allows the adjustment of the force which is exerted on the fabric by means of the device according to embodiments of the invention, but also allows the angle which the device according to embodiments of the invention occupies relative to the fabric to adjust itself in a suitable manner, so that the advantages as described in connection with the embodiment of Figure 14 are also achieved in this case.

[0104] According to a variant, which is not illustrated, the spring 340 can also be replaced by a weight which exerts a specific force on the guide element.

[0105] In order to be able to achieve different fabric thicknesses, the intermediate distance between the top component and the bottom component can be adjusted by spacers which are fitted between the two components, for example by providing washer plates 190 between the components 530 and 540, as illustrated in Figure 9.

[0106] It is possible to modify the surface characteristics of the points of contact, surfaces of contact or contact wheels of the guide elements and/or to use other radii of curvature and/or to provide run-in funnels on the side of the guide elements directed towards the beat-up line, and the like.

[0107] The cutting facility for removing the longitudinal profile from the fabric may be shears having two cutting blades, at least one cutting blade of which is arranged so as to be able to move. The cutting facility may be a heat cutter or an ultrasound cutter. The cutting facility may be a circular blade, optionally mounted rotatably on a motor shaft. The cutting facility may be a passively arranged blade, for example a razor blade, along which the fabric travels. The cutting facility is preferably fixedly attached to the guide element, so that the relative position of the cutting facility with respect to the guide element remains constant if the guide element is repositioned.

[0108] The longitudinal profile 900 may be a continuous weave-in element 901, as illustrated in Figure 20. After the weave-in element 901 has been woven-in and guided by means of the guide element 902, the continuous weave-in element 901 can be cut from the fabric and returned to the rear 903 of the weaving machine where it is again fed to the shed 904.

[0109] After cutting, the weave-in element 901 is preferably provided with a tensile tension in the warp direction. The device may therefore also be provided with a means for exerting a tensile force on the weave-in element, preferably on the weave-in element after it has been released from the fabric. This additionally prevents variations in the warp thread tensions in the width direction from occurring, since the tensile tension partially cancels out the friction forces of the contact surfaces.

[0110] The longitudinal profile 1001 may be tensioned by means of a tensioning unit, for example a compensator 1000, as represented in Figure 21. The longitudinal profile is provided with a pulley 1002, which pulley 1002 is suspended between two fixedly arranged running wheels 1003 and 1004. A possibly adjustable weight 1008 determines the force which is exerted parallel to the centre

axis of the longitudinal profile, i.e. in the warp direction of the fabric. Following the weaving of the fabric and removal of the longitudinal profile from the fabric, additional longitudinal profile becomes available, which allows the pulley 1002 to be lowered under force, for example the gravitational force. A bottom position detector 1006 will generate a first signal the moment the pulley reaches the detector 1006. The signal of detector 1006 will be used to activate the drive mechanism of the driven running wheel 1004. As a result, the longitudinal profile 1001 which is situated between the running wheels 1004 and 1005 is removed from the loop and the pulley 1002, optionally with a weight, will move upwards until the pulley 1002 is at a top position detector 1007 which monitors the top position of the pulley. When the pulley 1002 is at the detector 1007, a second signal will be generated by the detector 1007 which deactivates the drive mechanism of running wheel 1004.

[0111] A system may be provided to roll up the longitudinal profile after it has been removed from the fabric, for example onto a suitable reel. When the reel is full, the same reel may, optionally, be used to feed the longitudinal profile to the shed again by arranging for the reel to supply longitudinal profile at the rear of the weaving machine again and, for example, unwinding it at a preset tension.

[0112] It will be clear that the device according to embodiments of the invention can not only be used at a lateral section of the weaving machine. Figure 22 describes an embodiment in which, in addition to two devices 3010, 3020 which are arranged at fabric strips 3001, 3002 near a lateral section of the weaving machine, also two devices 3040, 3050 according to the invention are provided at a fabric strip 3006 near the centre of the weaving machine or near the centre of the fabric 3000. The devices 3040 and 3050 may be of a design similar to the devices 3010 or 3020. This embodiment can, for example, be used if a fabric 3000 is woven which, after weaving, is cut in two pieces 3210 and 3220 by means of a cutting facility 3100. The devices 3040 and 3050 in this case also serve to keep the fabric 3000 produced in a fixed or substantially fixed position and/or for maintaining the fabric width of a fabric 3000 which is provided with at least one longitudinal profile 3011, 3021, 3041 and/or 3051.

[0113] The system may be provided with a means for measuring the warp thread tension distribution along the width of the fabric or warp beam by using, for example, more than one warp thread tension meter. The means for measuring the warp thread tension distribution may be provided in order to measure the tension in the warp threads behind the frames. The means for measuring the warp thread tension distribution may be provided for measuring the fabric tension across the width of the fabric behind the beat-up line or behind the guide element or the guide elements. The means for measuring the warp thread tension distribution may be used to generate control signals which may be used, for example, by the cen-

tral machine control in order to generate certain operations, such as for example emitting error messages, controlling the warp beam drive, controlling any actuators on the guide elements, controlling the tension on the longitudinal profile and/or other similar operations.

[0114] One or more devices for maintaining the fabric width of a fabric on a weaving machine can be used on different types of weaving machines, such as for example weaving machines in which the weft is introduced into the shed via a jet of air, a jet of water, projectiles, grippers, fly shuttles or the like.

[0115] Possibly, modifications may be made to other parts of the weaving machine in order to better incorporate the device according to the invention into the operation of the weaving machine. The guide element is preferably positioned on the weaving machine as closely as possible to the beat-up line of the fabric, so that the force in the weft direction can be applied as closely as possible to the beat-up line. The form of the reed, which beats weft threads or yarns against the beat-up line, may possibly be modified in its form in order to prevent contact in the end position of the reed, that is to say the moment when it hits the beat-up line. For example, in the case where a tunnel reed is used, which are used with weaving machines which introduce weft threads using air, the guide element can penetrate as far as into the tunnel. Optionally, the top or bottom lip of the tunnel can be omitted in places. Optionally, a reed with a funnel can be used. A reed 180 may, for example, be designed as a flat reed or as a tunnel reed, as described in W099/64654.

[0116] It is also possible to modify the fabric support in order to make it possible to fit the guide elements as closely as possible to the beat-up line. The fabric support may be provided with an incision in order to compensate for the thickening of the fabric on the back of the fabric, caused by the longitudinal profile. Optionally, the fabric support may be omitted in places, at the thickening in the fabric. The supporting function can be performed by the bottom component of the guide element. Optionally, it is also possible to use a removable fabric support.

[0117] Optionally, the bottom component may be designed to be slightly shorter than the top component, so that during fitting the top component protrudes further forward, that is to say closer to the beat-up line, than the bottom component.

[0118] Although the invention has been described with reference to preferred embodiments, it will be clear to the person skilled in the art that various changes and modifications regarding form and detail are possible without departing from the scope of protection of the claims of the present invention.

Claims

1. Device (100, 400, 500, 1400, 2100) for maintaining the fabric width of a fabric (200, 3000) on a weaving machine, which device comprises a guide element

(120, 520, 1420) for exerting a force in the weft direction (220) on a fabric strip (225, 226, 3001, 3002, 3006) of the fabric (200, 3000), **characterised in that** the device for maintaining the fabric width further comprises a longitudinal profile (110, 510, 600, 700, 800, 901, 1410) which produces a contact surface (251, 252, 1411) which is designed so that said force can be exerted thereon by the guide element and in which the longitudinal profile, when used in a weaving machine is provided on the fabric strip (225, 226, 3001, 3002, 3006) in the warp direction (210).

2. Device (100, 400, 500, 1400, 2100) according to Claim 1, in which the longitudinal profile (110, 510, 600, 800, 901, 1410) comprises a weave-in element which is intended to be woven into the fabric strip (225, 226).
3. Device (100, 400, 500, 2100) according to any of Claim 1 to 2, in which the longitudinal profile (110, 510) produces a thickening (251, 252) of the fabric surface at the level of said fabric strip, at least on the front (241) of the fabric or the back (242) of the fabric.
4. Device (100, 400, 500, 1400, 2100) according to Claim 3, in which the guide element (120, 520, 1420) comprises a first component (140, 540, 1440) and a second component (130, 530, 1430) which are fitted on top of one another, with the first component touching the back (242) of the fabric and the second component touching the front (241) of the fabric, and in which at least one of either the first component or the second component has at least one point of contact for exerting the force on said thickening.
5. Device (100, 500) according to any of Claims 3 or 4, in which the guide element (120, 520) touches said thickening along a tangent line or a tangent surface of contact (131, 141).
6. Device (500, 1400) according to any of Claims 1 to 5, in which the guide element (520, 1420) touches the contact surface by means of at least one contact wheel (531, 541, 1450).
7. Device according to any of Claims 1 to 6, in which the longitudinal profile comprises at least one thread element.
8. Device (1400) according to any of Claims 1 to 2, in which the longitudinal profile is a strip (1410), in which the strip (1410) has a substantially rectangular cross section with a long rectangle side which is oriented substantially parallel to the front and back of the fabric.
9. Device according to any of Claims 1 to 8, in which the device (100, 500, 2100) comprises at least one

control unit (133, 143, 533, 543, 2133) for controlling the position and/or the force exerted by the guide element on said contact surface.

10. Device according to any of Claims 1 to 9, in which the device (100, 500) comprises at least one cutting facility (300) for removing the longitudinal profile (110, 510) from the fabric and/or in which the device comprises a tensioning unit (1000) for exerting a tensile tension in the warp direction on the longitudinal profile.
11. Device according to any of Claims 1 to 10, in which the longitudinal profile (800) is woven into the fabric by means of a leno weave (801).
12. Device according to any of Claims 1 to 11, in which the device comprises a longitudinal profile (110, 510, 600, 700, 800, 901, 1410) which produces a contact surface (251, 252, 1411) which is designed for exerting said force by the guide element over a distance in the warp direction of equal to or greater than 50 mm, and in which the longitudinal profile is intended to be provided at the fabric strip (230) over at least this distance.
13. Weaving machine which comprises at least one device according to any of Claims 1 to 12.
14. Weaving machine according to Claim 13, in which the guide element extends over a distance in the warp direction in order to exert a force on the fabric via a contact surface which is produced by the longitudinal profile.
15. Weaving machine according to Claim 13 or 14, in which the guide element is arranged immediately behind a beat-up line in order to exert a force on the contact surface.

Patentansprüche

1. Vorrichtung (100, 400, 500, 1400, 2100) zum Behalten der Gewebebreite eines Gewebes (200, 3000) auf einer Webmaschine, welche Vorrichtung ein Führungselement (120, 520, 1420) enthält zum Ausüben einer Kraft in der Schussrichtung (220) auf einem Gewebeband (225, 226, 3001, 3002, 3006) des Gewebes (200, 3000), **dadurch gekennzeichnet dass** die Vorrichtung zum Behalten der Gewebebreite weiter ein Längsprofil (110, 510, 600, 700, 800, 901, 1410) enthält dass eine Kontaktfläche (251, 252, 1411) erbringt die so ausgebildet ist dass die genannte Kraft darauf ausgeübt werden kann durch das Führungselement und, in der das Längsprofil, wenn angewendet auf einer Webmaschine, vorgesehen ist auf den Gewebeband (225, 226,

3001, 3002, 3006) in der Kettrichtung (210).

2. Vorrichtung (100, 400, 500, 1400, 2100) nach Anspruch 1, in der das Längsprofil (110, 510, 600, 800, 901, 1410) ein Einwebelement enthält, dass in den Gewebeband (225, 226) gewebt werden soll.
3. Vorrichtung (100, 400, 500, 2100) nach einem der Ansprüche 1 bis 2, in der das Längsprofil (110, 510) eine Verdickung (251, 252) der Gewebefläche erbringt im Bereich des genannten Gewebebandes, mindestens auf der Vorderseite (241) des Gewebes oder der Rückseite (242) des Gewebes.
4. Vorrichtung (100, 400, 500, 1400, 2100) nach Anspruch 3, in der das Führungselement (120, 520, 1420) einen ersten Bestandteil (140, 540, 1440) und einen zweiten Bestandteil (130, 530, 1430) enthält die oben aufeinander befestigt sind, der erste Bestandteil die Rückseite (242) des Gewebes berührt und der zweite Bestandteil die Vorderseite (241) des Gewebes berührt, und in der mindestens einer der beiden der erste Bestandteil oder der zweite Bestandteil mindestens einen Kontaktpunkt hat zum Ausüben der Kraft auf genannter Verdickung.
5. Vorrichtung (100, 500) nach einem der Ansprüche 3 oder 4, in der das Führungselement (120, 520) die genannte Verdickung entlang einer Tangentiallinie oder einer Tangentialfläche des Kontaktes (131, 141) berührt.
6. Vorrichtung (500, 1400) nach einem der Ansprüche 1 bis 5, in der das Führungselement (520, 1420) die Kontaktfläche mittels mindestens ein Kontaktrad (531, 541, 1450) berührt.
7. Vorrichtung nach einem der Ansprüche 1 bis 6, in der das Längsprofil mindestens ein Fadenelement enthält.
8. Vorrichtung (1400) nach einem der Ansprüche 1 bis 2, in der das Längsprofil ein Streifen (1410) ist, in der der Streifen (1410) einen im wesentlichen rechteckigen Querschnitt mit einer langen rechteckigen Seite hat, welche im wesentlichen parallel zur Vorderseite und Rückseite des Gewebes orientiert ist.
9. Vorrichtung nach einem der Ansprüche 1 bis 8, in der die Vorrichtung (100, 500, 2100) mindestens eine Steuereinheit (133, 143, 533, 543, 2133) enthält zum Steuern der Position und/oder der Kraft ausgeübt durch das Führungselement auf genannter Kontaktfläche.
10. Vorrichtung nach einem der Ansprüche 1 bis 9, in der die Vorrichtung (100, 500) mindestens einen Schneidapparat (300) enthält zum Entfernen des

Längsprofils (110, 510) vom Gewebe und/oder in der die Vorrichtung eine Spannungseinheit (1000) enthält zum Ausüben einer Zugspannung in der Kett- richtung auf dem Längsprofil.

11. Vorrichtung nach einem der Ansprüche 1 bis 10, in der das Längsprofil (800) in das Gewebe mittels eine Dreherbindung (801) gewebt ist.
12. Vorrichtung nach einem der Ansprüche 1 bis 11, in der die Vorrichtung ein Längsprofil (110, 510, 600, 700, 800, 901, 1410) enthält dass eine Kontaktfläche (251, 252, 1411) erbringt die ausgebildet ist zum Ausüben genannter Kraft durch das Führungsele- ment über einen Abstand in der Kettrichtung von gleich oder grösser als 50 mm, und in der das Längs- profil auf dem Gewebiband (230) vorgesehen wer- den soll über mindestens diesen Abstand.
13. Webmaschine die mindestens eine Vorrichtung nach einem der Ansprüche 1 bis 12 enthält.
14. Webmaschine nach Anspruch 13, in der das Füh- rungselement sich über einen Abstand in der Kett- richtung erstreckt, um eine Kraft auf dem Gewebe über eine Kontaktfläche auszuüben, die durch das Längsprofil erbracht wird.
15. Webmaschine nach Anspruch 13 oder 14, in der das Führungselement direkt hinter einer Anschlaglinie geordnet ist, um eine Kraft auf der Kontaktfläche auszuüben.

Revendications

1. Dispositif (100, 400, 500, 1400, 2100) pour maintenir la largeur de tissu d'un tissu (200, 3000) sur une machine à tisser, lequel dispositif comprend un élé- ment de guidage (120, 520, 1420) pour exercer une force dans la direction de trame (220) sur une bande de tissu (225, 226, 3001, 3002, 3006) du tissu (200, 3000), **caractérisé en ce que** le dispositif pour maintenir la largeur de tissu comprend en outre un profil longitudinal (110, 510, 600, 700, 800, 901, 1410) qui produit une surface de contact (251, 252, 1411) qui est formée de sorte que ladite force peut être exercée là-dessus par l'élément de guidage et dans lequel le profil longitudinal, lorsqu'il est utilisé dans une machine à tisser, est prévu sur la bande de tissu (225, 226, 3001, 3002, 3006) dans la direc- tion de chaîne (210).
2. Dispositif (100, 400, 500, 1400, 2100) selon la re- vendication 1, dans lequel le profil longitudinal (110, 510, 600, 800, 901, 1410) comprend un élément de tissage qui est destiné à être tissé dans la bande de tissu (225, 226).

3. Dispositif (100, 400, 500, 2100) selon l'une quelcon- que de la revendication 1 ou 2, dans lequel le profil longitudinal (110, 510) produit un épaissement (251, 252) de la surface de tissu au niveau de ladite bande de tissu, au moins à la partie frontale (241) du tissu ou l'arrière (242) du tissu.
4. Dispositif (100, 400, 500, 2100) selon la revendica- tion 3, dans lequel l'élément de guidage (120, 520, 1420) comprend un premier composant (140, 540, 1440) et un deuxième composant (130, 530, 1430) qui sont montés l'un sur l'autre, avec le premier com- posant touchant l'arrière (242) du tissu et le deuxiè- me composant touchant la partie frontale (241) du tissu, et dans lequel au moins un des deux le premier composant ou le deuxième composant a au moins un point de contact pour exercer la force sur ledit épaissement.
5. Dispositif (100, 500) selon l'une quelconque des re- vendications 3 ou 4, dans lequel l'élément de guida- ge (120, 520) touche ledit épaissement le long d'une ligne tangente ou une surface tangente du contact (131, 141).
6. Dispositif selon l'une quelconque des revendications 1 à 5, dans lequel l'élément de guidage (520, 1420) touche la surface de contact au moyens d'au moins un roue de contact (531, 541, 1450).
7. Dispositif selon l'une quelconque des revendications 1 à 6, dans lequel le profil longitudinal comprend au moins un élément de fil.
8. Dispositif (1400) selon l'une quelconque des reven- dications 1 à 2, dans lequel le profil longitudinal est une bande (1410), dans lequel la bande (1410) a une section transversale substantiellement rectan- gulaire avec un côté rectangle long qui est orienté substantiellement parallèle à la partie frontale et l'ar- rière du tissu.
9. Dispositif selon l'une quelconque des revendications 1 à 8, dans lequel le dispositif (100, 500, 2100) com- prend au moins une unité de commande (133, 143, 533, 543, 2133) pour contrôler la position et/ou la force exercée par l'élément de guidage sur ladite surface de contact.
10. Dispositif selon l'une quelconque des revendications 1 à 9, dans lequel le dispositif (100, 500) comprend au moins une facilité de coupe (300) pour enlever le profil longitudinal (110, 510) du tissu et/ou dans le- quel le dispositif comprend une unité de tension (1000) pour exercer une tension de traction dans la direction de chaîne sur le profil longitudinal.
11. Dispositif selon l'une quelconque des revendications

1 à 10, dans lequel le profil longitudinal (800) est tissé dans le tissu au moyen d'une armure de gaze (801).

- 12.** Dispositif selon l'une quelconque des revendications 1 à 11, dans lequel un dispositif comprend un profil longitudinal (110, 510, 600, 700, 800, 901, 1410) qui produit une surface de contact (251, 252, 1411) qui est formé pour exercer ladite force par l'élément de guidage sur une distance dans la direction de chaîne égale ou supérieure à 50 mm, et dans lequel le profil longitudinal qui est destiné à être prévu sur la bande de tissu (230) sur au moins cette distance. 5 10
- 13.** Machine à tisser qui comprend au moins un dispositif selon l'une quelconque des revendications 1 à 12. 15
- 14.** Machine à tisser selon la revendication 13, dans laquelle l'élément de guidage s'étend sur une distance dans la direction de chaîne pour exercer une force sur le tissu via une surface de contact qui est produit par le profil longitudinal. 20
- 15.** Machine à tisser selon la revendication 13 ou 14, dans laquelle l'élément de guidage est disposé immédiatement derrière une ligne de frappe pour exercer une force sur la surface de contact. 25

30

35

40

45

50

55

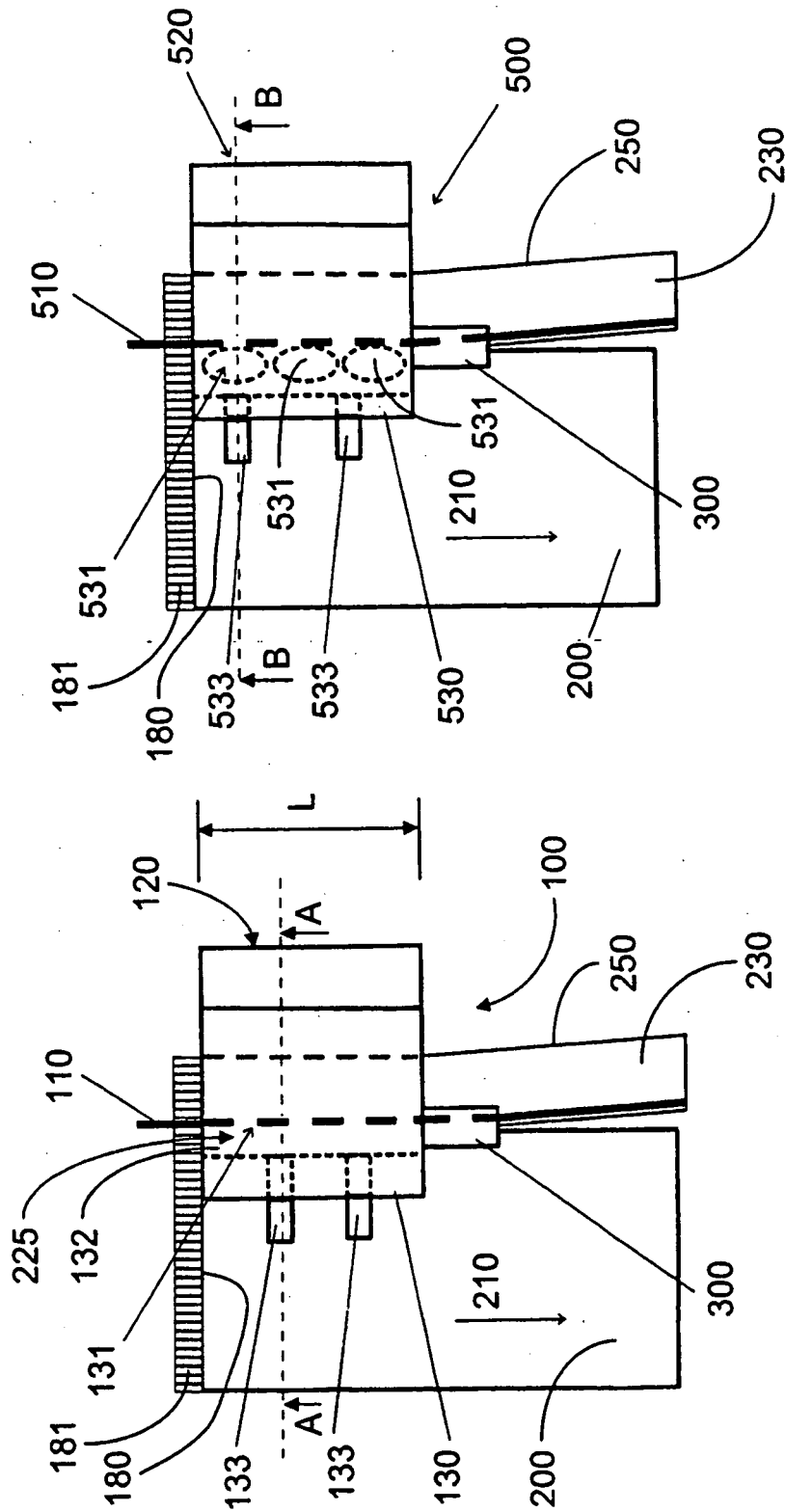


Fig. 8

Fig. 1

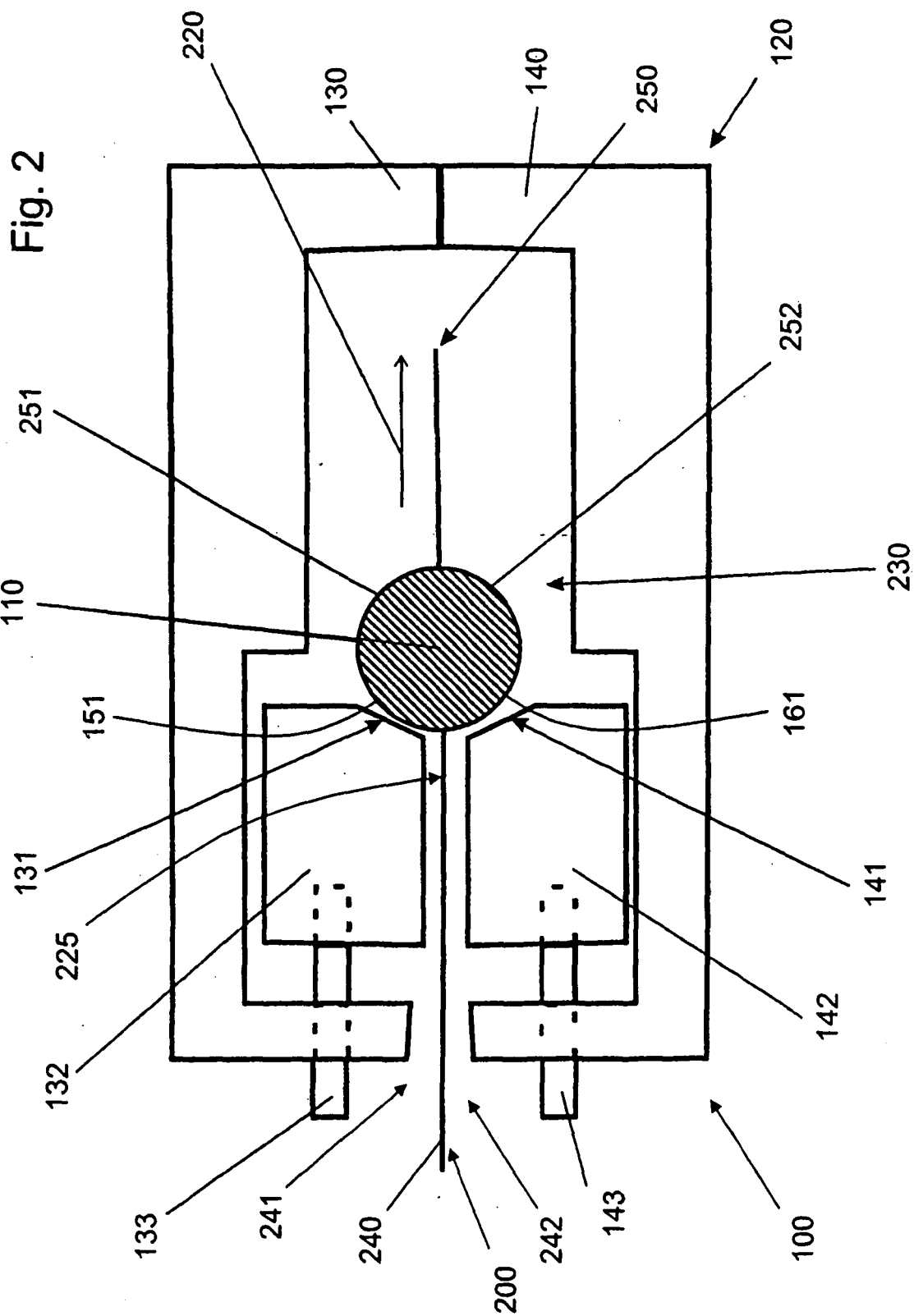


Fig. 3

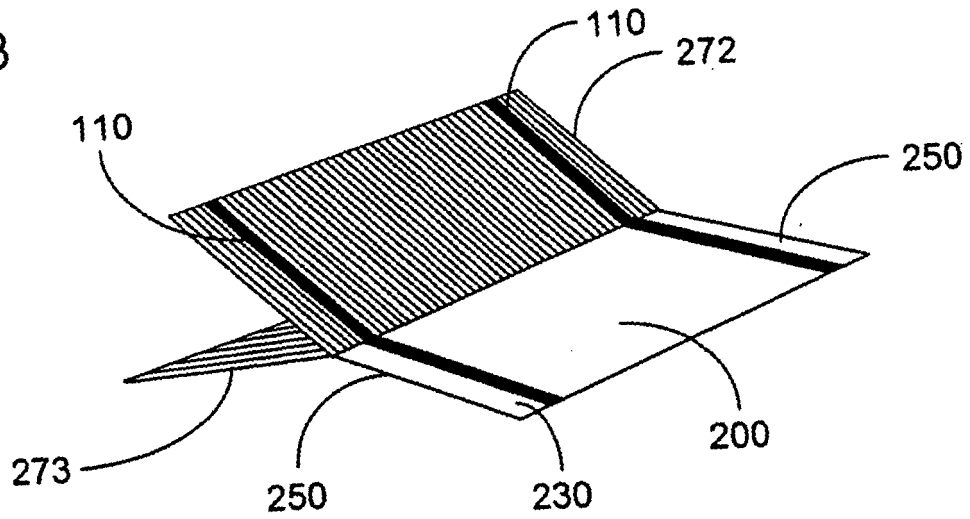


Fig. 4

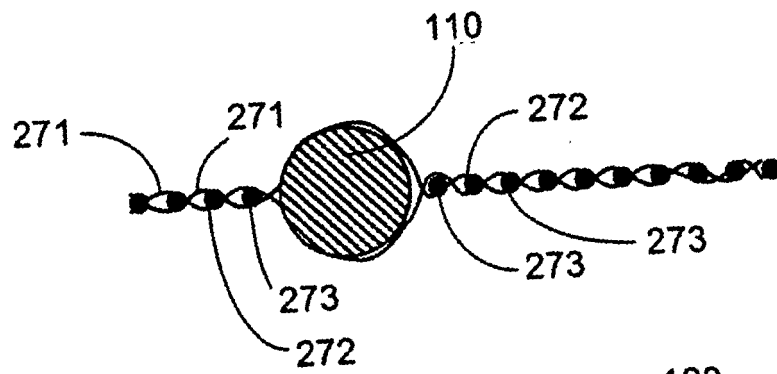


Fig. 19

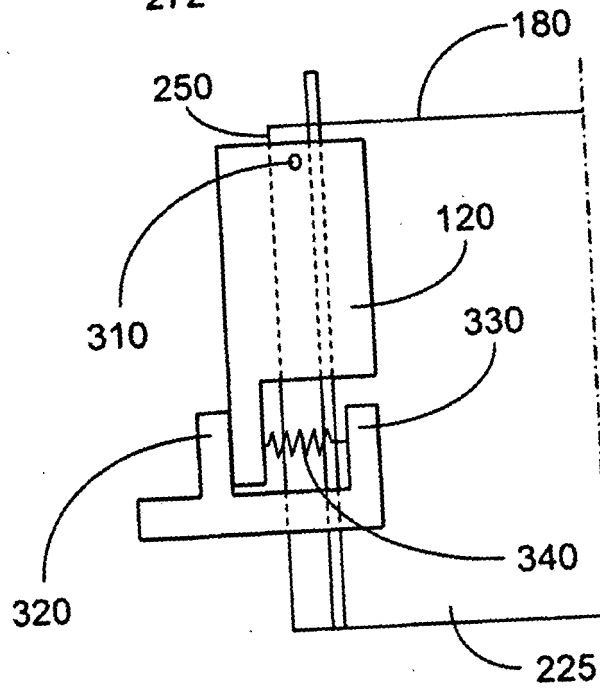


Fig. 5

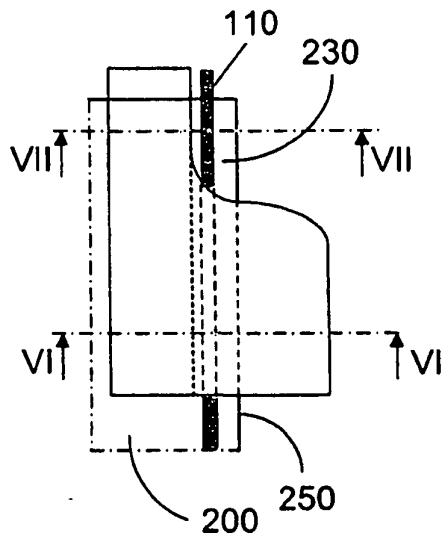


Fig. 7

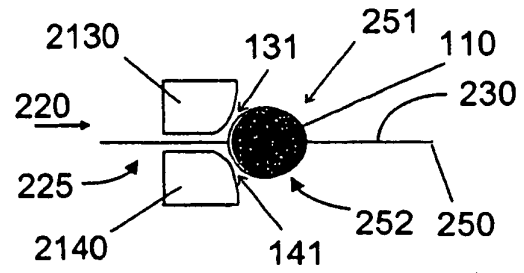


Fig. 6

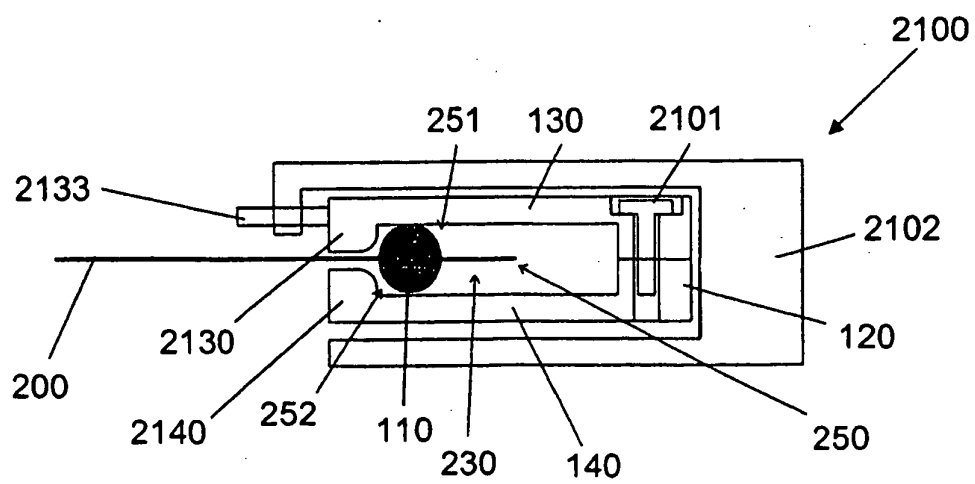


Fig. 9

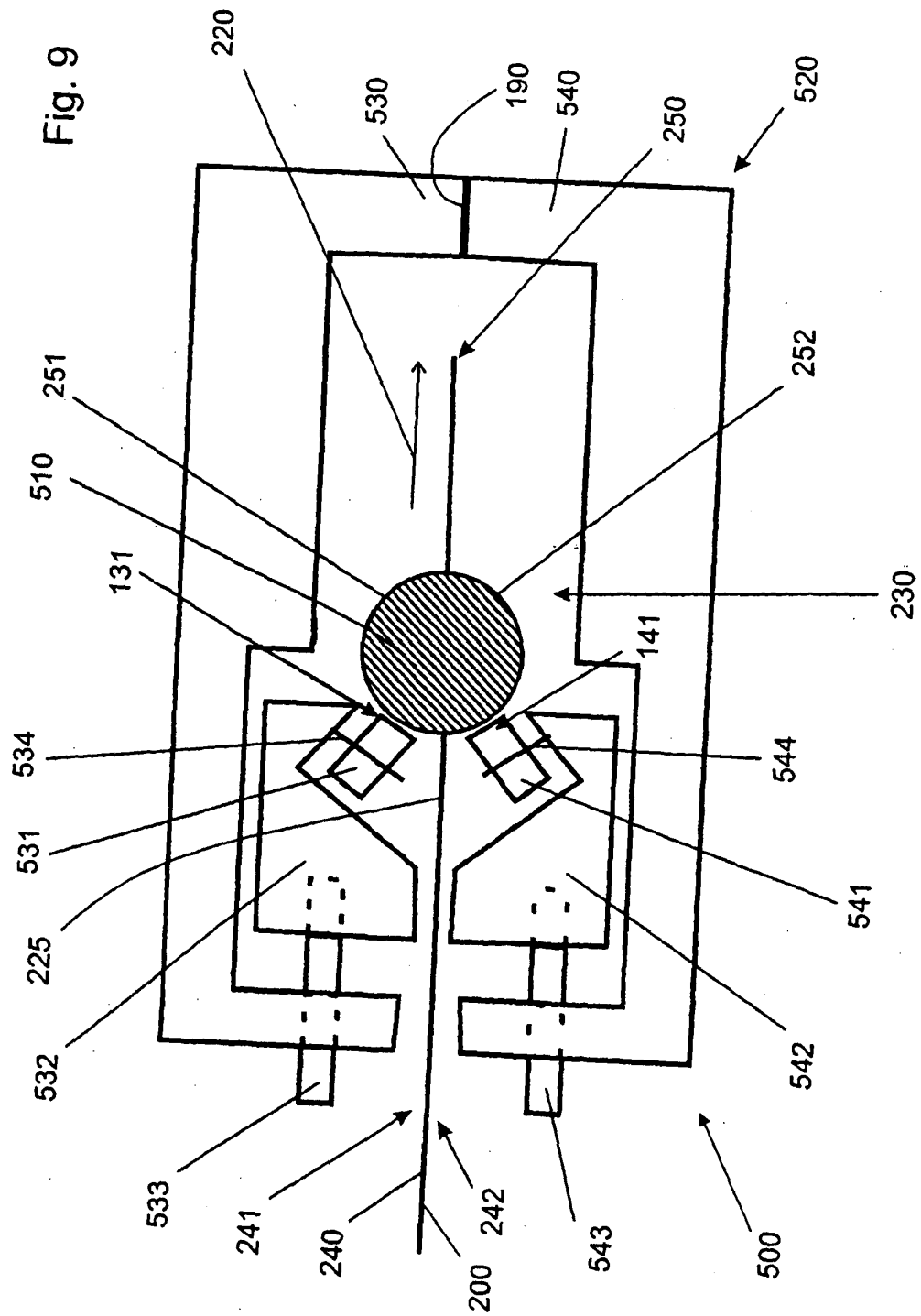


Fig. 10

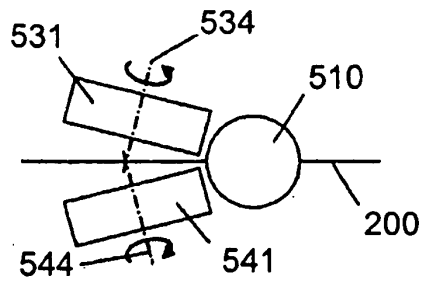


Fig. 11

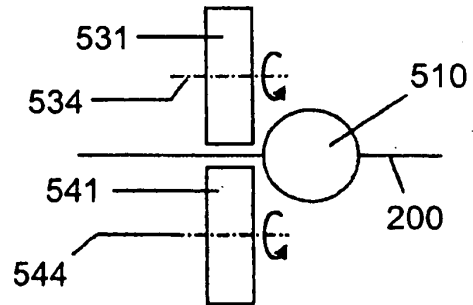


Fig. 12

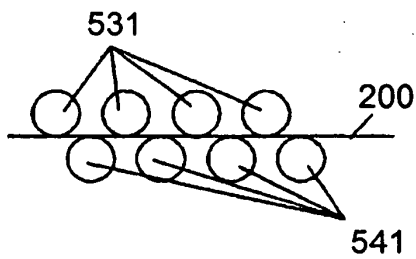


Fig. 13

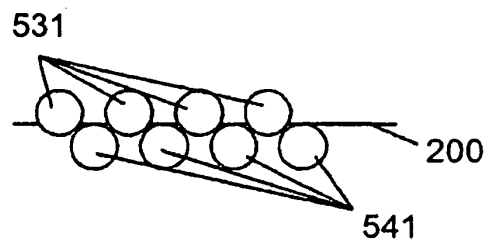


Fig. 16

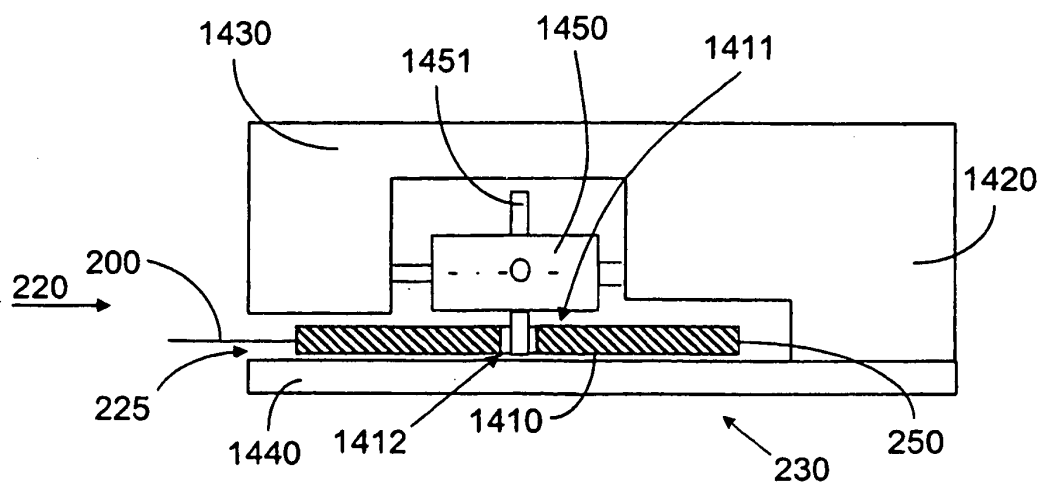


Fig. 14

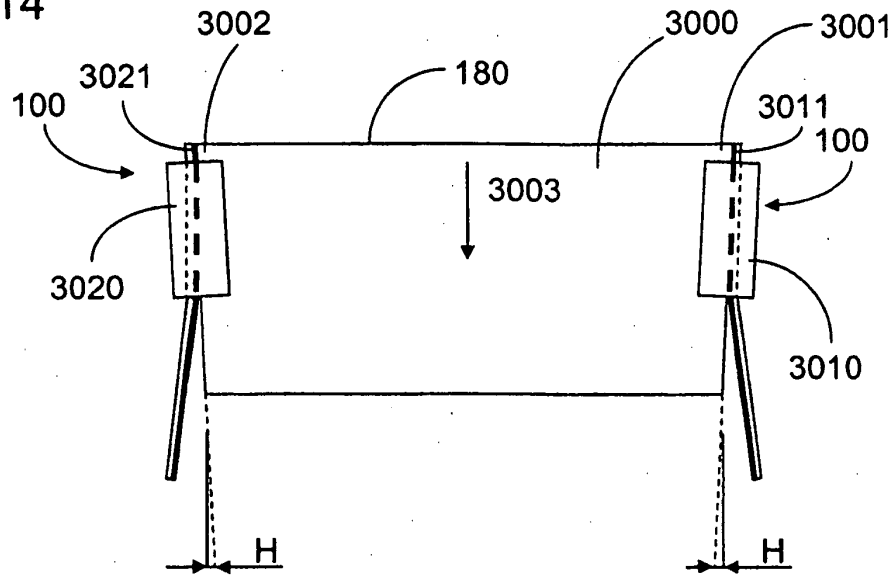


Fig. 22

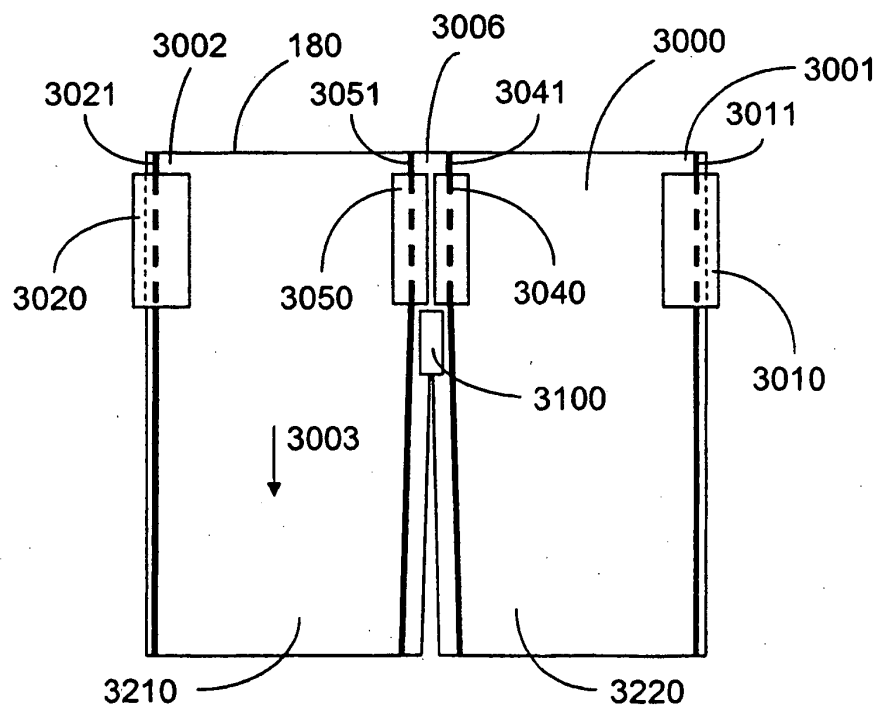


Fig. 15

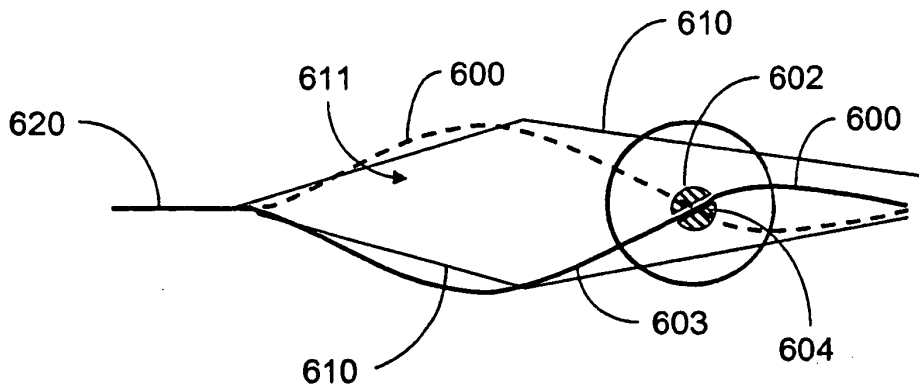


Fig. 17

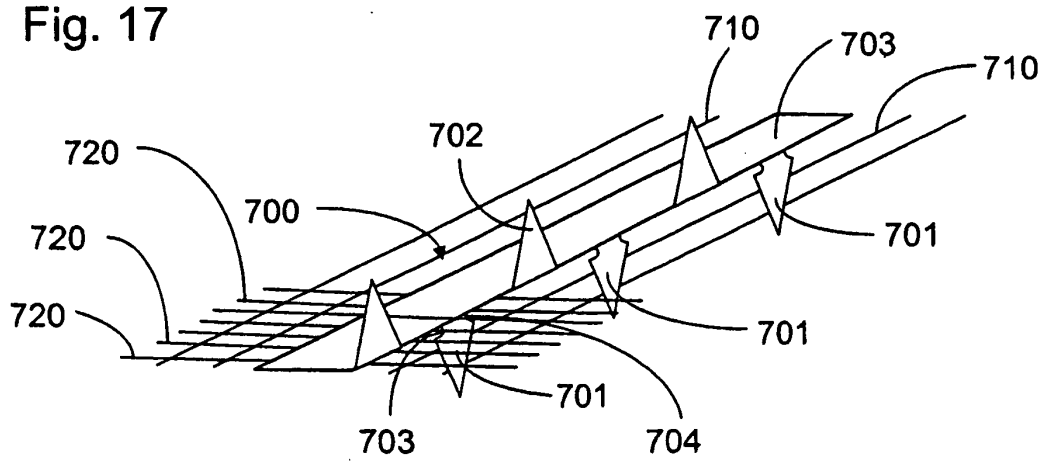


Fig. 18

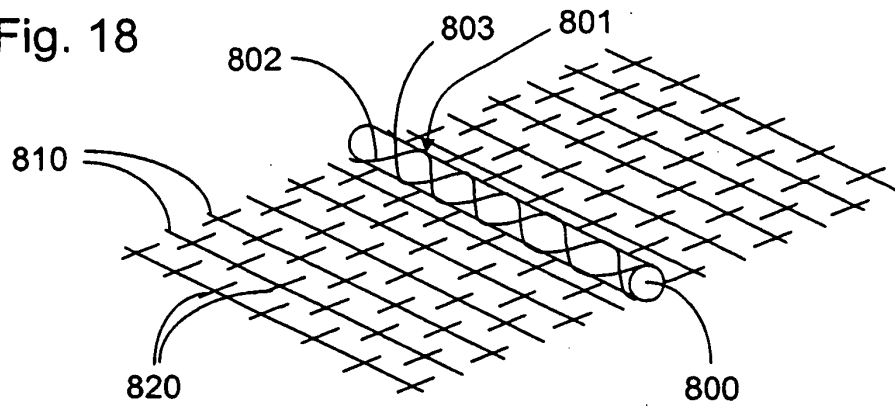


Fig. 20

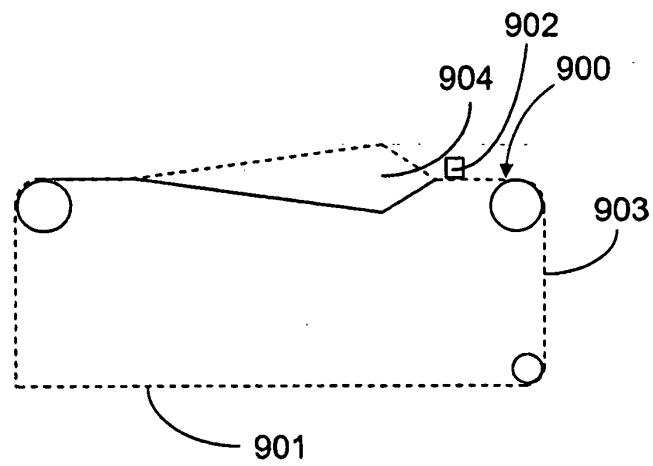
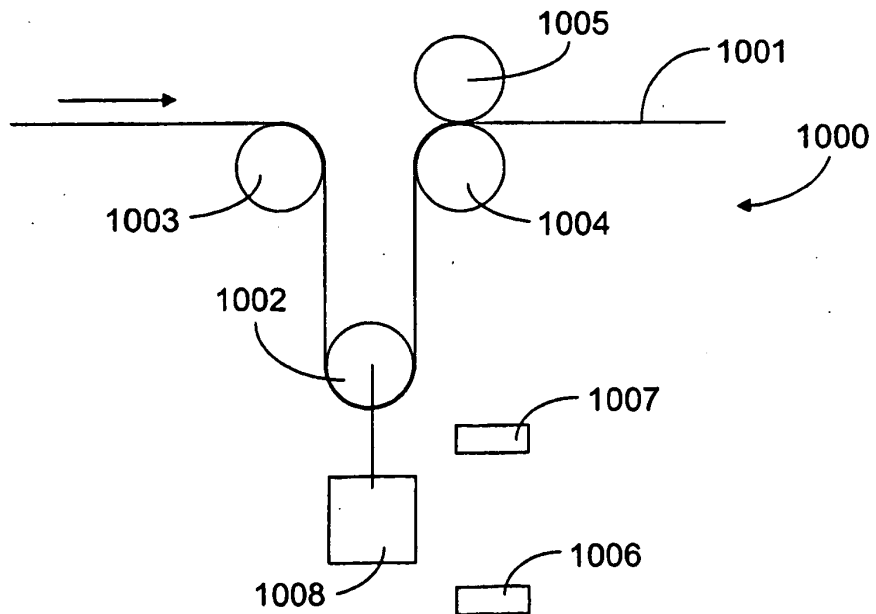


Fig. 21



REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- EP 0430321 A [0003]
- WO 9964654 A [0115]