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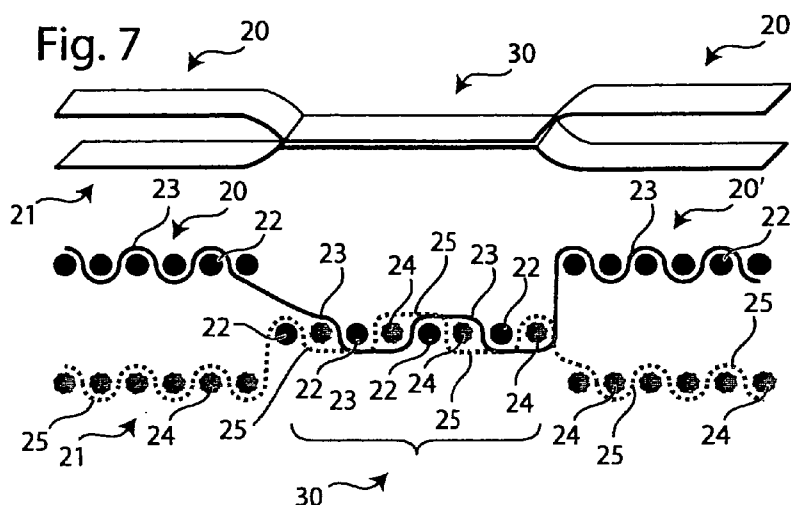
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(54) Title: FABRIC MADE UP OF AT LEAST TWO LAPS INTERWOVEN ALONG A COMMON STRETCH AND METHOD FOR ITS PRODUCTION



(57) Abstract: Fabric made up of at least two laps (20, 21), each of which is formed by a series (22, 24) of longitudinal threads of yarn (warp) that are interwoven with one or more series (23, 25) of threads of yarn transverse to these (weft), characterized in that said first (20) and second laps (21) are joined along a common interweave stretch (30), respectively, parallel to the threads of warp yarn (22, 24) or parallel to the threads of weft yarn (23, 25) and in which the threads of weft yarn (23, 25) and of warp yarn (22, 24) of the two laps (20, 21) are interwoven; said common interweave stretch (30) extending laterally to the laps (20, 21) in such a way as to form a sort of third lap of width at least sufficient to guarantee the solidity of the join of the laps (20, 21) along said stretch of joining (30).

Fabric made up of at least two laps interwoven along a
common stretch and method for its production

DESCRIPTION

The subject of the present invention is a fabric made up
5 of at least two laps interwoven along a common stretch, as
well as the method for its production.

Fabrics with double width, which can be made only with
shuttle looms, are used to make fabrics with a width twice
what can normally be obtained with the reed width

10 With said technique, two fabrics are obtained set on top
of one another and joined together on one side; once it
has come out of the loom, the fabric that is obtained
hence has a width twice the reed width.

For production of the above fabric, as may be noted in
15 Figure 1, it is necessary to combine the weave of the
fabric of the front with that of the back, both in the
direction of the warp 11 and in the direction of the weft
10.

Weft insertion, in the case of a plain weave, will
20 present the following sequence: the first weft insertion
will interweave with the threads of warp yarn of the top
fabric 12 (odd threads of yarn of the top fabric on top);
the second weft insertion will interweave with the threads
of warp yarn of the bottom fabric 13 (odd threads of yarn
25 of the bottom fabric on top and lifting *en masse* of the
threads of yarn of the top fabric), as likewise the third
weft insertion (even threads of yarn of the bottom fabric
on top and lifting *en masse* of the threads of yarn of the

top fabric); and the fourth weft insertion will interweave with the threads of warp yarn of the top fabric (even threads of yarn of the top fabric on top).

By adopting the above logic, it is possible to obtain
5 fabrics even of triple width 12, 13, 14 and 17, represented in Figure 2 described below.

Tubular fabrics (illustrated in Figure 3), which can also be made only with shuttle looms, are constituted by two fabrics 12 and 13 set on top of one another bound
10 together only at the ends 17 through the two selvages; they are in general used for making bags or sacks, or tubular fabric coatings.

Tubular fabrics differ from the double-width fabrics as regards the system of weft insertion, the sequence of
15 which, in the case of a plain weave is as follows: the first weft will interweave with the threads of warp yarn of the top fabric (odd threads of yarn of the top fabric on top); the second weft with the threads of warp yarn of the bottom fabric (even threads of yarn of the bottom
20 fabric on top and lifting *en masse* of the threads of yarn of the top fabric); the third weft will interweave with the threads of warp yarn of the top fabric (even threads of yarn of the top fabric on top); and the fourth weft will interweave with the threads of yarn of the bottom
25 fabric (odd threads of yarn of the bottom fabric on top and lifting *en masse* of the threads of yarn of the top fabric).

If in a tubular fabric the threads of warp yarn and the

threads of weft yarn alternate, as may be noted in Figure 4, an alternating tubular fabric is obtained where the threads of warp yarn and threads of weft yarn that constitute the top fabric 12 and 13 exchange with one another on a longitudinal line 15, then coming to form the bottom fabric 13' and 12', as illustrated in Figure 4.

By adopting the same logic, it is also possible to obtain alternating triple fabrics 12, 13, 16; 16', 12', 13'; 13'', 16'', 12'', as illustrated in Figure 5.

10 The purpose of the present invention is to produce a fabric, formed by one or more series of longitudinal threads of yarn (warp) that interweave with one or more series of threads of yarn transverse to these (weft), which, by being constrained by one or more interweave stretches can come to form a product with three, four, or more laps of fabric that derive from said interweaves.

The interweave stretches and of mutual constraint of the various laps can be longitudinal or transverse.

20 The laps of fabric can be constituted by fabrics with plain weave or fabrics with complex weave and hence ones that can be produced using heddle looms or else jacquard looms.

The present invention stems from the fabrics of double or triple width and plain or alternating tubular fabrics. 25 The originality of the invention lies in the fact that one or more interweave stretches are obtained that join together the various laps of the fabric, then rendering them variously separate from and independent of one

another.

The above laps will moreover have the characteristic of presenting the longitudinal edges finished with tuck-in selvedge, true selvedge, or also a finish made with the
5 leno motion device and/or hemming carried out in a subsequent step.

In order to achieve the above, as well as further purposes that will be understood more fully hereinafter, provided according to the invention are a fabric in
10 accordance with Claim 1 and a method for its production in accordance with Claim 10.

The fabric according to the invention will now be described with reference to the attached plates of drawings, in which:

15 Figures 1-5 illustrate different embodiments of a fabric belonging to the state of the art; each figure represents the fabric in a schematic form and in the form of a web;

Figure 6 is a schematic illustration of some embodiments of the fabric according to the invention;

20 Figures 7, 8, 9, 10 and 11 illustrate the fabric according to the invention in some embodiments thereof in the same way as the fabrics according to the known art are illustrated in Figures 1-5;

Figures 7a, 8a, 9a and 10a illustrate the tuck-in
25 selvedges that can be obtained in the respective embodiments.

Albeit using the basic ideas of the types of fabric described above, in all the variables of weave, reductions, possible alternations, and number of laps of

fabric, the characteristic feature of originality of the fabric according to the invention is that of having at least one longitudinal (not necessarily rectilinear) interweave stretch, around which the various laps of fabric are, at least on one side, free and independent of one another even though not ruled out is the possibility of them being variously constrained by interweaving also on transverse lines.

The so-called "interweave stretch" constitutes a constraint whereby the various laps of the fabric are kept together; the interweave stretch has, preferably but not exclusively, a longitudinal development, i.e., a development in the direction of the warp. For certain applications of the fabric, in fact, the interweave stretch can have a transverse development, i.e., a development in the direction of the weft, and in either case it can have a rectilinear or non-rectilinear development; a rectilinear stretch can be made both with heddle looms and with jacquard-type looms; non-rectilinear stretches must necessarily be made with jacquard-type looms.

The interweave stretch is made by interweaving the threads of warp yarn with the threads of weft yarn that make up the various laps of the fabric in order to enable them to be joined together; it can be more or less wide; i.e., it can involve a greater or smaller number of threads of warp yarn.

The number of interweave stretches that can be made may

be variable, and there may be made on one and the same fabric a number n of stretches of a given dimension (width x length) and n stretches of another dimension (width x length).

5 Represented schematically in Figure 6 are some examples of fabric made according to the invention; the interweave stretches are indicated, in all the embodiments except H, as thin bands 30, for reasons of simplicity of drawing, even though they necessarily have a certain plane
10 extension such as to guarantee the secure joining of the various laps that constitute the product.

Illustrated, for example, in Figure 6 are: a fabric A with four laps, two of which form a tubular fabric; a fabric B, like the fabric A, but with the tubular fabric
15 cut longitudinally to form four laps; a fabric C with four laps; a fabric D with six laps; a fabric E with four laps and a central tubular fabric; a fabric F with six laps and a central transverse tubular fabric; a fabric G with eight laps in so far as it is divided by interweave stretches
20 both in a longitudinal direction and in a transverse direction; and a fabric H with three laps. The embodiment H is the only one in which the interweave stretch 30 is very wide so that this also forms a lap of fabric, and hence the fabric has three laps.

25 For the production of the weave and of the common interweave stretch, either simple weaves or complex weaves can be used, including even weaves that can represent geometrical, ornate, or twilled patterns.

Conceptually similar to interweave stretches are also any possible transverse constraints, i.e., ones in a weft direction, that were to be made on the fabric, either in combination or not, with longitudinal stretches.

5 The fabric is made on traditional shuttle looms whether manual or mechanical, both on looms having different systems of weft insertion: rapier type, projectile type, gripper type, or jet type.

10 The looms of the two types can be understood as governed with heddle warp control, or by means of jacquard-type machines in the case where the production of operated (jacquard-type) fabrics is required.

It is also possible to make use of "slotted leno heald" bodies for the creation of gauze-type or gossamer fabrics.

15 The looms can be with a single warp beam or with a number of warp beams each provided with one or more pairs of flanges.

20 In the case of shuttle-less looms, tuck-in devices may be provided according to the number of individual widths of fabric to be produced simultaneously in the width of the loom, or else, in the case where it is desired to achieve a finish of the sides in a different way, leno motion devices may be used to enable n articles to be produced on the loom.

25 The threads of yarn that make up the warp of the fabric can be of various types, i.e., smooth or variously operated, with plain or fancy twill, of various titre and composition; they can be more or less in number according

to the width and to the reductions per unit length of the fabric; and they can be either of a single type or in combination with one another.

They may be warped with reductions and shades of colour
5 of any kind.

These threads of yarn will be put on the yarn beam in the desired width, being delimited by a pair of fringes.

The threads of yarn that constitute the weft of the fabric can be of various types, i.e., smooth or variously
10 operated, with plain or fancy twill, of various titre and composition, and they can be of a single type or in combination with one another, the same as or different from the ones used for the warp.

They may be wefted with reductions and shades of colour
15 of any kind.

For heddle looms, the drawing-in of the warp differs according to the type of fabric to be produced and to the maximum number of heddles allowed by the loom.

For jacquard-type looms, the passing could be
20 traditional, but differentiated passings can also be envisaged according to the type of warp yarn to be used.

The looms may be provided either with single reeds or with double reeds having homogeneous or different reeding, as well as with reeds of variable section according to the
25 type of fabric to be produced.

There now follows a description, provided purely by way of example, of five types amongst the most specific for the production of as many fabrics according to the

invention for the production of scarves. It is understood that, even though scarves are described as an application of the fabric, this does not imply any limitation to the possible applications of the fabric according to the
5 invention.

This fabric, in fact, can find multiple applications in the sectors of clothing, of furnishing, of technical textiles and in any case in all the sectors in which fabrics are used that can advantageously present the
10 characteristics of the fabric according to the invention.

Example 1

Scarf (see Figure 7) with four laps, with the interweave stretch set centrally; for the four laps of fabric a plain weave is envisaged, whilst for the central stretch a weave
15 of the Batavia 2/2 type is used.

The scarf is produced on a heddle loom of any width, which, if it is of the shuttle type, will necessarily have a width corresponding to that of the loom (single scarf), whereas, if it is produced on looms with a weft insertion
20 of a different type from that of a shuttle loom, even a number of scarves could be made on the same loom width with the aid of pairs of tuck-in devices each provided for reinsertion of the stretch of weft cut. In the case where the scarf were to be made with fringes and/or lateral
25 merrow edges, the tuck-in devices could be superfluous or not operative.

In the case of a plain weave to be made on the four laps

and a Batavia weave to be made as weave of the central stretch, 8 heddles are necessary, plus the heddles for the selvedge; 4 heddles will be used for making the laps, the remaining 4 heddles for making the interweave stretch.

5 In the specific example, weaving will be carried out so as to produce a top fabric, which forms two laps 20 and 20' and is made up of threads of warp yarn 22 and threads of weft yarn 23, and a bottom fabric that forms laps 21 and 21' and is constituted by threads of warp yarn 24 and
10 of weft yarn 25.

As may be noted, the threads of top weft yarn 23 interweave both with the threads of warp yarn 22 of the top fabric and with the threads of warp yarn 24 of the bottom fabric; likewise, the threads of weft yarn 25 of
15 the bottom fabric interweave both with the threads of warp yarn 22 of the top fabric and with the threads of warp yarn 24 of the bottom fabric, in an area corresponding to a stretch 30, which can be more or less wide according to the needs, but which in any case determines an axis of
20 hinge between the four laps of fabric that have been formed.

In the case where the intention were to make, on the four laps of the product, more complex weaves or particular evolutions or patterns of the central
25 interweave stretch, a jacquard-type loom may be envisaged.

In the case where the product were to be made on shuttle-less looms provided with tuck-in devices for reininsertion of the wefts cut at the two sides of the

fabric, there should be envisaged an idle pick of the loom, without weft insertion for formation of the fabric, but with the operation of raising of the heddles, to enable reinsertion in the fabric of the end of weft cut by
5 the tuck-in device in the previous pick.

Figure 7a illustrates how the tuck-in selvedge is obtained according to this solution.

Example 2

Scarf (see Figure 8) with two stretches set centrally,
10 the two stretches delimiting a central band of tubular fabric, whilst outside the two stretches there develop two respective laps of fabric. The laps develop in the scarf in alternating ways; namely: the top lap 20 on the left side, after the left-hand interweave stretch 30, passes
15 onto the bottom side 20' centrally and, after the right-hand interweave stretch 30', passes again on the top side 20''; the other lap of fabric follows an opposite path: from the bottom left-hand side 21, after the first interweave stretch 30 it passes onto the top side 21' and,
20 after the second interweave stretch 30', returns to the bottom side 21''. For the laps of fabric 20, 20', 21, 21' a plain weave is envisaged, whereas for the two interweave stretches 30, 30' a Batavia 2/2 weave is envisaged.

The scarf will be woven on a heddle loom, of any width,
25 which, if it is a shuttle loom, will necessarily have the width corresponding to that of the loom (single scarf). If the scarf is woven on looms with a type of weft insertion

different from the shuttle weft insertion, even a number of scarves may be produced on the same loom width with the aid of pairs of tuck-in devices provided each for reinsertion of the stretch of weft cut. In the case where
5 the scarf were to be made with fringes and/or lateral merrow edges, the tuck-in devices could be superfluous or not operative.

In the case of a plain weave to be performed on the two alternating faces, and a Batavia weave for the two axes,
10 12 heddles are necessary, plus the selvedge heddles; 4 heddles will be used for making the two axes and the other 8 heddles for making the two alternating fabrics.

In the case where the intention were to make, on the two (alternating) laps of the product, more complex weaves or
15 particular evolutions or patterns of the axes, a jacquard-type loom may be envisaged.

In the case where the product were to be made on shuttle-less looms provided with tuck-in devices for reinsertion of the wefts cut at the two sides of the
20 fabric, there should be envisaged an idle pick of the loom, without weft insertion for formation of the fabric, but with the operation of raising of the heddles, to enable reinsertion in the fabric of the end of weft cut by the tuck-in device in the previous pick.

25 Figure 8a illustrates how the tuck-in selvedge is obtained according to this solution.

Example 3

Scarf (see Figure 9) with six laps with the interweave

stretch set centrally; for the six laps of fabric a plain weave is envisaged; for the central stretch a weave of a Batavia 2/2 type is envisaged.

5 The scarf will be made on a heddle loom, of any width, which, if it is a shuttle loom, will necessarily have the width corresponding to that of the loom (single scarf). If the scarf is woven on looms with a type of weft insertion different from the shuttle weft insertion, even a number of scarves may be produced on the same loom width with the
10 aid of pairs of tuck-in devices provided each for reinsertion of the stretch of weft cut. In the case where the scarf were to be made with fringes and/or lateral merrow edges, the tuck-in devices could be superfluous or not operative.

15 In the case of a plain weave to be performed on the six laps and a Batavia weave for the interweave stretch, 10 heddles are necessary, plus the selvedge heddles; 6 heddles will be used for making the laps, and the remaining 4 heddles for making the interweave stretch.

20 In the specific example, weaving will be performed to produce a top fabric, which forms two laps 20 and 20' and is constituted by threads of warp yarn 22 and of weft yarn 23, an intermediate fabric, which forms the laps 21 and 21' and is constituted by threads of warp yarn 24 and of
25 weft yarn 25, and a bottom fabric, which forms the two laps 28 and 28' and is constituted by threads of warp yarn 26 and of weft yarn 27.

In this case, the threads of top weft yarn 23 are

interwoven with: the threads of warp yarn 22 of the top fabric, the threads of warp yarn 24 of the intermediate fabric, and the threads of warp yarn 26 of the bottom fabric.

5 Likewise, also the threads of weft yarn 25 of the intermediate fabric and the threads of weft yarn 27 of the bottom fabric are interwoven with the three aforesaid sets of threads of warp yarn, 22, 24, 26, in an area
10 corresponding to a central stretch 30, which can be more or less wide according to the needs, but which in any case determines an axis of hinge between the six laps of fabric that have been formed.

In the case where the intention were to make, on the six laps of the product, more complex weaves or particular
15 evolutions or patterns of the axes, a jacquard-type loom may be envisaged.

In the case where the product were to be made on shuttle-less looms provided with tuck-in devices for reinsertion of the wefts cut at the two sides of the
20 fabric, there should be envisaged an idle pick of the loom, without weft insertion for formation of the fabric, but with the operation of raising of the heddles, to enable reinsertion in the fabric of the end of weft cut by the tuck-in device in the previous pick.

25 Figure 9a illustrates how the tuck-in selvedge is obtained according to this solution.

Example 4

Scarf (see Figure 10) with two laps with interweave

stretch set laterally to define a third lap; for the two laps of fabric a plain weave is envisaged; for the lateral stretch a weave of a Batavia 2/2 type is envisaged.

5 The scarf will be made on a heddle loom of any width, which, if it is a shuttle loom, will necessarily have the width corresponding to that of the loom (single scarf). If the scarf is woven on looms with a type of weft insertion different from the shuttle weft insertion, even a number of scarves may be produced on the same loom width with the aid of pairs of tuck-in devices provided each for
10 reininsertion of the stretch of weft cut. In the case where the scarf were to be made with fringes and/or lateral merrow edges, the tuck-in devices could be superfluous or not operative.

15 In the specific example, weaving will be performed to produce a top fabric, which forms one lap 20 and is constituted by threads of warp yarn 22 and of weft yarn 23, and a bottom fabric, which forms a lap 21 and is constituted by threads of warp yarn 24 and of weft yarn
20 25.

As in Example 1 illustrated with reference to Figure 7, the threads of top weft yarn 23 are interwoven both with the threads of warp yarn 22 of the top fabric and with the threads of warp yarn 24 of the bottom fabric.

25 Likewise, also the threads of weft yarn 25 of the bottom fabric are interwoven both with the threads of warp yarn 22 of the top fabric and with the threads of warp yarn 24 of the bottom fabric in an area corresponding to a stretch

30, which in this case is sufficiently wide to provide a third lap 30 of any desired width.

In the case where the intention were to make, on the six laps of the product, more complex weaves or particular evolutions or patterns of the interweave stretch, a
5 jacquard-type loom may be envisaged.

In the case where the product were to be made on shuttle-less looms provided with tuck-in devices for reinsertion of the wefts cut at the two sides of the
10 fabric, there should be envisaged an idle pick of the loom, without weft insertion for formation of the fabric, but with the operation of raising of the heddles, to enable reinsertion in the fabric of the end of weft cut by the tuck-in device in the previous pick.

15 Figure 10a illustrates how the tuck-in selvedge is obtained according to this solution.

Example 5

Fabric (see Figure 11) with two laps, with interweave stretch set laterally to define a third lap.

20 The example shown is the case where the interweave stretch is made, not in a longitudinal direction, i.e., parallel to the threads of warp, but in a transverse direction, i.e., parallel to the threads of weft.

It is unnecessary to reproduce all the cases of the
25 previous examples in the case of a transverse interweave stretch (the other examples regarded a longitudinal interweave stretch) in so far as from the drawings they would be obtained simply with a rotation of 90° in each

case.

This example is comparable with Example 4 of Figure 10, where there are two laps joined by an interweave stretch. In the specific example, the weave will be made so as to
5 produce a fabric that forms one lap 20, made up of threads of warp yarn 22 and of weft yarn 23 and a lap 21, made up of threads of warp yarn 24 and of weft yarn 25.

As in Example 4, illustrated with reference to Figure 10, in the lap 20 the threads of weft yarn 23 are
10 interwoven with the threads of warp yarn 22; in the lap 21 the threads of weft yarn 25 are interwoven with the threads of warp yarn 24; in an area corresponding to the common interweave stretch, which also in this case is sufficiently wide as to provide a third lap 30 of any
15 desired length, the two threads of weft yarn 23 and 25 are interwoven with both of the threads of warp yarn 22 and 24
.

In the case where the intention were to make, on the six laps of the product, more complex weaves or particular
20 evolutions or patterns of the interweave stretch, a jacquard-type loom may be envisaged.

In the case where the product were to be made on shuttle-less looms provided with tuck-in devices for reinsertion of the wefts cut at the two sides of the
25 fabric, there should be envisaged an idle pick of the loom, without weft insertion for formation of the fabric, but with the operation of raising of the heddles, to enable reinsertion in the fabric of the end of weft cut by

the tuck-in device in the previous pick.

CLAIMS

1) A fabric made up of at least two laps (20, 21), each of which is formed by a series (22, 24) of longitudinal threads of yarn (warp) that are interwoven with one or
5 more series (23, 25) of threads of yarn transverse to these (weft), said fabric being characterized in that said first (20) and second laps (21) are joined along a common interweave stretch (30), respectively, parallel to the threads of warp yarn (22, 24) or parallel to the threads
10 of weft yarn (23, 25), and in which the threads of weft yarn (23, 25) and of warp yarn (22, 24) of the two laps (20, 21) are interwoven; said common interweave stretch (30) extending laterally to the laps (20, 21) in such a way as to form a sort of third lap of width at least
15 sufficient to guarantee the solidity of the join of the laps (20, 21) along said stretch of joining (30).

2) The fabric according to Claim 1, characterized in that the interweave stretch (30) is longitudinal, parallel to the threads of warp yarn (22, 24) so that in said
20 stretch the threads of warp yarn (22) of the first lap (20) and the threads of warp yarn (24) of the second lap (21) form a single series (22, 24) of threads of warp yarn, whilst the threads of weft yarn (23) of the first lap (20) and the threads of weft yarn (25) of the second
25 lap (21) are interwoven with said single series (22, 24) of threads of warp yarn.

3) The fabric according to Claim 1, characterized in that the interweave stretch (30) is transverse, parallel

to the threads of weft yarn (23, 25) so that in said stretch the threads of weft yarn (23) of the first lap (20) and the threads of weft yarn (25) of the second lap (21) form a single series (23, 25) of threads of weft yarn, whilst the threads of warp yarn (22) of the first lap (20) and the threads of warp yarn (24) of the second lap (21) are interwoven with said single series (23, 25) of threads of weft yarn.

4) The fabric according to Claim 1, characterized in that the interweave stretches (30) are two, perpendicular to one another, one is longitudinal, parallel to the threads of warp yarn (22, 24) and the other is transverse, parallel to the threads of weft yarn (23, 25).

5) The fabric according to Claim 1, characterized in that the two laps (20, 21) extend beyond the interweave stretch (30) to form a tubular fabric element.

6) The fabric according to Claim 1, characterized in that the interweave stretch (30) that joins the two laps (20, 21) is of a width sufficient to form itself a third lap.

7) The fabric according to Claim 1, characterized in that the laps are four (20, 21; 20', 21') divided into pairs joined by the interweave stretch (30).

8) The fabric according to Claim 1, characterized in that the laps are six (20, 21; 21, 21'; 28, 28') divided into in two groups of three, each joined by the interweave stretch (30).

9) The fabric according to Claims 7 and 8, characterized

in that in a single product a number of common interweave stretches (30, 31) are envisaged, even with dimensions (extension and length) that differ from one another, which join to one another a number of pairs or groups of laps.

5 10) A method for the production of a fabric made up of at least two laps, of which a first, top, lap (20) and a second, bottom, lap (21), each of which is formed by threads of longitudinal (warp) yarn (22, 24) that are interwoven with threads of transverse (weft) yarn (23,
10 25), said method being characterized in that it is constituted by:

- production of at least two laps of fabric (20, 21) set on top of one another;

- joining of the laps along a common interweave stretch
15 (30), which, in the case where it is longitudinal, i.e., parallel to the threads of warp yarn, is obtained by forming a single series of the threads of warp yarn (22) of the top lap (20) and of the threads of warp yarn (24) of the bottom lap (21), and interweaving the threads of
20 weft yarn (23) of the top lap (20) and the threads of weft yarn (25) of the bottom lap (21) with said single series (22, 24) of threads of warp yarn, whilst, in the case where it is transverse, i.e., parallel to the threads of weft yarn, it is obtained by forming a single series of
25 the threads of weft yarn (23) of the top lap (20) and of the threads of weft yarn (25) of the bottom lap (21), and interweaving the threads of warp yarn (22) of the top lap (20) and the threads of warp yarn (24) of the bottom lap

(21) with said single series (23, 25) of threads of weft yarn.

1/8

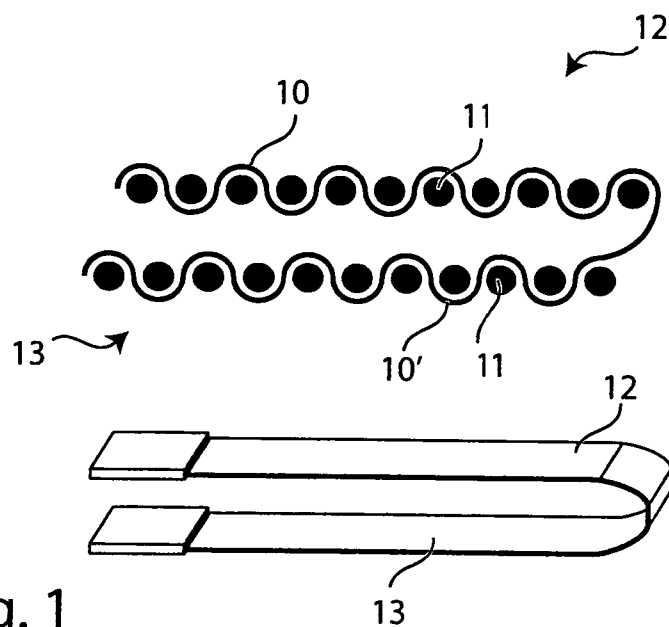


Fig. 1

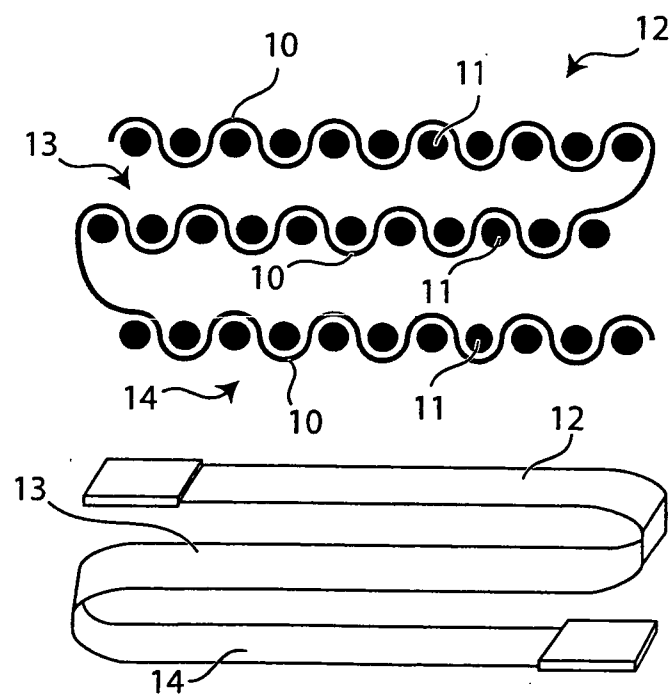


Fig. 2

2/8

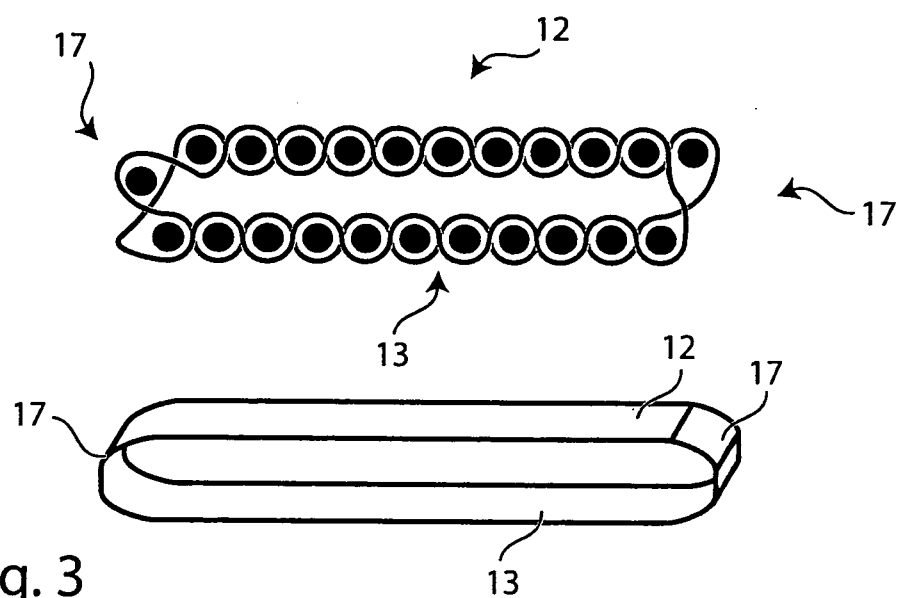


Fig. 3

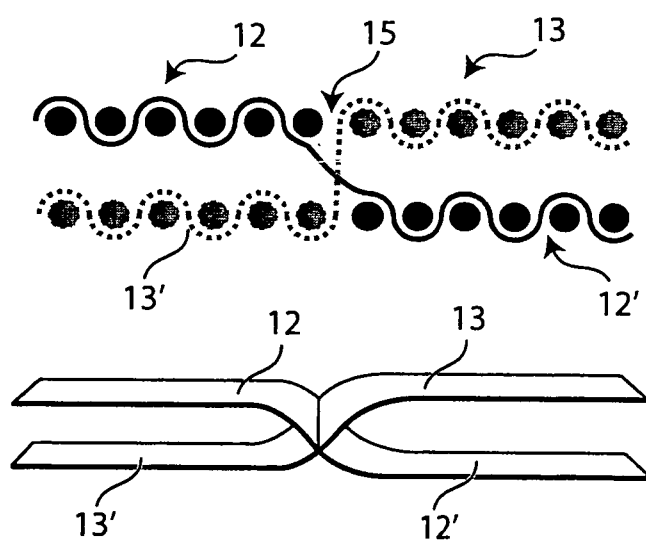


Fig. 4

3/8

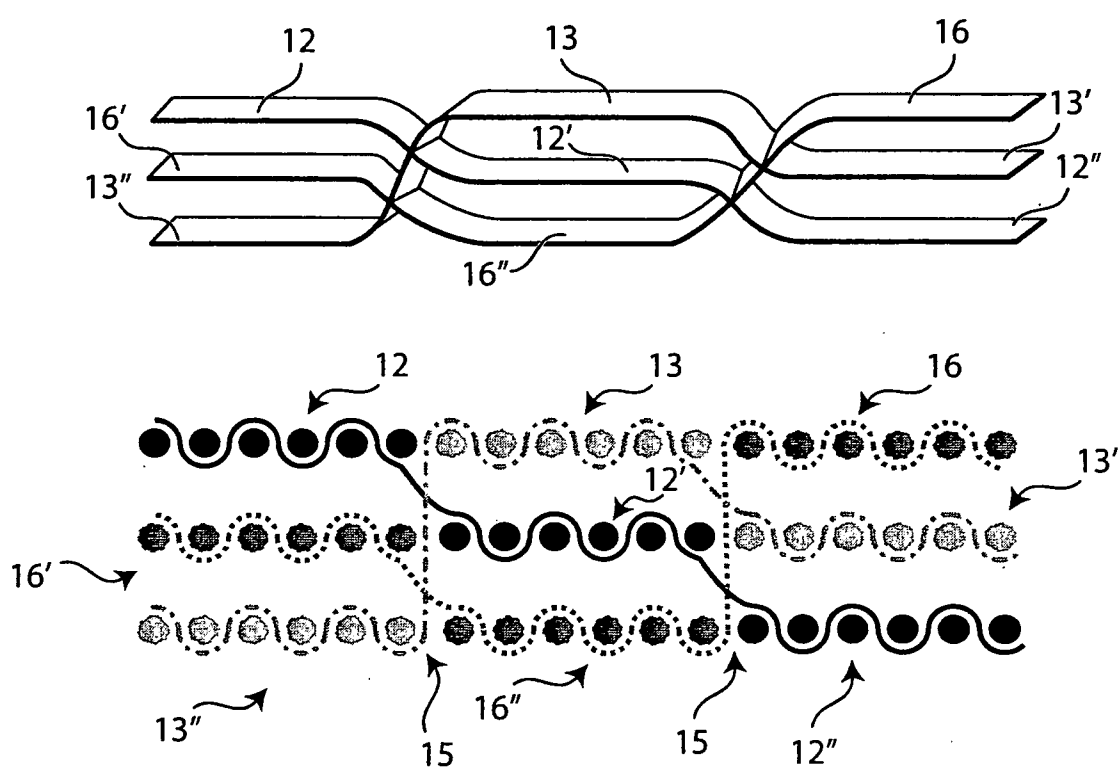


Fig. 5

4/8

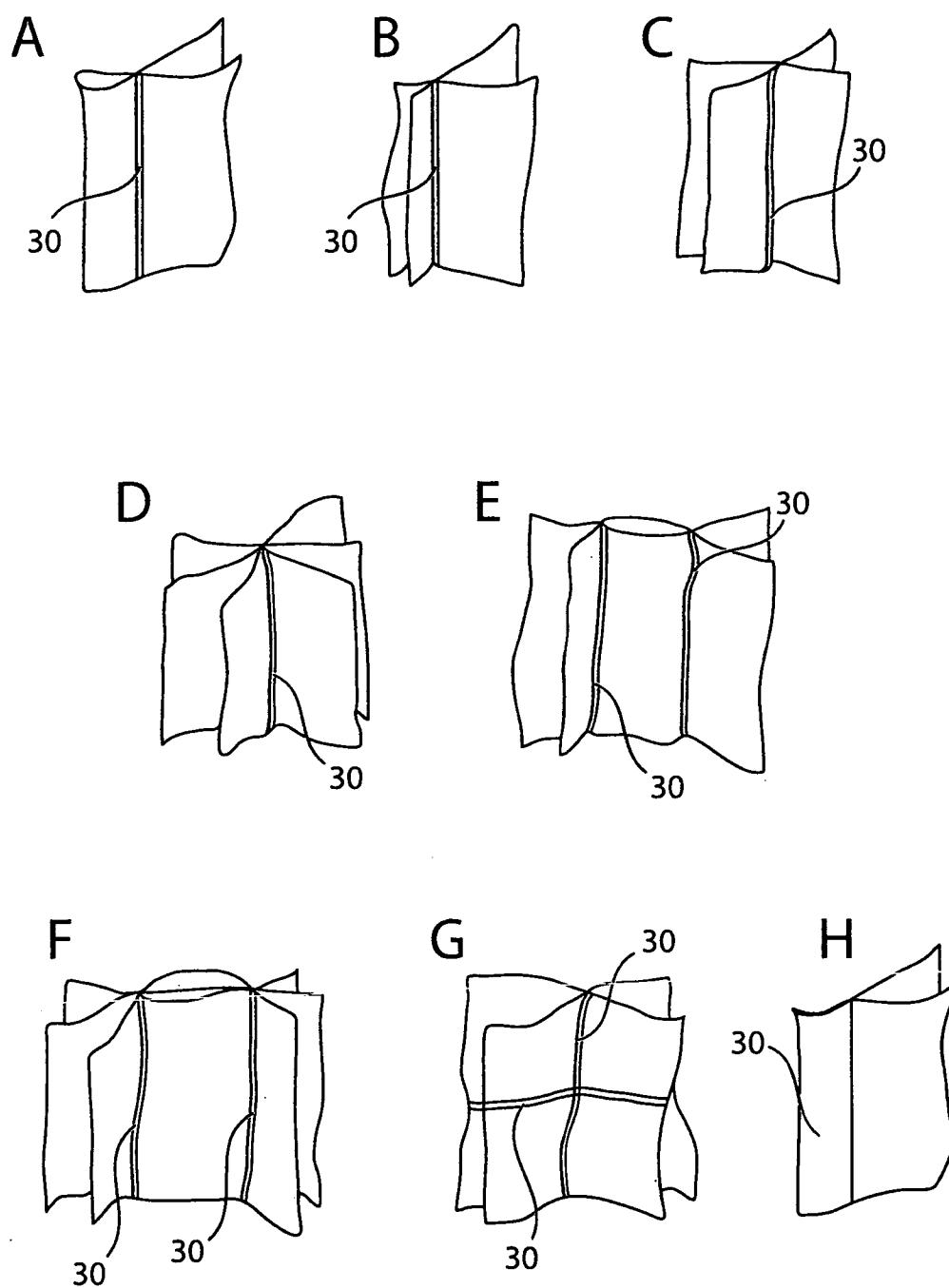
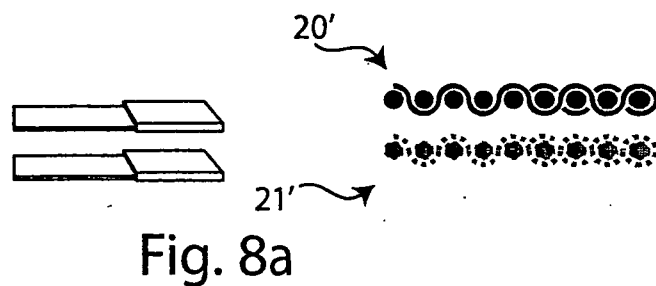
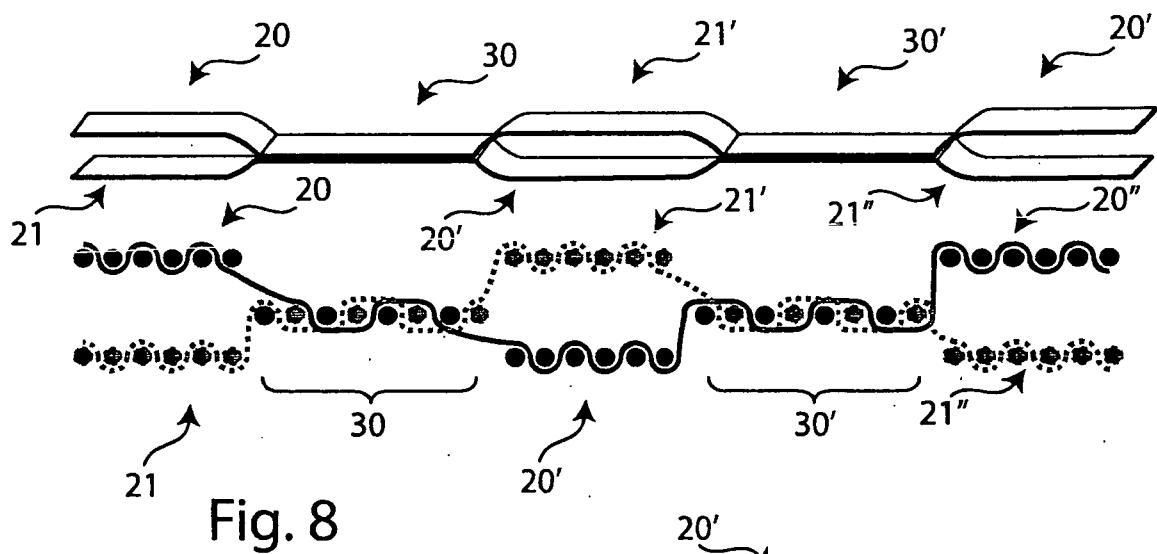
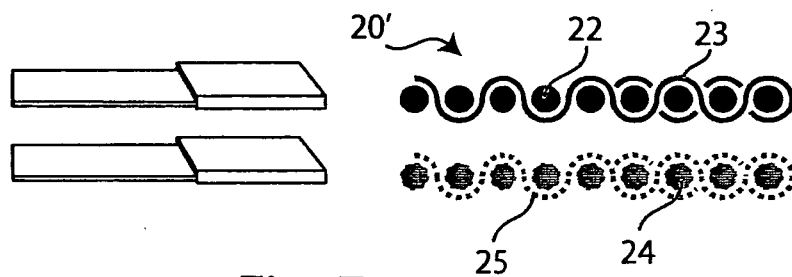
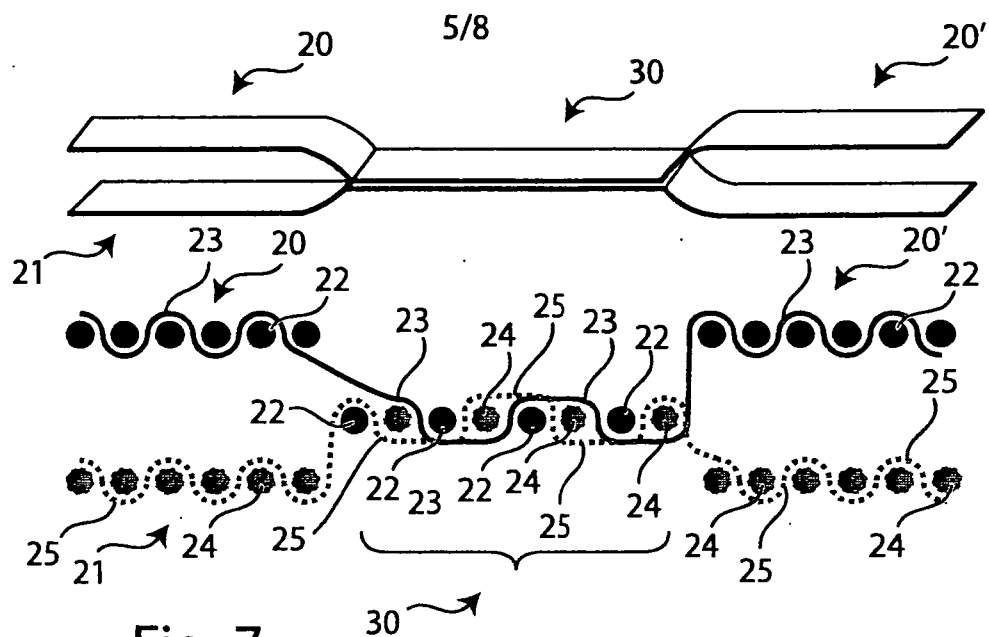


Fig. 6



6/8

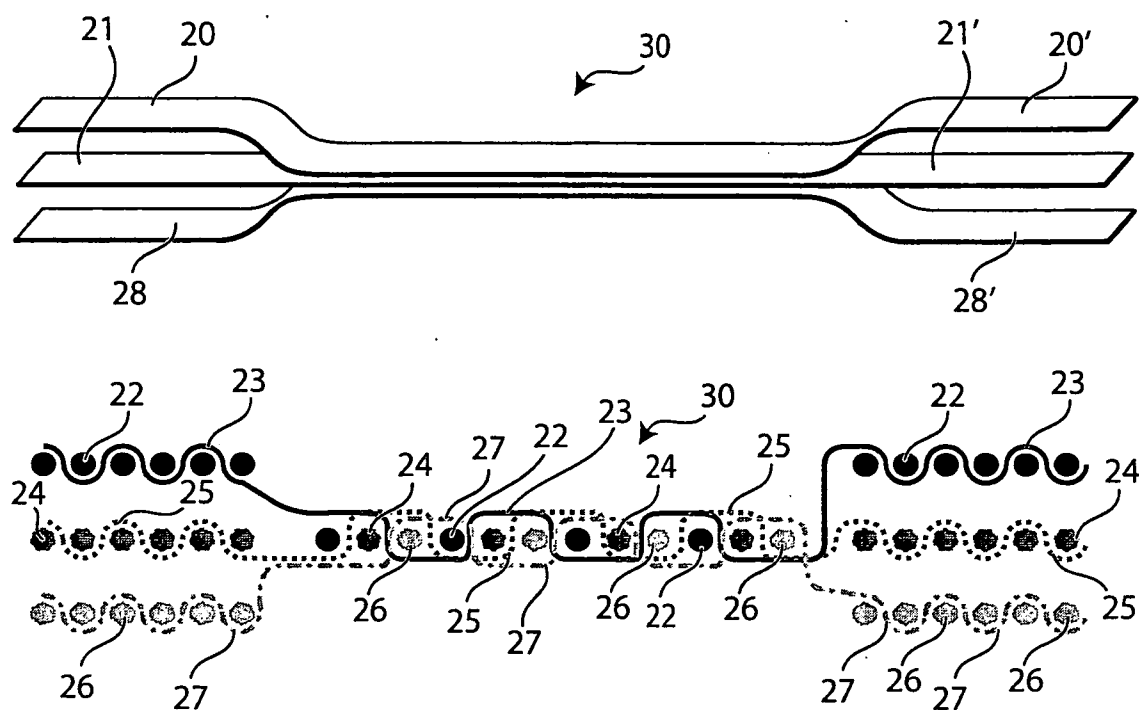


Fig. 9

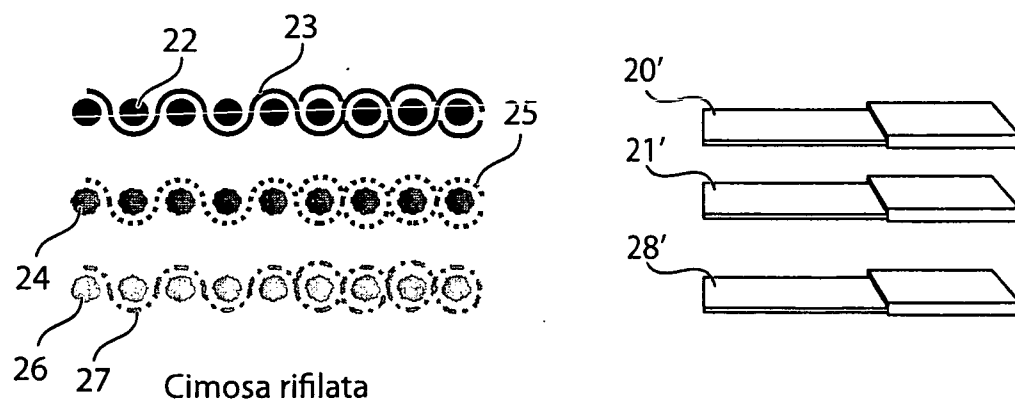


Fig. 9a

7/8

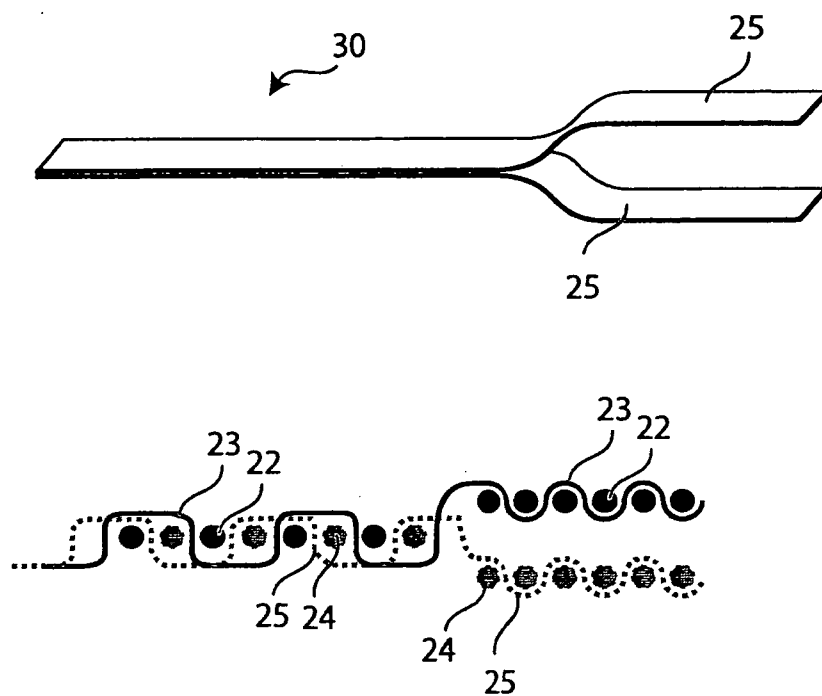


Fig. 10

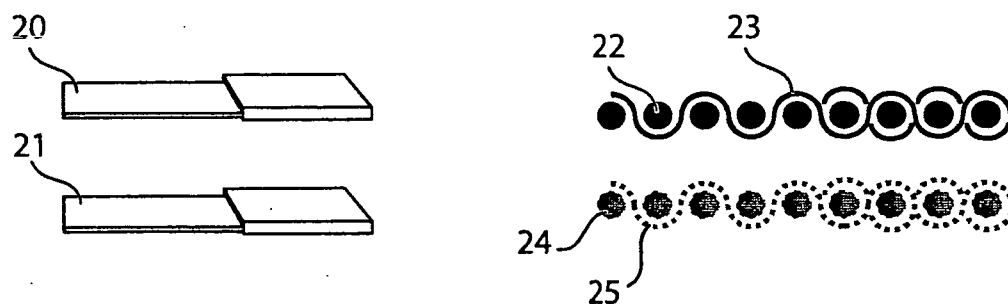


Fig. 10a

8/8

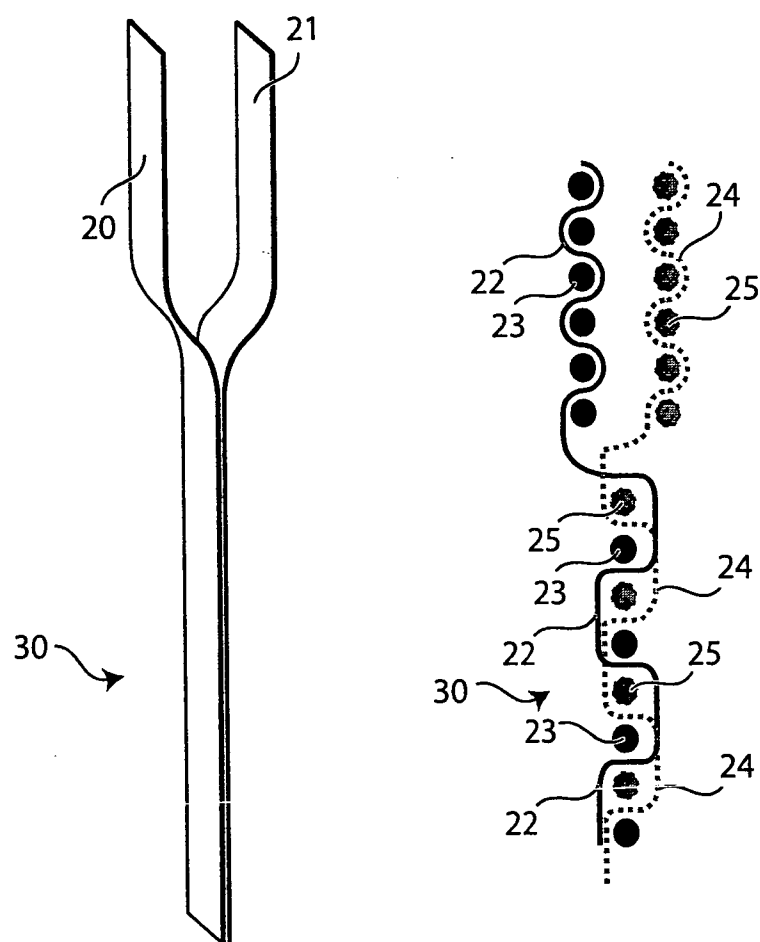


Fig. 11

INTERNATIONAL SEARCH REPORT

International application No

PCT/EP2008/005900

A. CLASSIFICATION OF SUBJECT MATTER

INV. D03D3/00 D03D11/02 D03D25/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

D03D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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X	US 5 657 795 A (SAWKO PAUL M [US] ET AL) 19 August 1997 (1997-08-19) column 12, line 14 - line 43; figures 9A-9C	1,2,6,7, 10
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☒ Further documents are listed in the continuation of Box C.☒ See patent family annex.

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Date of the actual completion of the international search

29 September 2008

Date of mailing of the international search report

09/10/2008

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INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2008/005900

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
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Information on patent family members

International application No

PCT/EP2008/005900

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