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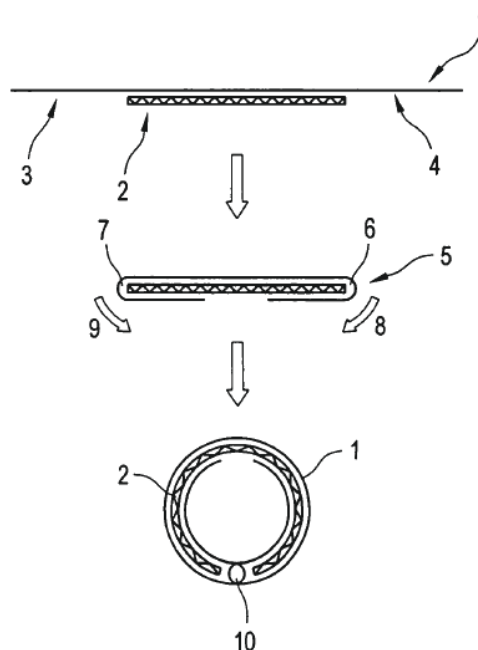
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The following information has been taken from documents filed by the applicant

(54) Title: **Press material**

(57) Abstract: The invention relates to a paper machine clothing comprising a woven fabric material and a perforated mesh material. The woven fabric is folded around the ends of the perforated nonwoven mesh material to form fold regions, and loops facing in the machine direction are provided at the fold regions.



Description

[0001] The present invention relates to clothing materials that are used in web formation equipment, for example for paper manufacturing. The invention is used in particular, but not exclusively, for press felts.

Prior Art

[0002] Paper is traditionally manufactured by transporting paper pulp, which typically is made up of a suspension of cellulose fibers, on a forming fabric or between two forming fabrics in a forming section, wherein the sheet being developed is then led through a pressing section and lastly through a drying section of a paper manufacturing apparatus. In the case of conventional tissue paper machines, the paper web is transferred from the press felt onto a Yankee cylinder and then creped.

[0003] Paper machine clothing is used essentially for carrying the paper web through these various stations of the paper manufacturing apparatus. In the forming section, the pulp is laid wet on a moving forming wire, and water is induced to flow off by means of suction boxes and suction foils. The paper web is then transferred to a press felt which transports it through the pressing section, where it generally passes through a series of press nips that are formed by rotating cylindrical press rollers. Water is pressed out of the paper web and into the press felt, while the web and the clothing pass together through the nip. In the final stage the paper web is transferred either to a Yankee drying cylinder in the case of tissue paper manufacturing, or to a group of drying cylinders on which the majority of the remaining water is evaporated with assistance by the clamping action of the drying fabric.

[0004] Press felts generally include nonwoven layers of fibrous material that are needled with a woven basic structure. The base fabric may be sewn, but is generally endless-woven.

[0005] Press felts are subjected to extended wear during operation of the paper machine. This wear is caused mostly by the pressure that is exerted on the felts when they pass through the nip rollers.

[0006] GB 2,238,272 relates to a seamed press felt in which the multi-ply base fabric is provided

with folds at its ends. Yarns in the cross-machine direction are removed at the fold regions, and leave behind loops thereon in the machine direction. The clothing is then folded together in order to interdigitate these two sets of loops, and a pintle wire is guided through the loops to provide an endless clothing.

[0007] US 6,000,441 describes clothing with an endless-woven design having two layers of wefts and two layers of warps. Seam loops are formed at each end of the base fabric due to the absence of warp yarns in these areas. Each warp yarn-free area has an area of essentially uncrimped weft yarns which form seam loops. The two sets of seam loops may be interdigitated and held together by a pintle wire.

[0008] US 6,283,165 discloses a paper machine clothing in which an arrangement of longitudinal threads that are fastened to a nonwoven layer is wound around an insert that includes a series of transverse threads. The transverse threads on the outside are removed to form coupling eyes which may be interdigitated and held together by a wire.

Statement of the Object

[0009] None of the clothings mentioned above deal with the problem of press felt wear.

[0010] According to a first aspect of the present invention, a paper machine clothing is provided which comprises a woven fabric and a perforated mesh material, wherein the woven fabric is folded around the ends of the perforated mesh material to form fold regions in which loops facing in the machine direction are provided at the fold regions.

[0011] According to a second aspect of the present invention, a method for manufacturing paper machine clothings is provided, comprising the step of folding the woven fabric around the ends of a perforated mesh material to form fold regions with loops thereon which face in the machine direction.

[0012] The woven fabric and the perforated mesh material are ideally affixed to one another by needling. Nonwoven material is likewise ideally affixed to the woven fabric, preferably by needling. The nonwoven material not only is used as a store for water that has been removed from the paper web, but also improves the structural strength of the press felt. The presence of the woven

material provides good fiber bonding, resulting in reduced fraying problems.

[0013] If the woven fabric is flat-woven, it may be necessary to remove cross-directional weft yarns from opposite ends of the material, thus forming seam loops. However, the base fabric may be woven in such a way that the weft yarns at the end areas are held to a minimum or are entirely absent. In this case, seam loops may be incorporated into the material during the weaving.

[0014] If the woven material is endless-woven, the need for removing warp yarns in order to provide seam loops depends on the weaving process used. When the process described in US 6,000,441 is used, seam loops are formed as part of the weaving process. However, if the base fabric is woven using a standard "endless web technique," such as techniques that are well known to those skilled in the art, cross-directional warp yarns must be removed in order to provide seam loops.

[0015] In addition, it is known to manufacture endless-woven textile loops in duplex form, i.e., two layers of connected textile tubes, with an outer tube and an inner tube. Such a duplex tube is woven with a seam loop. It is understood that such a duplex endless-woven tube may be manufactured in which the inner tube and the outer tube are not joined together, as a result of which a double-layer tube made of a single woven fabric may be formed. For this reason, the inner tube and the outer tube could be separated after the weaving, thus producing a larger one-layer endless-woven tube. In this case, seam loops would be incorporated into the base fabric during the weaving.

[0016] These machine direction loops may be interdigitated and joined together by a pintle wire. Portions of a seam structure may optionally be affixed to each of the loops, and these portions may be fastened together to form a seam. A pintle wire generally would likewise be used here.

[0017] The perforated mesh material provides increased resistance to compaction, and increased elasticity. The perforated mesh material is ideally of an elastomeric type. Preferred materials include any of the following, either alone or in combination: The perforated mesh material is ideally manufactured according to GB 2,235,705 B and GB 2,202,873 B.

[0018] If the woven fabric material is flat-woven, the perforated mesh material is preferably situated in the middle of the woven material in such a way that sections of the woven fabric extend

beyond the ends in the longitudinal direction of the perforated mesh material. These protruding sections, if present, are folded together with the insert around the bottom side of the perforated mesh material, so that the ends are in close proximity to one another but do not necessarily abut. These free ends may be affixed by needling.

[0019] If the woven fabric is endless-woven, the perforated mesh material is situated essentially centrally in the hole that is defined by the continuous tube of the woven fabric. The mesh material could then be affixed by needling.

Exemplary Embodiment

[0020] To aid in understanding the present invention, specific embodiments are described by way of example, with reference to the appended drawings:

[0021] Figure 1 shows a method for manufacturing a material according to the invention;

[0022] Figure 2 shows a second method for manufacturing a material according to the invention;

[0023] Figure 3 shows a third method for manufacturing a material according to the invention; and

[0024] Figure 4 shows a fourth method for manufacturing a material according to the invention.

[0025] With reference to Figure 1, a flat base fabric 1 and a nonwoven perforated mesh structure 2 are manufactured separately. The flat base fabric 1 has a plain weave, but may have any other weaving pattern that is known in the field, and the perforated mesh structure 2 is manufactured as a membrane according to GB 2,202,873 and/or GB 2,235,705. The flat base fabric 1 is essentially twice as long as the nonwoven membrane structure 2, so that when the membrane structure 2 is centrally arranged on the base fabric 1, sections 3, 4 protruding from the base fabric are visible. The protruding sections 3, 4 are folded around the bottom side of the membrane structure so that the ends of the protruding sections 3, 4 almost touch one another, thus forming a layer around the membrane. For consolidation of the membrane structure and the base fabric, they are needled to one another (not shown), thus forming an intermediate arrangement 5. In this stage, nonwoven layers (not shown) are affixed at this position by needling. In the next

manufacturing step, the cross-directional weft yarns at the end of diametrically opposed areas of the base fabric are removed from the intermediate arrangement in order to provide seam loops 6, 7. The areas of the intermediate structure that have the seam loops are folded in the direction indicated by the arrows 8, 9, thus interdigitating and bringing the seam loops together. To allow the seam loops to be affixed in position, each area of loops is joined to the other, using a pintle wire 10.

[0026] With reference to Figure 2, an endless-woven basic structure 11 and a nonwoven membrane structure 2 are manufactured separately. The membrane structure is manufactured according to GB 2,202,873 and/or GB 2,235,705. The membrane structure 2 is inserted into the cavity 12 in the basic structure 11. For consolidation of the membrane structure and the basic structure, they are needled together with the nonwoven layers (not shown), thus forming an intermediate arrangement. In the next manufacturing stage, the cross-directional warp yarns at the end of diametrically opposed areas of the basic structure are removed from the intermediate arrangement in order to provide seam loops 6, 7. The areas of the intermediate structure that have the seam loops are folded in the direction indicated by the arrows 8, 9, thus interdigitating and joining the seam loops together using a pintle wire 10. The press fold with the seam is then complete.

[0027] With reference to Figure 3, an endless-woven basic structure 13 and a nonwoven membrane structure 2 are manufactured separately. The basic structure 13 is manufactured according to US 6,000,441, with seam loops 6, 7 being incorporated into the basic structure during the weaving. The membrane structure is manufactured according to GB 2,202,873 and/or GB 2,235,705. The membrane structure 2 is inserted into the cavity 14 in the basic structure 13. For consolidation of the membrane structure and the basic structure, they are needled together with the nonwoven layers (not shown), thus forming an intermediate arrangement 15 for interdigitation and connection via a pintle wire 10.

[0028] With reference to Figure 4, an endless-woven basic structure 16 and a nonwoven membrane structure 2 are manufactured separately. In this case the two layers of the two-layer basic structure are not joined together, so that the two-layer structure may be placed openly, thus forming a larger endless-woven one-layer basic structure 17. The membrane structure is manufactured according to GB 2,202,873 and/or GB 2,235,705. The membrane structure 2 is inserted into the cavity 18 in the basic structure 17. For consolidation of the membrane structure

2 and the basic structure 17, they are then needled together with the nonwoven material (not shown), thus forming an intermediate arrangement 19. The areas of the intermediate structure that have the seam loops are folded in the direction indicated by the arrows 8, 9, thus bringing the seam loops together. To allow the seam loops to be affixed in position, each area with loops is joined together, using a pintle wire 10.

[0029] It is noted that all of the embodiments described above are provided with a nonwoven insert. The insert is provided at the outer surface of the press felt, and is in contact with the paper web during the paper manufacturing. At the location where it is contained, an insert is added directly in front of the needling for the intermediate arrangement and is situated at the membrane on the opposite side of the basic structure; i.e., the woven basic structure is enclosed between the membrane and the insert in the needled intermediate arrangement.

[0030] It is naturally understood that the above-described embodiments are used only for illustration, and that numerous modifications and variations are possible.

Claims

1. A paper machine clothing comprising a woven fabric material and a perforated mesh material, **characterized in that** the woven fabric is folded around the ends of the perforated nonwoven mesh material to form fold regions in which loops facing in the machine direction are provided at the fold regions.
2. The paper machine clothing according to claim 1, characterized in that the woven fabric and the perforated mesh material are affixed to one another by needling or other lamination techniques, such as adhesive bonding.
3. The paper machine clothing according to claim 1 or 2, characterized in that the paper machine clothing includes a nonwoven insert that is needled to the woven fabric.
4. The paper machine clothing according to claim 1 or 2 or 3, characterized in that the ends of the woven fabric are in close proximity to one another after the folding.
5. The paper machine clothing according to one of claims 1 through 4, characterized in that the

paper machine clothing is a press felt or a forming fabric or a drying fabric or a transfer belt or a smoothing belt.

6. A method for manufacturing paper machine clothing, comprising the step of folding the woven fabric around the ends of a perforated mesh material to form fold regions with loops thereon which face in the machine direction.

7. The method according to claim 6, characterized in that if the woven fabric is flat-woven, cross-directional weft yarns are removed from the folded opposite ends of the woven fabric, thus forming seam loops.

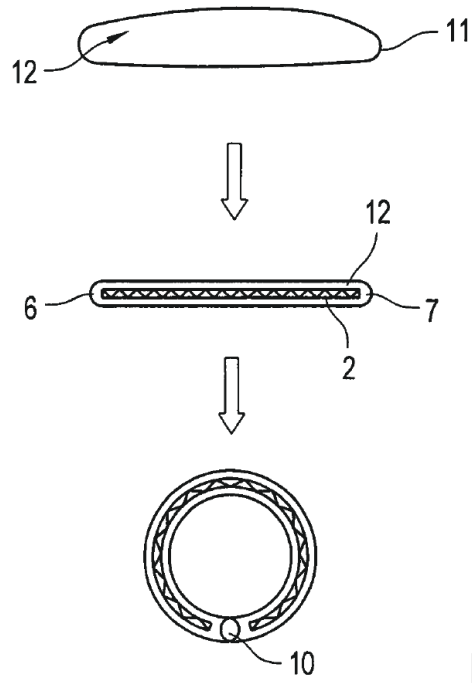
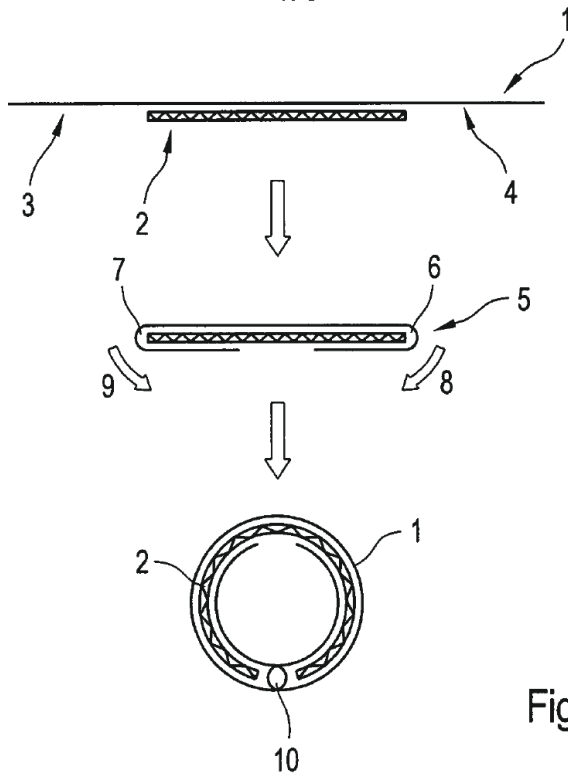
8. The method according to claim 6, characterized in that the flat woven fabric is woven in such a way that the cross-directional weft yarns at the intended fold regions are held to a minimum or are entirely absent.

9. The method according to claim 6, characterized in that if the woven fabric is endless-woven, the seam loops are formed as part of the weaving process.

10. The method according to claim 6, characterized in that if the woven fabric is endless-woven, the seam loops are formed by removing cross-directional warp yarns.

3 sheets of drawings are appended

Appended Drawings



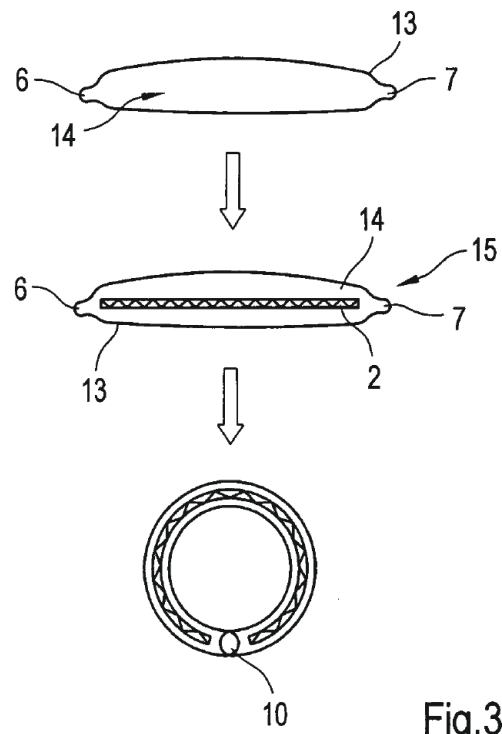


Fig.3

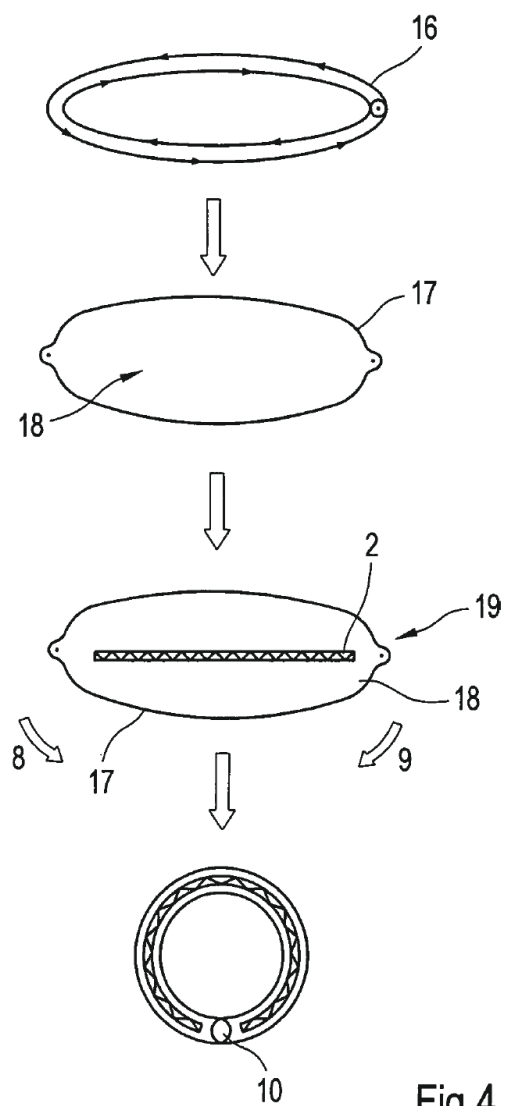


Fig.4

Certification of Accuracy

To whom it may concern:

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DE 10 2004 044 568

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Signature of Translator

June 13, 2025

Date