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(71) Applicant:
Federico Aspesi S.r.l.
21013 Gallarate - Varese (IT)

(72) Inventors:
• **Aspesi, Federico**
21013 Gallarate - Varese (IT)

• **Aspesi, Nicola**
21013 Gallarate - Varese (IT)
• **Aspesi, Antonio**
21013 Gallarate - Varese (IT)
• **Aspesi, Francesco**
21013 Gallarate - Varese (IT)

(74) Representative:
Long, Giorgio et al
Jacobacci & Perani
Via Visconti di Modrone 7
20122 Milano (IT)

(54) Method and equipment for needle-punching finished textile materials

(57) A method of treating finished textile materials intended for making into clothes, garments and the like, comprising the steps of providing at least one layer of one of said finished textile materials and needling a first side thereof. It is thus advantageously possible to cause

some of the fibres of the first side of the layer to appear on the second side, so producing a wool/velvet-like effect and new colour effects.

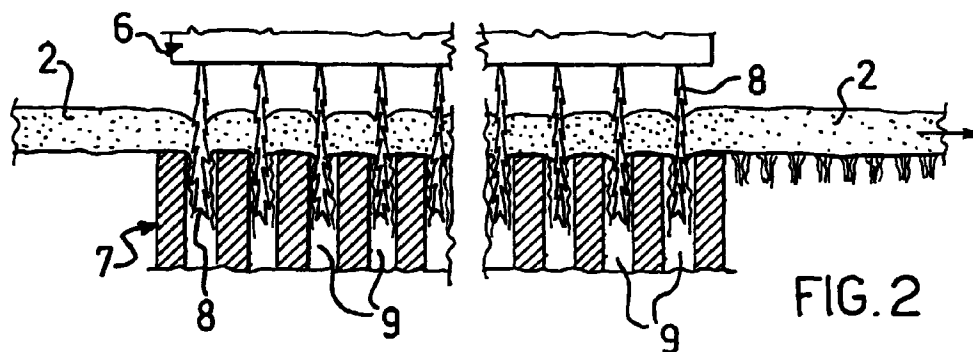


FIG. 2

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Description

[0001] The present invention relates to a method of treating finished textile materials intended for making into clothes, garments and the like, in order to enhance the fashion content thereof and make it possible to combine two or more layers of such materials.

[0002] The present invention also relates to equipment for applying said treatment to the finished textile materials.

[0003] Within the context of the present description, the expression "finished textile materials" is intended to denote not only woven fabrics but also knitted fabrics, lace and the other materials used in clothing manufacture. The finished textile materials known as "nonwovens" are not, however, included among the finished textile materials.

[0004] Where references are made to combining two or more finished textile materials, plastics films (PVC), the use of which has recently been introduced for the manufacture of certain parts of clothes, should also be considered in addition to the materials mentioned a moment ago.

[0005] Purely as an example, the following are certain possible combinations of finished textile materials: woven with woven, woven with knitted, woven with lace, lace with PVC film, and others.

[0006] For simplicity of description the term "fabric" will be used in the remainder of the present description in the place of finished textile materials.

[0007] As is known, there is a need in the clothing manufacturing sector for fabrics with a high fashion content, that is to say fabrics having a considerable aesthetic appeal so as to raise the value of the garment itself and make it more desirable in the eyes of future buyers.

[0008] It is also known that the above-mentioned fabrics are produced in the form of rolls that are usually several tens of metres in length and of the order of one or two meters wide, wound in bolts.

[0009] Once produced, the aesthetic content of the fabrics can be modified/enhanced only by printing and other such operations whose fastness and durability over time leave something to be desired.

[0010] The consequence is that if fabric manufacturers are to be able to offer a wide variety of fabrics, they are compelled to compensate for the above-mentioned problem by producing a highly diversified output, the obvious consequence of which is that they have to stock a large quantity of bolts of different fabrics which, because of the continual changes in trends imposed by fashion, risk remaining unsold.

[0011] Furthermore, if the need arises to combine together too or more fabrics, for instance in order to produce so-called double-face garments or to apply a lace to a fabric, the solution adopted is adhesive bonding. Once again, however, it is obvious that this solution is inappropriate for fabrics intended for making up into

expensive garments, the only possible alternative to which seems to be hand stitching.

[0012] The object of the present invention is to devise a method of treating finished textile materials whereby the above-mentioned need to increase the aesthetic content of the finished textile materials is satisfied simply and economically, while at the same time avoiding the drawbacks referred to.

[0013] This object is achieved in the form of a method of treating finished textile materials intended particularly for making into clothes, garments and the like, comprising the steps of providing at least one layer of one of said finished textile materials and needling a first side of said layer, so as to cause some of the fibres of material from the first side of the layer to appear on the second side.

[0014] The method preferably comprises the steps of superimposing at least a first layer and a second layer of said finished textile materials and needling the outward side of the first layer, so as to cause some of the fibres of material from the first layer to appear on the outward side of the second layer and produce a mechanical link between said at least a first and a second layer by the interpenetration of the fibres of the first layer in the second layer.

[0015] An equipment for carrying out the method according to the invention comprises a housing containing needling means and is characterised in that suction means are connected to said housing to remove the fine dust produced during the needling of finished textile materials.

[0016] In order that the invention and its advantageous aspects may be understood, there now follow a number of examples of embodiments of the method according to the invention and a detailed description, given purely by way of non-restrictive illustration, of a preferred embodiment of equipment for carrying out this method, reference being made to the accompanying drawings in which:

- Figure 1 is a diagrammatic perspective view in partial section of the equipment according to the invention,
- Figure 2 is a sectional view, not in scale, of a detail of the equipment shown in Figure 1 in a different phase of operation,
- Figure 3 is an exploded perspective view of Figure 2, and
- Figure 4 is a sectional view, not in scale, of a detail of the machine of Figure 1 in one phase of its operation.

[0017] With reference to the accompanying figures, 1 is a general reference for equipment for applying the treatment according to the invention to finished textile materials.

[0018] In the example considered the finished textile materials are fabric 2 wound in bolts 3.

[0019] The equipment 1 comprises a housing 4 containing needling means 5 that comprise a needling plate 6 and a perforated plate 7, these being roughly rectangular.

[0020] The perforated plate 7 is supported integrally by the housing 4 in such a way that its topside forms a horizontal supporting surface. The needling plate 6 is positioned over the perforated plate 7 and parallel with it, and is supported in such a way that it is vertically mobile (direction Y-Y).

[0021] The equipment 1 includes drive means, conventional in themselves and not shown in the figures, for driving the needling plate 6 vertically towards and away from the lower perforated plate 7.

[0022] The needling plate 6 comprises a plurality of needles 8 projecting from the lower surface i.e. the surface nearest the perforated plate 7, while the perforated plate 7 contains a corresponding plurality of through holes 9 into which the needles 8 enter as the needling plate 6 descends.

[0023] The needles 8 are so shaped that they present a series of little sawteeth, or hooks, that point downwards so as to pull down some of the fibres of the fabric 2 only during the descent.

[0024] Defined between the perforated plate 7 and the needling plate 6 is a needling zone where the needling of the fabric 2, or of a number of superimposed layers of fabric 2, takes place, as will become clear in the course of the description. During the needling operation the upper surface of the perforated plate 7 acts as a supporting surface to the fabric 2.

[0025] The housing 4 is completely closed with the exception of two openings on opposite sides, an entrance opening marked 10 and an exit opening marked 11 in Figure 1, through which the fabric 2 is moved towards and away from the needling zone.

[0026] In the example of Figure 1, the entrance opening 10 and exit opening 11 are arranged parallel to the two long sides of the needling plate 6 and perforated plate 7, and the fabric 2 is advancing through the housing 4 of the equipment 1 in a predetermined rectilinear direction X-X. Basically, as it advances in the direction X-X from the entrance opening 10 towards the exit opening 11, the fabric 2 passes through the needling zone defined between the perforated plate 7 and the needling plate 6.

[0027] In a preferred embodiment (Fig. 3), the needling plate 6 comprises a plurality of needles 8 arranged in rows 14 suitably spaced apart from each other and running parallel in the direction X-X. This makes it possible for the needling operation to produce a ruled effect on the lower surface of the fabric 2, as will become clearer in the course of the description.

[0028] The equipment 1 comprises means 12 for feeding in the fabric 2 to be needled and means 13 for receiving the fabric 2 coming from the needling zone.

[0029] The feeder means 12 are positioned close to the entrance opening 10 and in the present example

take the form of two motorised feeders that take bolt cores, so that two different layers of fabric 2 can be fed simultaneously into the needling zone.

[0030] The means 13 for receiving the fabric 2 leaving the needling zone are positioned close to the exit opening 11 and, in the present example, take the form of a motorised winder that takes bolt cores 16. In the case of Figure 1, it is clear that the bolt core-type winder makes it possible to wind on the same bolt both layers of fabric 2 leaving the needling zone.

[0031] Advantageously, suction means are connected to the housing 4 of the equipment 1 to remove the fine dust produced during the operation of needling the fabric 2 or a number of superimposed layers of fabric 2. This allows efficient dust removal so that the air of the premises in which the equipment 1 is located does not become full of fine dust.

[0032] These suction means take the form of a plurality of suction nozzles formed in the housing 4 which, via respective flexible ducts 17, are connected to a conventional suction device which is not shown in the figures.

[0033] To increase the efficiency of suction of the fine dust, the entrance and exit openings 10 and 11 are fitted with flexible screens 18 which reduce the cross section of the openings to that strictly necessary to enable the fabric to pass through. These flexible screens 18 basically function like seals to limit the ingress of air into the interior of the housing 4.

[0034] When the equipment 1 is operating, the feeder means 12 feed one or more superimposed layers of fabric to the entrance opening 10 of the housing 4. From here the fabric continues to advance in the direction X-X, through the needling zone and out through the exit opening 11 to be rewound into a bolt on the core-type winder 16.

[0035] Inside the needling zone the fabric is supported on the perforated plate 7.

[0036] When the equipment 1 is running, the needling plate 6 is driven vertically by the aforementioned drive means, so that its needles 8 move between a retracted position in which they are remote from the perforated plate 7 by a predetermined distance greater than the thickness of the layer of fabric, and an advanced position in which they enter, at least partially, the holes 9 of the perforated plate 7 (Figures 2 and 4).

[0037] Purely by way of a guide, the needling plate is driven with a frequency of 500-1400 strokes per minute, while the forward speed of the fabric is of the order of 1-7 metres per minute. The values are selected to suit the characteristics of the fabric to be needled.

[0038] In the case shown in Figure 2, the needling zone is fed with a single layer of fabric 2. During the needling operation the pulling action exerted on the fibres of the layer by the sawtooth parts of the needles 8 during the descent causes some of the fibres from the upper side of the layer to appear on its lower side. Because the density of the holes produced by the needles 8 in the fabric 2 is very great (of the order of 800-

1200 holes/cm² depending on the characteristics of the fabric), the fibres appearing on the lower side of the layer create a wool/velvet-like effect which modifies the aesthetic quality of the fabric.

[0039] The layer of fabric is fed into the needling zone with its wrong side uppermost and, consequently, the wool/velvet-like effect forms on the right side of the fabric.

[0040] It should be pointed out that if the warp yarns of the fabric are of a different colour from the weft yarns, in other words if the wrong side of the fabric is coloured differently from the right side of the fabric, the effect produced by the above-mentioned treatment is not only to give a surface wool-like handle but also to modify the chromatic appearance of the right side of the fabric. This of course necessitates no dyeing or similar processes.

[0041] So, for example, by treating a fabric of the type known commercially by the name DENIN, which has white warp yarns and blue weft yarns, in the way mentioned above, the right side of the fabric, which is coloured blue, acquires a plurality of white tufts, creating a dusting effect.

[0042] By using a needling plate 6 in which the needles 8 are arranged in rows 14 in the manner described earlier, it is obvious that a ruled effect will be produced on the lower side of the fabric layer. The type of ruled effect produced can of course be diversified by varying the size of the rows 14 and the distance between them.

[0043] In the case illustrated in Figures 1 and 4, the needling zone of the equipment 1 is fed with two superimposed layers of fabric. If needling is performed on these superimposed layers from the outward side of the upper layer, some of the fibres of the material of the upper layer will appear on the outward side of the lower layer.

[0044] In this way it is possible to cause the fibres of the upper layer to interpenetrate with the fibres of the lower layer, producing a mechanical link between the layers, which are thus joined together.

[0045] It is obvious that, once again, by superimposing fabrics with different motifs and colorations, the outward side of the lower layer not only acquires a surface wool-like handle but also a novel chromatic effect which enhances the value of the fabric.

[0046] In the case of fabrics intended for making up into double-face garments, needling can be performed on both outward sides of the layers so as to modify both outward surfaces.

[0047] As can be appreciated from the above account the method of treating finished textile materials according to the present invention satisfies the aforementioned need to enhance the aesthetic content of finished textile materials in a simple and economical manner and at the same time to overcome the problems referred to earlier. Thus, with the method according to the invention it is possible to modify, in a durable manner, the right side of finished textile materials, increasing their fashion con-

tent with both a wool- and velvet-like effect and with new colour combinations.

[0048] Another advantage of the method according to the invention is that it makes it possible to produce a ruled effect on the right side of finished textile materials.

[0049] Another advantage of the method according to the invention is that it makes it possible to mechanically join two or more layers of identical or different finished textile materials. Non-exhaustive examples of such combinations are: woven with woven, knitted with woven, lace with woven, lace with plastic films (PVC) and others.

[0050] One advantage of the equipment according to the invention is that it can implement the above-mentioned method in a simple and economical manner and at the same time solve the problem of the fine dust generated during the needling of finished textile materials.

[0051] Clearly, in order to satisfy particular local requirements, a person skilled in the art will be able to make many modifications and alterations to the equipment and method described above, all of which will nonetheless fall within the scope of protection of the invention as defined by the following claims.

Claims

1. Method of treating finished textile materials intended particularly for making into clothes, garments and the like, comprising the steps of providing at least one layer of one of said finished textile materials (2) and needling a first side of said layer, so as to cause some of the fibres of material from the first side of the layer to appear on the second side.
2. Method according to Claim 1, in which the needling of said first side of the layer is done with a needling plate (6) comprising a plurality of needles (8) arranged in rows (14) spaced apart from each other and running parallel in a predetermined direction (X-X), the layer of finished textile material that is to be needled advancing in said direction (X-X) relative to said needling plate (6), so as to produce a ruled effect on the second side of the layer.
3. Method according to Claim 1, comprising the steps of superimposing at least a first layer and a second layer of said finished textile materials (2) and needling the outward side of the first layer, so as to cause some of the fibres of material from the first layer to appear on the outward side of the second layer and produce a mechanical link between said at least a first layer and a second layer by the interpenetration of the fibres of the first layer in the second layer.
4. Method according to Claim 1, comprising the steps of superimposing at least a first layer and a second

layer of said finished textile materials (2) and needling from both the outward sides.

the needled textile materials comprise a winder that takes bolt cores (16).

5. Equipment for carrying out the method according to any one of the previous claims, comprising a housing (4) containing needling means (5), characterised in that suction means (17) are connected to said housing (4) to remove the fine dust produced during the needling of finished textile materials (2).
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6. Equipment according to Claim 5, in which:
 - said housing (4) includes opposing entrance (10) and exit (11) openings through which the finished textile materials (2) are moved towards and away from said needling means (5),
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 - means (12) for feeding in the finished textile materials (2) are positioned at said entrance opening (10), and
 - means (13) for receiving the needled textile materials are positioned at said exit opening (11).
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7. Equipment according to Claim 6, in which said entrance (10) and exit (11) openings are provided with flexible screens (18).
25
8. Equipment according to Claim 5, in which said needling means (5) comprise a needling plate (6) having a plurality of needles (8) intended to be inserted into a corresponding plurality of holes (9) in a perforated plate (7) and drive means to drive the needling plate (6) to and from the perforated plate (7), the finished textile materials (2) to be needled being placed between the needling plate (6) and the perforated plate (7).
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9. Equipment according to Claim 5, 6 or 8, in which said needling means (5) comprise a needling plate (6) having a plurality of needles (8) arranged in rows (14) spaced apart from each other and running parallel in a predetermined direction (X-X), the layer of finished textile material that is to be needled advancing in said direction relative to said needling plate (6), so as to produce a ruled effect on the second side of the layer.
40
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10. Equipment according to Claim 6, in which the finished textile materials (2) to be needled are wound into bolts (3) and said feeder means comprise feeders that take bolt cores (15).
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11. Equipment according to Claim 10, comprising at least two feeders that take bolt cores (15).
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12. Equipment according to Claim 10, in which, after needling, the finished textile materials (2) are wound into bolts and said means (13) for receiving

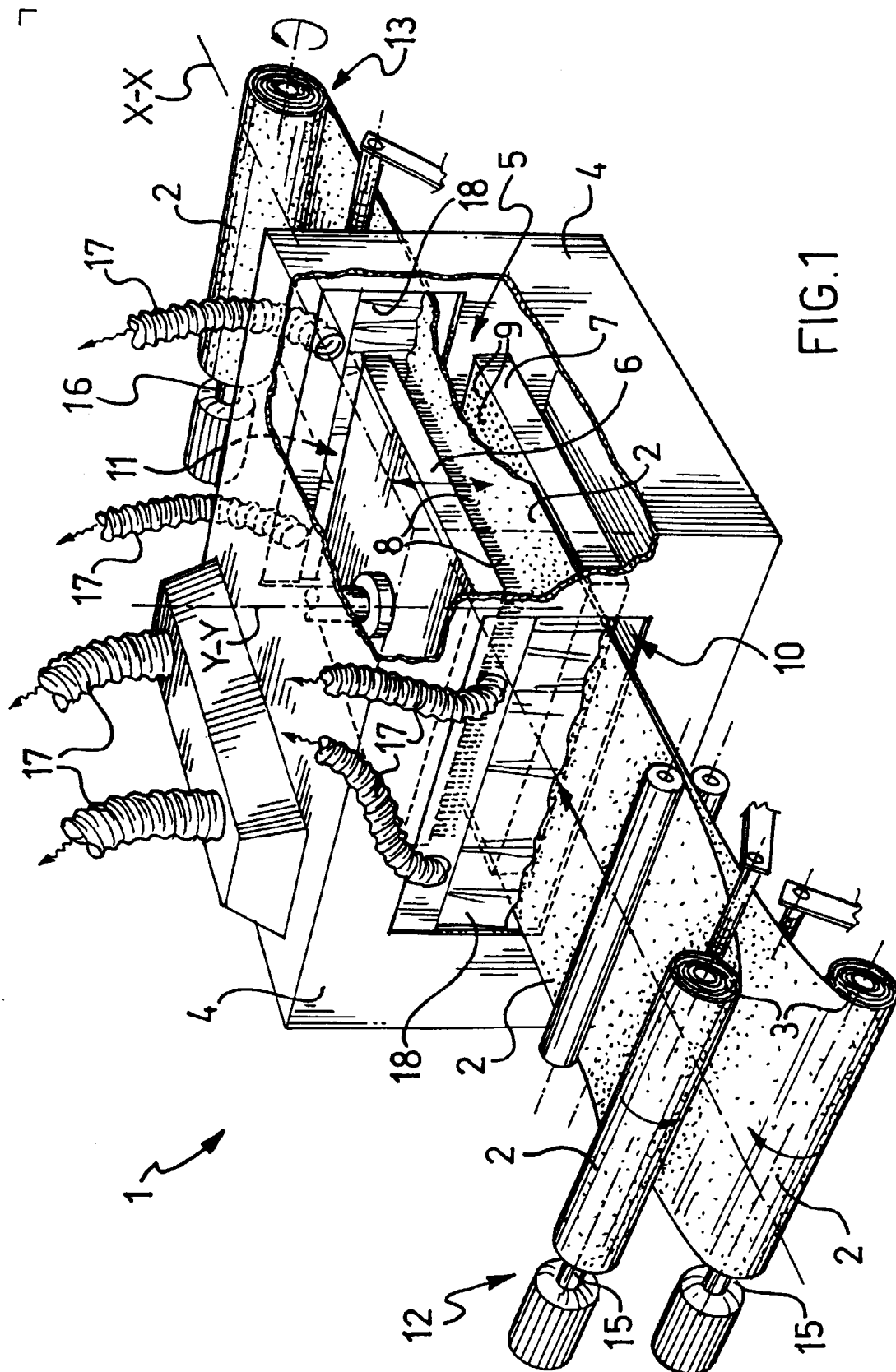
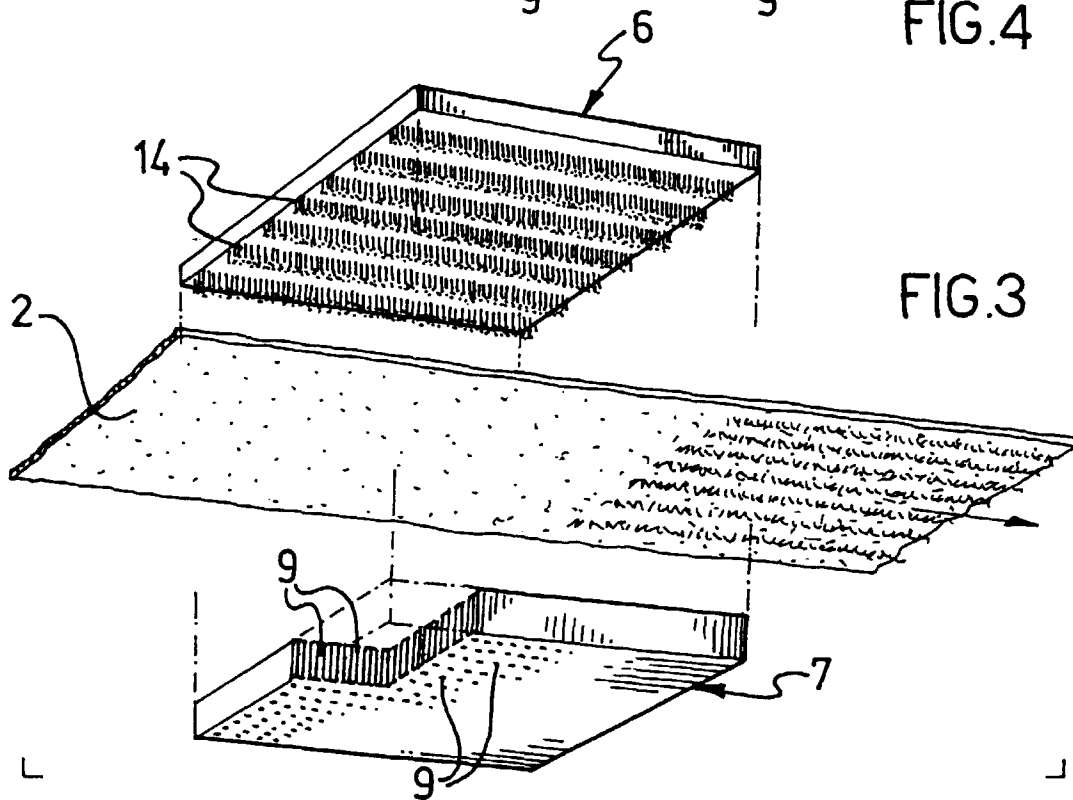
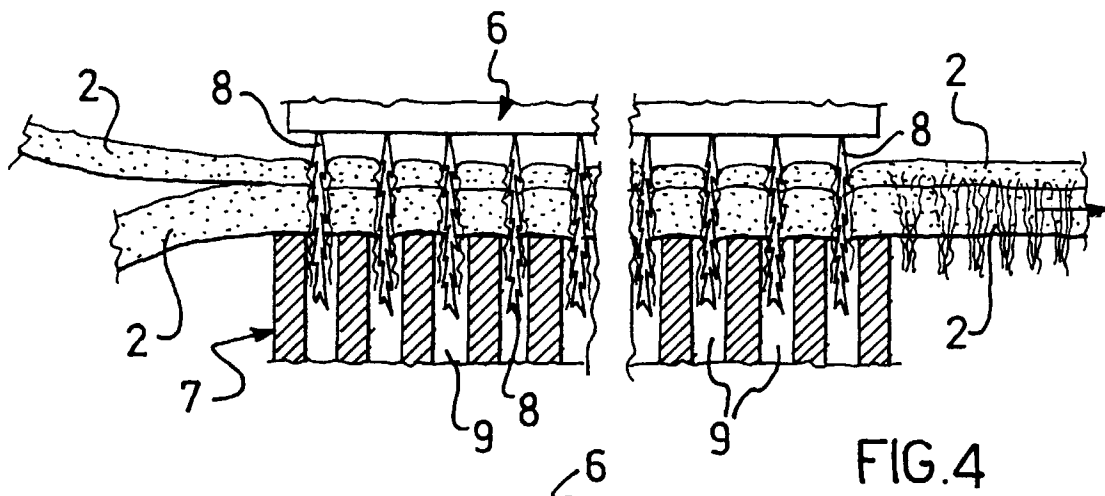
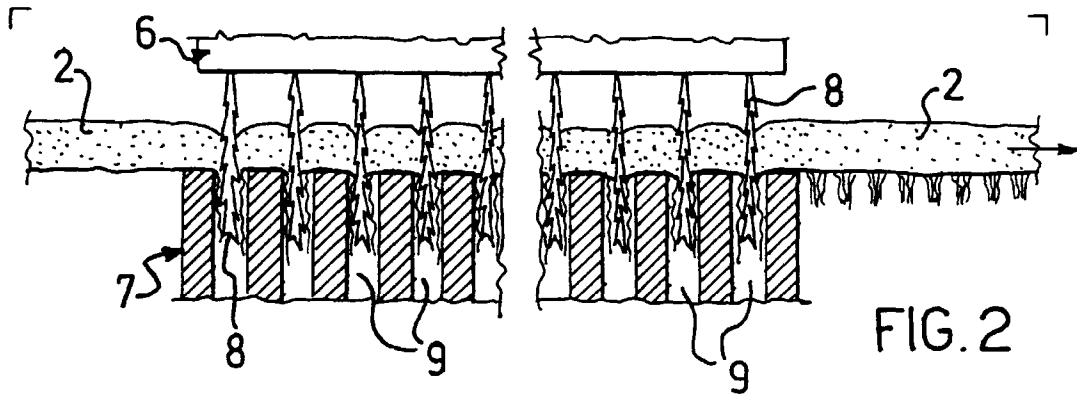


FIG. 1





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EUROPEAN SEARCH REPORT

Application Number
EP 98 20 4461

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Place of search THE HAGUE		Date of completion of the search 16 June 1999	Examiner Barathe, R
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EPO FORM 1503 03/82 (P04C01)



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Application Number
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THE HAGUE		16 June 1999	Barathe, R
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