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(54) **DEVICE FOR THE CONTROLLED REMOVAL OF PILES FROM A PILE FABRIC**

VORRICHTUNG ZUM KONTROLLIERTEN ENTFERNEN VON FLOR AUS EINEM FLORGEWEBE

DISPOSITIF DE RETRAIT CONTRÔLÉ DE POILS D'UN TISSU À POILS

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Description

Technical field

[0001] This invention relates to a device and a method for the controlled removal of piles from a pile fabric.

[0002] The term pile fabric is used to mean a fabric comprising a base textile support on which a plurality of piles of variable length extends on one side. The piles are fixed to the base support by various techniques known in the sector, such as, for example, by forming knots between the piles and the patterns of the base support, folding each individual pile substantially in a "U" shape in such a way that both ends of the pile pass beyond the base support.

Background art

[0003] Currently, in order to remove predetermined portions of pile, for example for aesthetic and decorative purposes, there are different types of operations.

[0004] A first prior art type consists in the use of so-called Jacquard frames. Jacquard frames are a type of frame for weaving which allow complex patterns to be executed on the fabric being processed.

[0005] With respect to the traditional frame, a station is added which allows the automatic movement of the individual warp threads creating the decorated portions according to predetermined patterns.

[0006] In practice, the Jacquard frames do not operate by removing pile where it is not desired, but during the step for producing the fabric they allow the "insertion" of pile only allow where it desired by the user according to the required pattern.

[0007] This type of frame is very widespread in the textile sector and it was the first to have allowed the execution of surface decorations on the fabric through a frame; however, it has major drawbacks.

[0008] A first major drawback is due to the fact that the complete machinery to achieve a processing on a fabric is very complex and therefore very expensive.

[0009] A second equally major drawback is due to the fact that the production by means of the Jacquard frames is very slow.

[0010] A second type of procedure known for removing portions of pile from pile fabrics involves the use of hot cylinders (or steam cylinders) which allow the piles to be flattened and folded in predetermined areas.

[0011] In practice, the pile fabric is made to pass in contact with hot a cylinder bearing in relief the decorations to be executed and this, by means of the heat and the pressure of the fabric against it (for example, generated by a second cylinder) executes the flattening and folding of the piles located in the portions to be decorated.

[0012] This type is functional and fast but it also has considerable drawbacks.

[0013] An example of prior art is described in patent document US1294516.

[0014] A first major drawback is due to the operating cost; in fact, since the operation is to be performed "hot", a large quantity of energy is necessary for heating the cylinder or for generating the steam.

[0015] A second equally major drawback is due to the fact that the piles are simply flattened and not completely removed.

[0016] As a result, the pattern is not permanent but only temporary; it is fact known that after a few washes of the fabric decorated by this procedure the piles tend to lose the flattening, therefore rendering the patterns less visible.

[0017] Moreover, the cylinders used for this purpose are made of metal and their construction is very expensive.

Disclosure of the invention

[0018] The aim of this invention is to provide a device and a method for controlled removal of piles from a pile fabric which overcomes the drawbacks of the prior art.

[0019] In this context, a first aim of the invention is therefore to provide a device and a method for the controlled removal of piles from a pile fabric which is able to optimise the timing and costs for the production of a decorated pile fabric.

[0020] A further aim is to provide a device and a method for controlled removal of piles from a pile fabric which allows a permanent decoration of the pile fabric to be obtained which is not subject to decay over time and during use.

[0021] The above aims are achieved by a device for the controlled removal of piles from a pile fabric comprising the technical features described in one or more of the accompanying claims.

Brief description of the drawings

[0022] Further features and advantages of the invention are more apparent in the non-limiting description of a preferred embodiment of it, as illustrated in the accompanying drawings, in which:

- Figure 1 shows a schematic front view of a device for the controlled removal of piles from a pile fabric according to the invention;
- Figure 2 shows a schematic side view of a device for the controlled removal of piles from a pile fabric according to the invention;
- Figure 3 shows a schematic view of a fabric decorated by means of a device for the controlled removal of piles from a pile fabric according to the invention,
- Figure 4 shows a schematic view of a fabric designed for processing with the device and method according to the invention.

[0023] With reference to the accompanying drawings, the numeral 1 denotes in its entirety a device for control-

led removal of piles 8 from a pile fabric 7.

Detailed description of preferred embodiments of the invention

[0024] The term pile fabric means a fabric 7 comprising a base support 13 which is passed through by a plurality of piles 8.

[0025] The piles 8 in particular pass entirely through the thickness of the support 13 of the fabric 7.

[0026] The fabric 7 has two surfaces, a lower surface 9, without piles 8 which project out from the support 13 but equipped with portions 12 for fastening the piles 8; and an upper surface 14, which is the visible surface of the finished fabric 7 and which comprises a plurality of piles 8 which project from the base support 13 typically in a range of between 1 mm and 50 mm, preferably between 2 mm and 25 mm.

[0027] The piles 8 pass through the entire thickness of the support fabric 7 and are connected by techniques known in the textile sector on the lower surface 9.

[0028] However, regardless of the specific type of processing, a plurality of portions 12 for mechanical type fastening the piles 8 are created on the surface 9.

[0029] The fabric 7 therefore has a plurality of piles 8 extending for a few millimetres on the visible side of the fabric 7 and with the same plurality of piles 8 but not extended, that is to say, in the form of fastening portions 12, relative to the support 13 in the lower surface 9.

[0030] A possible schematic representation of a fabric 7 designed to be processed with a device 1 and the method according to the invention is shown in Figure 4.

[0031] A device 1 for the controlled removal of piles 8 from a pile fabric 7 according to the invention and in its basic embodiment comprises a first cylinder 2 rotating relative to a respective axis X.

[0032] The first cylinder 2 comprises a plurality of relief portions 6, which extend from the side surface 5 and which are designed to come into contact with a surface 14 having a plurality of piles 8 of the pile fabric 7.

[0033] The relief portions 6 constitute the positive of the decoration to be obtained on the fabric 7.

[0034] The device 1 also comprises a second cylinder 3 rotating relative to a respective axis Y, parallel to the axis X.

[0035] The second cylinder 3 is movable towards the first cylinder 2 in the direction indicated in Figure 1 by the arrow F.

[0036] The second cylinder 3 comprises a plurality of rigid bristles 4, preferably metallic, designed and shaped for making contact with the surface 9 of the fabric 7, that is to say, the surface opposite to that with the plurality of piles 8, or more precisely the surface facing the fastening portions 12 of the piles 8.

[0037] The first cylinder 2 and the second cylinder 3 define a zone 11 for processing the fabric 7 where the actual removal of the piles 8 occurs at the relief portions 6, that is, in the zones planned by the specific pattern 10

desired on the finished fabric 7.

[0038] The rigid bristles 4 or the metal brush, impacting in rotation on the surface 9 of the fabric 7, and therefore on the fastening portions 12, remove the piles 8 pulling them out from the support 13, according to the direction indicated in Figure 4 by the arrow H.

[0039] In order to optimise and modulate the effect of removal of the piles 8 from the support 13 of the fabric 7 it is possible to configure the device 1 in such a way as to vary their extraction force.

[0040] More specifically, it is possible for the two cylinders 2, 3 to rotate with different or the same directions.

[0041] Moreover, again with the same purpose, it is possible to rotate the two cylinders 2, 3 at different angular speeds or at substantially equal speeds. Advantageously, moreover, depending on, for example, the type of fabric 7 being processed, it is possible for the bristles 4 to be made of different materials, in any case substantially rigid, for example metal or plastic. The bristles 4 may also, as well as having a linear extension, end with an at least partly hooked portion.

[0042] In this way, an easier removal of the piles 8 from the support 13 of the fabric 7 is obtained.

[0043] A fundamental importance for the purposes of processing fabric 7 by means of a device 1 according to the invention is that all the processing steps may performed "cold", that is to say, without the need for heating the processing zone 11, the first cylinder 2 and the second cylinder 3.

[0044] A further aspect of the invention consists in a method for the controlled removal of piles 8 from a pile fabric 7, of the type described above, comprising the steps of:

- preparing a first cylinder 2 rotating relative to an axis X and comprising the relief portions 6, that is to say, the positive of the decorations 10, designed to come into contact with the surface 14 of the fabric 7 having a plurality of piles 8,
- preparing a second cylinder 3 rotating relative to an axis Y parallel to the axis X. The second cylinder 3 comprises a plurality of rigid bristles 4 designed to enter into contact with the surface 9 of the fabric 7 opposite to that with the plurality of piles 8, that is to say, the surface facing the fastening portions 12 of the piles 8 themselves
- inserting a first end of the fabric 7 interposed between the first cylinder 2 and the second cylinder 3. The fabric 7 is positioned in such a way that the surface 14 having piles 8 is in contact with the first cylinder 2, and in particular with the relative protruding portions 6.
- keeping under pressure the fabric 7 on the first cylinder 2, according to the direction shown in Figure 2 by the arrows G; for example, this pressure may be generated and maintained by suitable rollers on which is wound and unwound the fabric 7.
- moving the second cylinder 3 towards the first cylinder 2.

der 2 in such a way that the rigid bristles 4 are in contact with the surface 9 of the fabric 7, that is to say, the one with the fastening portions 12 of the piles 8 and opposite to the surface 14,

- rotating the first cylinder 2 and the second cylinder 3,
- removing by withdrawing the piles 8 from the support 13 of the fabric 7 located at the relief portions 6 by means of rubbing with the rigid bristles 4. The method may be used to obtain a finished fabric 7 as schematically shown in Figure 3, that is to say, having decorative zones 10 "excavated" with respect to the surface 14 having the piles 8 which have not been processed by the relief portions 6.

[0045] Advantageously, the step of rotating the first cylinder 2 and the second cylinder 3 can occur with the same or different directions and at different or substantially equal angular speeds.

[0046] The invention overcomes the drawbacks of the prior art and brings major advantages.

[0047] A first major advantage consists in providing a device and a method for removing piles 8 from a pile fabric 7 in a inexpensive and fast manner.

[0048] A second major advantage consists in the fact that the processing occurs "cold", that is to say, without the need to provide any heat outside the system.

[0049] A further advantage consists in the fact that the processing according to the invention makes it possible to obtain a definitive decorative effect.

Claims

1. A device (1) for the controlled removal of piles (8) from a pile fabric (7) comprising:

a first cylinder (2) rotating relative to an axis X and comprising relief portions (6) designed to come into contact with a surface (14) having a plurality of piles (8) of the pile fabric (7),

a second cylinder (3) rotating relative to an axis Y parallel to the axis X, the first cylinder (2) and the second cylinder (3) defining a zone (11) for processing the fabric (7) for removing the piles (8) at the relief portions (6), said device (1) being **characterized in that** said second cylinder (3) is movable towards the first cylinder (2), the second cylinder (3) comprises a plurality of rigid bristles (4) designed to come into with a surface (9) of the fabric (7) which is opposite to that with the plurality of piles (8)

2. The device (1) according to claim 1, wherein the plurality of bristles (4) of the second cylinder (3) have one end at least partly hook shaped.
3. The device (1) according to any one of the preceding claims, wherein the first cylinder (2) and the second

cylinder (3) rotate in opposite directions.

4. The device (1) according to claim 1 or 2, wherein the first cylinder (2) and the second cylinder (3) rotate in the same directions.

5. The device (1) according to any one of the preceding claims, wherein the first cylinder (2) and the second cylinder (3) rotate at different angular speeds.

6. The device (1) according to any one of the preceding claims, wherein the first cylinder (2) and the second cylinder (3) are not heated

7. A method for the controlled removal of piles (8) from a pile fabric (7) comprising the steps of:

- preparing a first cylinder (2) rotating relative to an axis X and comprising the relief portions (6) designed to come into contact with a surface having a plurality of piles (8) of the pile fabric (7),

- preparing a second cylinder (3) rotating relative to an axis (Y) parallel to the axis (X), the second cylinder (3) comprising a plurality of rigid bristles (4) designed to come into contact with a surface (9) of the fabric (7) which is opposite to that with the plurality of piles (8),

- inserting a first end of the fabric (7) interposed between the first cylinder (2) and the second cylinder (3), the fabric (7) being positioned in such a way that the surface having piles (8) is in contact with the first cylinder (2),

- keeping the fabric (7) under pressure on the first cylinder (2),

- moving the second cylinder (3) towards the first cylinder (2) in such a way that the rigid bristles (4) are in contact with the surface (9) of the fabric (7) which is opposite to that with the plurality of piles (8),

- rotating the first cylinder (2) and the second cylinder (3),

- removing by withdrawing the piles (8) from the fabric (7) located at the relief portions (6) by means of rubbing with the rigid bristles (4).

8. The method according to claim 7, wherein the step of rotating the first cylinder (2) and the second cylinder (3) occurs with different directions of rotation.

9. The method according to claim 7, wherein the step of rotating the first cylinder (2) and the second cylinder (3) occurs with the same directions of rotation.

10. The method according to any one of claims 7 to 9, wherein the step of rotating the first cylinder (2) and the second cylinder (3) occurs with different angular speeds.

Patentansprüche

1. Vorrichtung (1) zum kontrollierten Entfernen von Flor (8) aus einem Florgewebe (7), umfassend:

einen ersten Zylinder (2), der sich relativ zu einer X-Achse dreht und erhabene Abschnitte (6) umfasst, die ausgestaltet sind, um mit einer Oberfläche (14) in Kontakt zu kommen, aufweisend eine Vielzahl von Florelementen (8) des Florgewebes (7),

einen zweiten Zylinder (3), der sich relativ zu einer Y-Achse dreht, die parallel zur X-Achse verläuft, wobei der erste Zylinder (2) und der zweite Zylinder (3) eine Zone (11) zum Bearbeiten des Gewebes (7) zum Entfernen von Flor (8) an den erhabenen Abschnitten (6),

wobei die Vorrichtung (1) **dadurch gekennzeichnet ist, dass** der zweite Zylinder (3) hinführend zum ersten Zylinder (2) bewegbar ist, wobei der zweite Zylinder (3) eine Vielzahl von steifen Borsten (4) umfasst, die ausgestaltet sind, um mit einer Oberfläche (9) des Gewebes (7) in Kontakt zu kommen, die gegenständig zu der mit der Vielzahl von Florelementen (8) angeordnet ist.

2. Vorrichtung (1) nach Anspruch 1, wobei die Vielzahl von Borsten (4) des zweiten Zylinders (3) ein Ende aufweist, das zumindest teilweise hakenförmig ausgebildet ist.

3. Vorrichtung (1) nach einem der vorhergehenden Ansprüche, wobei sich der erste Zylinder (2) und der zweite Zylinder (3) in entgegengesetzte Richtungen drehen.

4. Vorrichtung (1) nach Anspruch 1 oder 2, wobei sich der erste Zylinder (2) und der zweite Zylinder (3) in dieselben Richtungen drehen.

5. Vorrichtung (1) nach einem der vorhergehenden Ansprüche, wobei sich der erste Zylinder (2) und der zweite Zylinder (3) bei verschiedenen Winkelgeschwindigkeiten drehen.

6. Vorrichtung (1) nach einem der vorhergehenden Ansprüche, wobei der erste Zylinder (2) und der zweite Zylinder (3) nicht erwärmt sind.

7. Verfahren zum kontrollierten Entfernen von Flor (8) aus einem Florgewebe (7), umfassend die folgenden Schritte:

- Vorbereiten eines ersten Zylinders (2), der sich relativ zu einer X-Achse dreht und die erhabenen Abschnitte (6) umfasst, die ausgestaltet sind, um mit einer Oberfläche in Kontakt zu kommen,

men, die eine Vielzahl von Florelementen (8) des Florgewebes (7) aufweist;

- Vorbereiten eines zweiten Zylinders (3), der sich relativ zu einer Achse (Y) dreht, die parallel zur Achse (X) verläuft, wobei der zweite Zylinder (3) eine Vielzahl von steifen Borsten (4) umfasst, die ausgestaltet sind, um mit einer Oberfläche (9) des Gewebes (7) in Kontakt zu kommen, die gegenständig zu der mit der Vielzahl von Florelementen (8) angeordnet ist;

- Einfügen eines ersten Endes des Gewebes (7), das zwischen dem ersten Zylinder (2) und dem zweiten Zylinder (3) eingesetzt ist, wobei das Gewebe (7) so positioniert ist, dass die Flor (8) aufweisende Oberfläche in Kontakt mit dem ersten Zylinder (2) ist;

- Halten des Gewebes (7) unter Druck auf dem ersten Zylinder (2);

- Bewegen des zweiten Zylinders (3) hinführend zum ersten Zylinder (2), sodass die steifen Borsten (4) mit der Oberfläche (9) des Gewebes (7) in Kontakt sind, das gegenständig zu dem mit der Vielzahl von Florelementen (8) angeordnet ist;

- Drehen des ersten Zylinders (2) und des zweiten Zylinders (3);

- Entfernen des an den erhabenen Abschnitten (6) befindlichen Flors (8) durch Zurückziehen vom Gewebe (7) mittels Reiben mit den steifen Borsten (4).

8. Verfahren nach Anspruch 7, wobei der Schritt zum Drehen des ersten Zylinders (2) und des zweiten Zylinders (3) mit unterschiedlichen Drehrichtungen stattfindet.

9. Verfahren nach Anspruch 7, wobei der Schritt zum Drehen des ersten Zylinders (2) und des zweiten Zylinders (3) mit denselben Drehrichtungen stattfindet.

10. Verfahren nach einem der Ansprüche 7 bis 9, wobei der Schritt zum Drehen des ersten Zylinders (2) und des zweiten Zylinders (3) mit unterschiedlichen Winkelgeschwindigkeiten stattfindet.

Revendications

1. Dispositif (1) de retrait contrôlé de poils (8) d'un tissu à poils (7), comprenant :

un premier cylindre (2) tournant par rapport à un axe X et comprenant des parties en relief (6) conçues pour entrer en contact avec une surface (14) comportant une pluralité de poils (8) du tissu à poils (7),

un second cylindre (3) tournant par rapport à un axe Y parallèle à l'axe X, le premier cylindre (2)

- et le second cylindre (3) définissant une zone (11) pour traiter le tissu (7) pour retirer les poils (8) en correspondance des parties en relief (6), ledit dispositif (1) étant **caractérisé en ce que** ledit second cylindre (3) est mobile vers le premier cylindre (2), le second cylindre (3) comprend une pluralité de crins rigides (4) conçus pour entrer en contact avec une surface (9) du tissu (7) qui est opposée à celle avec la pluralité de poils (8).
2. Dispositif (1) selon la revendication 1, dans lequel la pluralité de crins (4) du second cylindre (3) comporte une extrémité au moins essentiellement en forme de crochet.
 3. Dispositif (1) selon l'une quelconque des revendications précédentes, dans lequel le premier cylindre (2) et le second cylindre (3) tournent dans des sens opposés.
 4. Dispositif (1) selon la revendication 1 ou 2, dans lequel le premier cylindre (2) et le second cylindre (3) tournent dans le même sens.
 5. Dispositif (1) selon l'une quelconque des revendications précédentes, dans lequel le premier cylindre (2) et le second cylindre (3) tournent à des vitesses angulaires différentes.
 6. Dispositif (1) selon l'une quelconque des revendications précédentes, dans lequel le premier cylindre (2) et le second cylindre (3) ne sont pas chauffés.
 7. Procédé pour le retrait contrôlé de poils (8) d'un tissu à poils (7), comprenant les étapes de :
 - préparer un premier cylindre (2) tournant par rapport à un axe X et comprenant les parties en relief (6) conçues pour entrer en contact avec une surface comportant une pluralité de poils (8) du tissu à poils (7),
 - préparer un second cylindre (3) tournant par rapport à un axe (Y) parallèle à l'axe (X), le second cylindre (3) comprenant une pluralité de crins rigides (4) conçus pour entrer en contact avec une surface (9) du tissu (7) qui est opposée à celle avec la pluralité de poils (8),
 - insérer une première extrémité du tissu (7) interposée entre le premier cylindre (2) et le second cylindre (3), le tissu (7) étant positionné de telle sorte que la surface comportant des poils (8) soit en contact avec le premier cylindre (2),
 - maintenir le tissu (7) sous pression sur le premier cylindre (2),
 - déplacer le second cylindre (3) vers le premier cylindre (2) de telle sorte que les crins rigides (4) soient en contact avec la surface (9) du tissu (7) qui est opposée à celle comportant la pluralité de poils (8),
 - faire tourner le premier cylindre (2) et le second cylindre (3),
 - enlever en retirant les poils (8) du tissu (7) situés en correspondance des parties en relief (6) par frottement avec les crins rigides (4).
 8. Procédé selon la revendication 7, dans lequel l'étape de rotation du premier cylindre (2) et du second cylindre (3) se produit avec des sens de rotation différents.
 9. Procédé selon la revendication 7, dans lequel l'étape de rotation du premier cylindre (2) et du second cylindre (3) se produit avec les mêmes sens de rotation.
 10. Procédé selon l'une quelconque des revendications 7 à 9, dans lequel l'étape de rotation du premier cylindre (2) et du second cylindre (3) se produit avec des vitesses angulaires différentes.

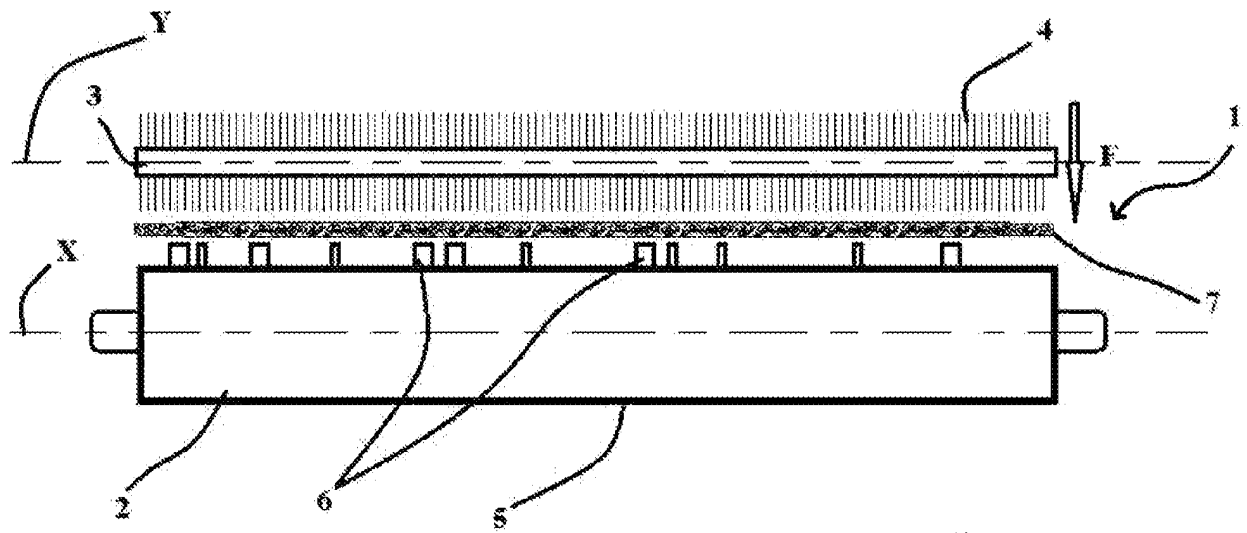


Fig.1

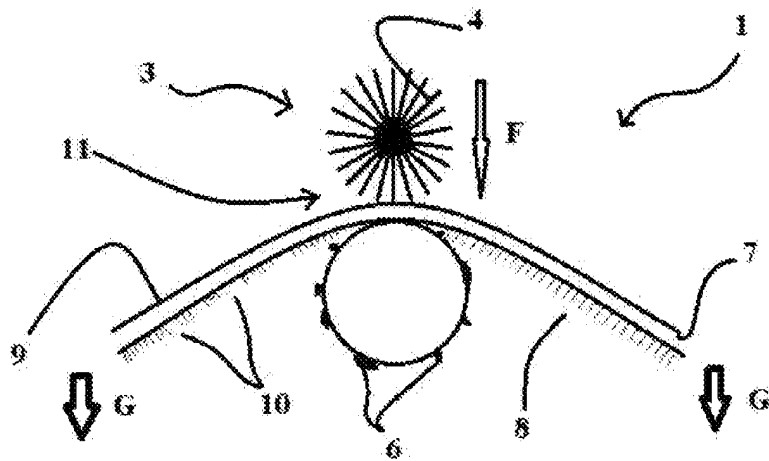


Fig.2

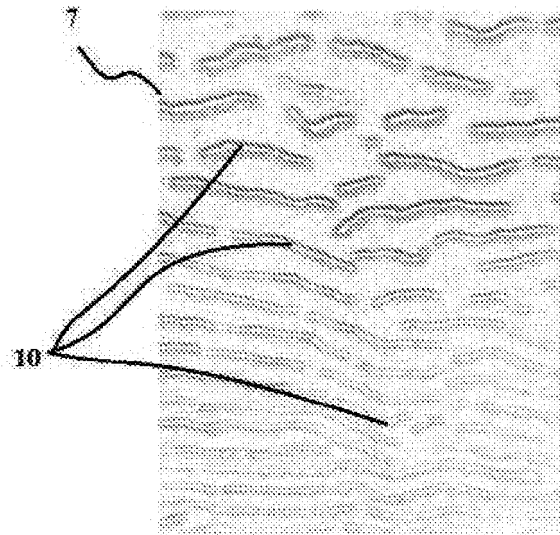


Fig.3

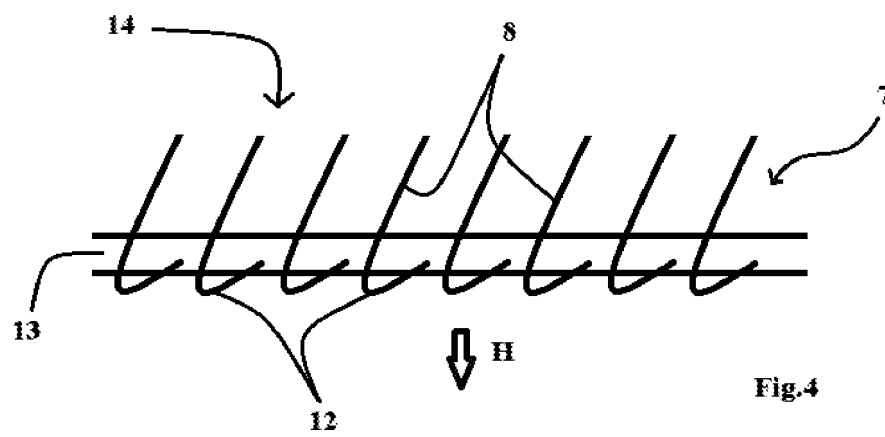


Fig.4

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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