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(54) **FELTING PROCESS UTILIZING SILK**

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(75) Inventor: **Hope Newman**, New York, NY (US)

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Correspondence Address:

**GOTTLIEB RACKMAN & REISMAN PC**  
**270 MADISON AVENUE**  
**8TH FLOOR**  
**NEW YORK, NY 100160601**

(57) **ABSTRACT**

(73) Assignee: **Goatworks, Inc.**

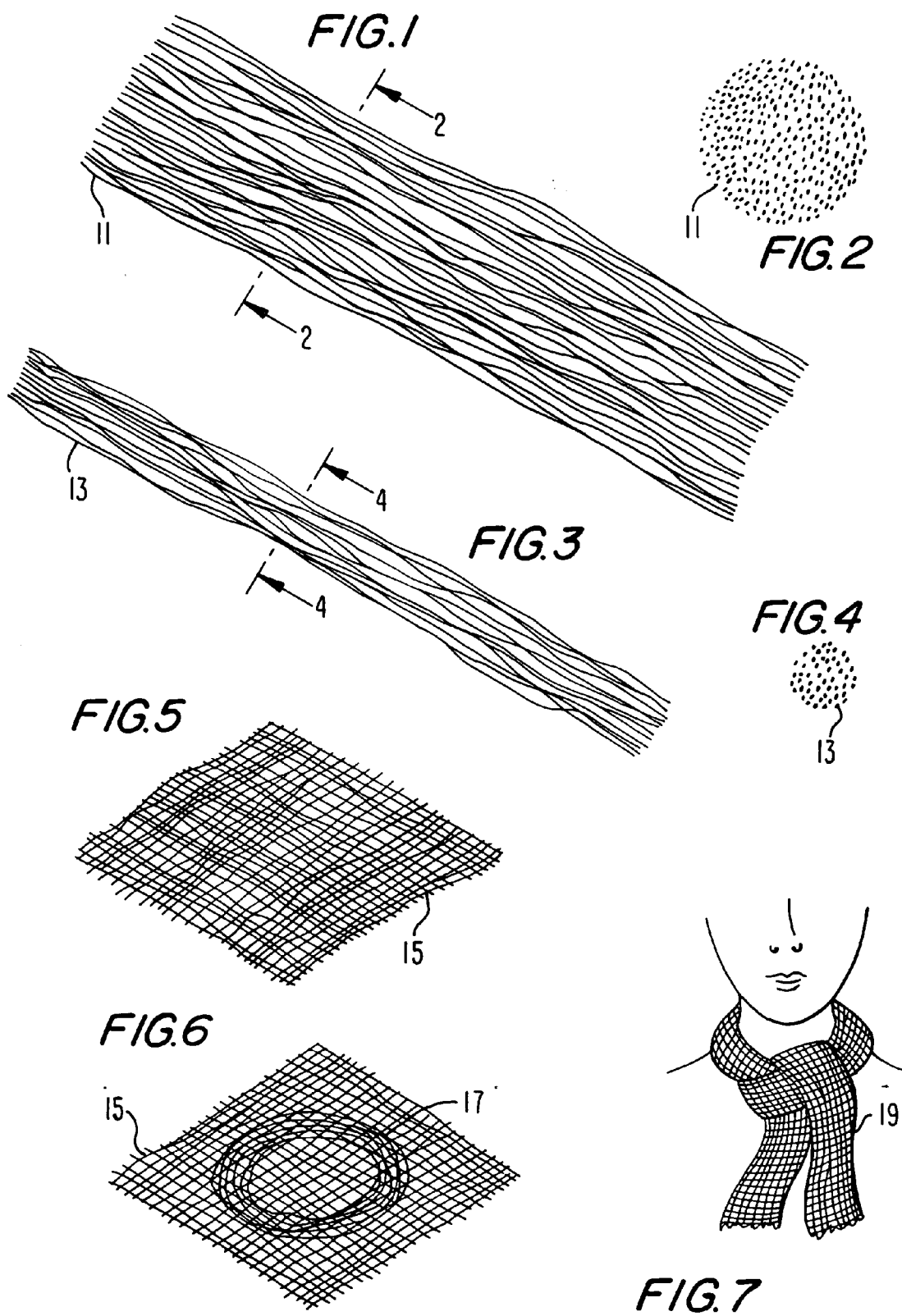
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An improved felting process utilizing silk fibers is now described. It comprises the steps of pulling off tufts of wool from a wool roving; placing at least some of said pulled tufts of wool one next to the other in order to produce a first row of wool tufts; adding one or more additional rows of wool tufts to said first row in order to produce a first layer of wool tufts of a desired size and shape; laying out at least one additional layer of wool tufts over said first layer of wool tufts in order to produce a wool fabric layout; laying out wool and silk along said layout in a desired geometric pattern in order to produce a felt fabric; wetting said felt fabric; and applying friction to said fabric layout.



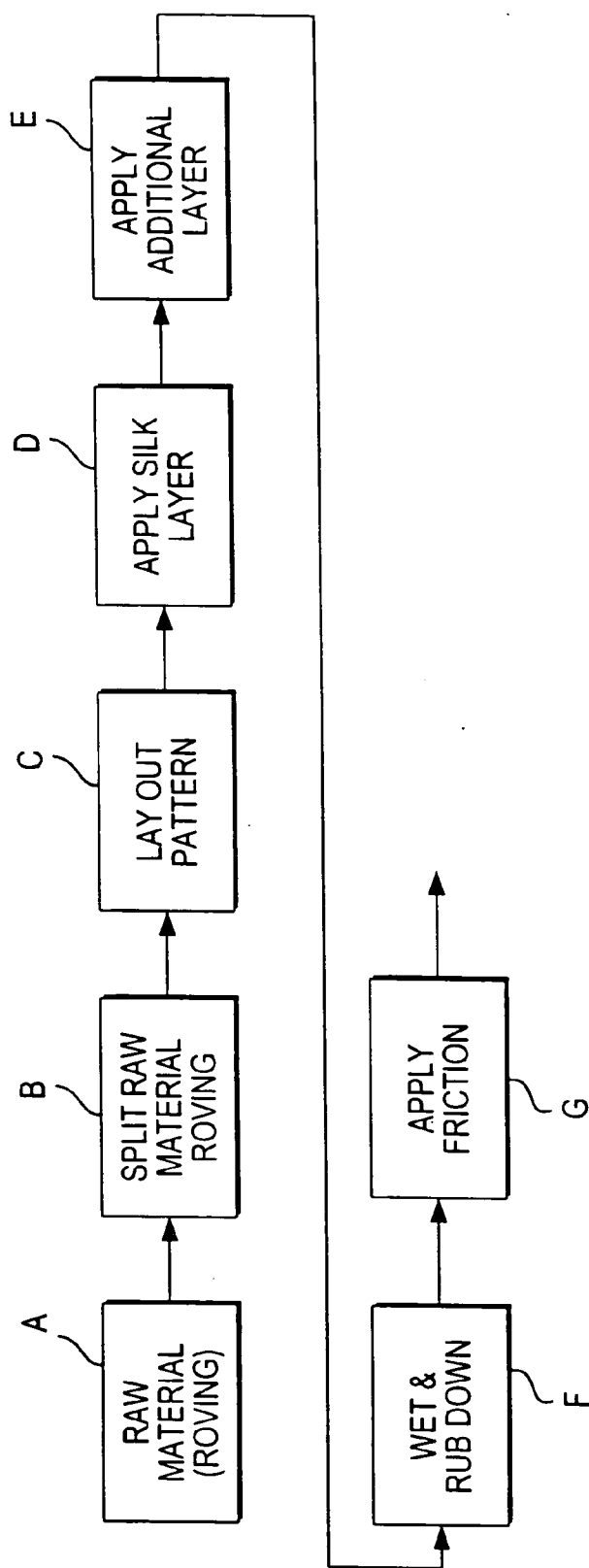
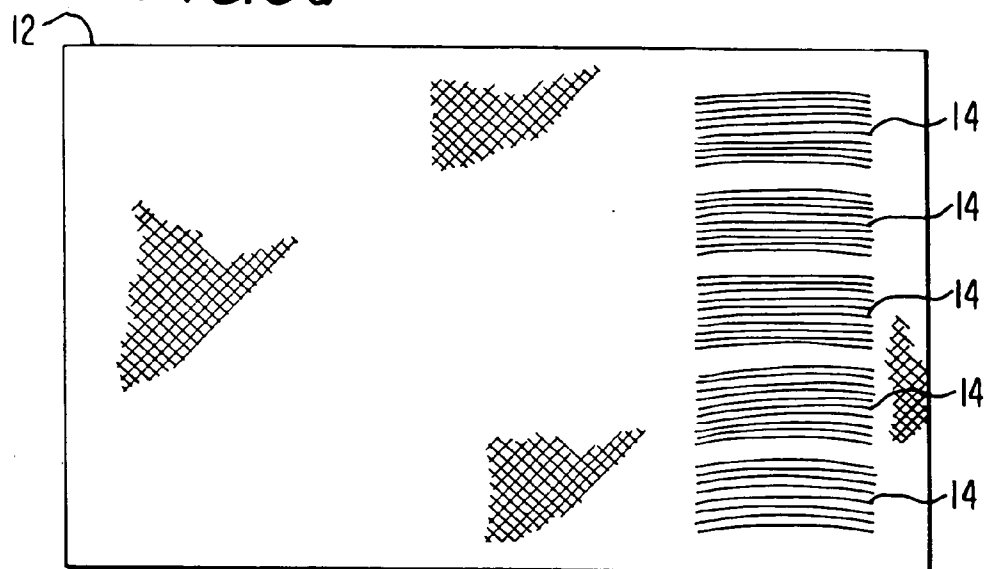
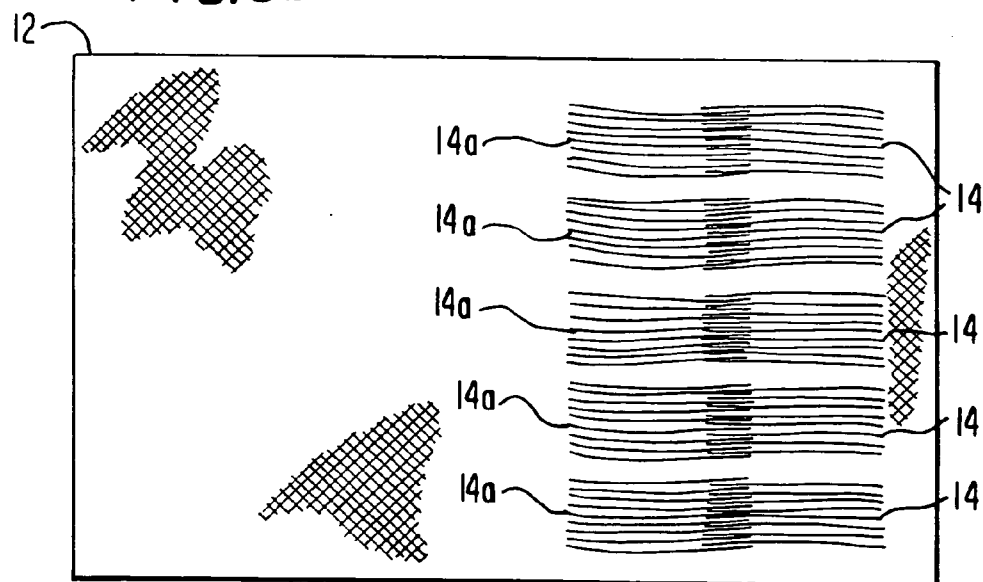


FIG. 8

*FIG. 3a*



*FIG. 3b*



## FELTING PROCESS UTILIZING SILK

### BACKGROUND

[0001] This invention relates to a novel felting process, and more particularly, to a felting process that utilizes silk in order to produce a unique type of felted garment.

[0002] The process of felting is a traditional technique which consists of overlapping wool fibers which, after they have been soaked in water, as well as rubbed and pounded together, form a dense textile commonly known as felt. The felting process is achievable since wool fiber naturally consists of a series of scales which overlap one another. When these scales come in contact with hot water, the scales open up. Thereafter, when the scales are pounded, rubbed or tread upon, they tighten into each other.

[0003] The felting process is commonly used to make blankets, shoes and other apparel items. Conventionally, the felting process begins by laying out a towel over a surface area. A fabric piece is then laid down—the piece is typically made entirely of polyester. Then, a 5-6 inch piece of wool roving is taken in one hand and, using one's other hand, the roving is held down at the other end and pulled. Continuing, more fibers are pulled and laid next to each other until a row of wool fibers is created. Then one lays down another row of wool fibers, making this row slightly overlapping the first row. Then, a second layer is created in the same way, but the wool fibers are laid at right angles to the first layer. Additional layers of wool may be laid down.

[0004] In order to create a decorative item in the felt, silk roving may be pulled out in the same manner as the wool roving, such that the silk is laid out in short irregular tufts. When the design that is desired has been completed, another layer of polyester is placed over the top.

[0005] It is now necessary to wet the fabric material. Warm water with some soap is applied and scattered over the fabric design. It is important to rub all of the water into the felt so that the wool is soaked completely. When the entire fabric is fully soaked, one then rubs the wool against any irregular surface, such as by using bubble wrap, bamboo or a wash board. One can then roll up the felt in an irregular surface material and roll it with one's hands, machine or even one's feet; alternatively, one may simply rub the felted fabric directly against the irregular surface. As a result of this rubbing, the wool fibers will overlap and entangle themselves so that the material appears to shrink and appear more dense.

[0006] While conventional felting techniques produce a much thicker felt end product (greater than 1/4 inch), they are less than advantageous. Also, the silk used for the surface design was laid out in irregular tufts, producing a non-symmetrical design.

[0007] Accordingly, it would be desirable to provide a felting process which overcomes these disadvantages while still utilizing silk fiber.

### SUMMARY OF THE INVENTION

[0008] Generally speaking, in accordance with the invention, an improved felting process utilizing silk fibers is now described. It comprises the steps of pulling off tufts of wool from a wool roving; placing at least some of said pulled tufts

of wool one next to the other in order to produce a first row of wool tufts; adding one or more additional rows of wool tufts to said first row in order to produce a first layer of wool tufts of a desired size and shape; laying out at least one additional layer of wool tufts over said first layer of wool tufts in order to produce a wool fabric layout; laying out wool and silk along said layout fabric in a desired geometric pattern in order to produce a felt fabric; wetting said felt fabric; and applying friction to said fabric.

[0009] Accordingly, it is an object of the invention to provide an improved felting process.

[0010] Still another object of the invention is to provide an improved felting process which utilizes silk fibers.

[0011] Yet a further object of the invention is to provide an improved felting process in which the produced felt is very thin.

[0012] Yet another object of the invention is to provide an improved felting process in which the silk may be laid down in various geometric patterns as desired.

[0013] Still other objects and advantages of the invention will in part be obvious and will in part be apparent from the following description.

### BRIEF DESCRIPTION OF THE DRAWINGS

[0014] For a fuller understanding of the invention, reference is made to the following description, taken in connection with the accompanying drawings, in which:

[0015] **FIG. 1** is a perspective view of the wool roving raw material;

[0016] **FIG. 2** is a cross-sectional view taken along line 2-2 of **FIG. 1**;

[0017] **FIG. 3** is a perspective view of a length of roving after being split from the wool roving raw material;

[0018] **FIG. 3a** is a top plan view depicting a single row of wool tufts;

[0019] **FIG. 3b** is a top plan view depicting two rows of wool tufts partially overlapping;

[0020] **FIG. 4** is a cross-sectional view taken along lines 4-4 of **FIG. 3**;

[0021] **FIG. 5** is a plan view of a wool layout made from the split roving;

[0022] **FIG. 6** is a perspective view of the wool layout after a silk layer is applied from silk roving;

[0023] **FIG. 7** is a view showing a finished scarf made by the inventive method; and

[0024] **FIG. 8** is a block diagram identifying the various steps in the inventive process.

### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0025] The inventive process begins by laying out a towel over a surface area and then laying down a first netting layer of polyester fabric **12** (see **FIG. 3a**), or any other man-made material which will not bind to wool fabric on the surface area. Then, a 5-6 inch length piece of wool roving **11** (see **FIGS. 1 and 2**), or some other naturally occurring material

roving, such as a cotton roving, is selected [FIG. 8—Step A] and split [FIG. 8—Step B], preferably into four or more parts or lengths 13 of roving (see FIGS. 3 and 4). Tufts of wool 14 (FIG. 3a) roving having a thickness of between about 0.3 and 1.0 mm. (preferably between about 0.4 and 0.75 mm.) and a weight per area of between about 1.0 and 3.5 oz. per square yard (preferably between about 1.0 and 2.0 oz. per square yard) are then pulled off from the split roving lengths. This is perhaps best achieved by holding the split lengths of roving on one hand and grasping the ends of the wool between the fingertips and palm of the other hand. Then, gently pull along the wool, breaking the wool fibers, and small light tufts will come away from the split roving links. These tufts should not clump and should appear uniform. The tufts should have a length of between about 2.5 and 6.0 inches and a width of between about 1.0 and 2.5 inches.

[0026] Then, and as shown in FIG. 3a, place the pulled-off tufts of wool down on the felting surface (the netting or polyester fabric). Place each tuft of wool one next to the other, with each tuft substantially parallel to and at the edge or side of the next tuft, with minimal overlap. Repeatedly do this until a row of wool tufts of a desired overall width is produced.

[0027] Then, add, lengthwise as shown in FIG. 3b, another row of wool tufts 14a which slightly overlaps the first row. This is achieved by placing the ends of the tufts of wool of the second row along the ends of the first row of tufts, overlapping the thin edge of the tufts of the first row with the thicker edge of the tufts of second row. In essence, one wants to achieve a sort of shingling effect. Continue to lay out additional adjacent rows of tufts of wool in order to produce an underside layer of wool tufts having a length that is desired [FIG. 8—Step C].

[0028] The next step requires producing a second outside layer of wool tufts laid over the first layer, lengthwise at an angle thereto, preferably at a substantially right angle thereto. The tufts for the second layer are pulled off from split roving lengths in the same manner as before and with the same range in thickness, length and width dimensions. These tufts are used to produce multiple slightly overlapping rows for defining the second layer. Additional layers of wool tufts may be produced and disposed between the underside and outside layers. A wool fabric layout 15, as shown in FIG. 5, is thus produced. If done appropriately, the netting of polyester fabric should be visible through the layers.

[0029] Utilizing both silk roving and wool roving, a third layer is then laid out comprising a mixture of silk and wool. The mixture is at least 30% silk by weight, and preferably at least 50% silk by weight. In a preferred form, the silk and wool is laid out in continuous lines [FIG. 8—Step D] by pulling out the silk and wool individually, in continuous lines, either in the form of circle lines or some other geometric pattern, as shown, by way of example, at 17 in FIG. 6, in order to produce the inventive felt fabric. Importantly, the silk and wool fibers are each pulled out gradually and not to the point of breaking (in contrast to production of the tufts) so that continuous lines rather than tufts are created along the wool layout. If possible, the silk/wool that is laid out to form the geometric pattern should be laid out at an angle with respect to the underlying wool layer. Optionally, and instead of pulling out continuous lines, tufts of wool and

silk may be used, or a combination of tufts of wool and silk and continuous lines of wool and silk may be used.

[0030] The next step is to place another layer of netting or polyester over the top of the produced felt fabric [FIG. 8—Step E]. Then, it is necessary to wet and rub down the fabric [FIG. 8—Step F]. This is achieved by, for example, dipping a sponge in warm soapy water, placing the wet sponge along the center of the fabric, pressing down in order to wet the fabric, and then pushing out any air from the fabric. Preferably, the fabric is repeatedly wetted while keeping the netting in place. The netting keeps the fabric from moving and sticking. The fabric should be completely wet and soapy, but can be dabbed with a towel or some other absorbent material in order to remove excess water.

[0031] When the entire piece of felt fabric is fully soaked, it is necessary to then apply some type of friction to the fabric, such as by utilizing a material having an irregular or abrasive surface, such as bubble wrap, bamboo or a wash board. Particularly, friction is applied to the fabric such that the fibers thereof bind into each other. Then, the fabric is peeled off from the polyester nettings. The fabric is uniquely thin, having a thickness of between about 1.0 and 3.0 mm., and more preferably, between about 1.25 and 2.25 mm. A finished textile, such as a scarf 19 as depicted in FIG. 7, is then produced.

[0032] In accordance with the invention, the thickness of the felt fabric is substantially smaller than that which was achieved in the prior art. This is due in part to the technique of pulling out the tufts of wool from the roving in substantially even sheer thin lengths and laying out the tufts of wool evenly and with minimal overlap as each row of tufts is produced.

[0033] Although, in the preferred embodiment, a single layer of a mixture of silk and wool is laid over the outside layer of wool tufts, a second layer of a mixture of silk and wool may be laid between the underside layer of wool tufts and the first netting layer without departing from the inventive method.

[0034] In accordance with the invention, between any of the layers of wool tufts, or between the outside layer of wool and silk and the adjacent layer of wool tufts, a plurality of decorative items may be selectively disposed. Suitable decorative items may be chosen from ornaments, string and animal hair or fur. A preferred decorative item is a sequin ornament. The decorative item chosen must have minimal thickness in order not to interfere with production of the inventive felt.

[0035] Although the description herein discloses certain techniques, steps and embodiments, others may be chosen or utilized without departing from the spirit and scope of the invention.

1. A method of producing felt comprising the steps of:

pulling off tufts of a natural fabric from a roving;

placing at least some of said pulled tufts one next to the other in order to produce a first row of wool tufts of a desired width;

adding one or more additional rows of tufts to said first row in order to produce a first layer of tufts of a desired length;

laying out an additional layer of tufts over said first layer of tufts in order to produce a fabric layout; and

depositing a mixture of natural fiber and silk as a design layer along said fabric layout and in a desired geometric pattern in order to define a felt fabric.

2. The method of claim 1, wherein said rows of tufts which define said first layer are laid down on a first fabric cover.

3. The method of claim 2, wherein said fabric cover comprises a netting.

4. The method of claim 1, wherein said mixture comprises at least 30% silk by weight.

5. The method of claim 1, further including the step of splitting the roving into a plurality of roving parts prior to said pulling off step.

6. The method of claim 1, wherein said pulling off step comprises pulling along said roving so that a plurality of wool fibers are removed.

7. The method of claim 1, wherein said placing step comprises disposing each tuft substantially parallel to and abutting each adjacent tuft.

8. The method of claim 1, wherein said adding step includes partially overlapping said tufts of said first row with the tufts of an adjacent row.

9. The method of claim 1, wherein said additional layer of tufts is laid out lengthwise at an angle with respect to the first layer.

10. The method of claim 9, wherein said additional layer is, lengthwise, substantially perpendicular to that of said first layer.

11. The method of claim 1, wherein said mixture of fiber and silk is laid out at an angle with respect to the lengthwise direction of said additional layer.

12. The method of claim 2, wherein a second fabric cover is laid over said design layer of fiber and silk.

13. The method of claim 1, further including the step of wetting said felt fabric.

14. The method of claim 1, further including a step of applying friction to said felt fabric.

15. The method of claim 14, wherein said friction applying step comprises running an irregular surface along said felt fabric.

16. The method of claim 1, wherein said tufts of roving have a thickness of between about 0.3 and 1.0 mm.

17. The method of claim 16, wherein the thickness of said roving tufts is between about 0.4 and 0.75 mm.

18. The method of claim 1, wherein said tufts have a eight per unit area of between about 1.0 and 3.5 oz. per square yard.

20. The method of claim 1, wherein said mixture of fiber and silk is laid out individually in continuous lines.

21. The method of claim 1, wherein said mixture of fiber and silk is laid out individually as tufts.

22. The method of claim 1, wherein said mixture of fiber and silk is laid out individually as a combination of continuous lines and tufts.

23. The method of claim 1, wherein said produced felt fabric has a thickness of between about 1.0 and 3.0 mm.

24. The method of claim 1, wherein said felt fabric thickness is between about 1.25 and 2.25 mm.

25. The method of claim 1, wherein said depositing step comprises placing a first mixture of fiber and silk along said first layer and a second mixture of fiber and silk along said additional layer.

26. The method of claim 1, further including the step of disposing one or more decorative items between any one of said layers.

27. The method of claim 1, wherein said natural fiber is selected from the group consisting of wool and cotton.

28. A method of producing felt comprising the steps of:

pulling off tufts of wool from a wool roving having a thickness of between about 0.3 and 1.0 mm. and a weight per unit area of between about 1.0 and 3.5 oz. per square yard;

placing at least some of said pulled tufts of wool one next to the other in order to produce a first row of wool tufts of a desired width;

adding one or more additional rows of wool tufts to said first row in order to produce a first layer of wool tufts of a desired length;

laying out an additional layer of wool tufts over said first layer of wool tufts in order to produce a wool fabric layout; and

depositing a mixture of wool and silk as a design layer along said fabric layout and in a desired geometric pattern in order to define a felt fabric having a thickness of between about 1.0 and 3.0 mm.

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