

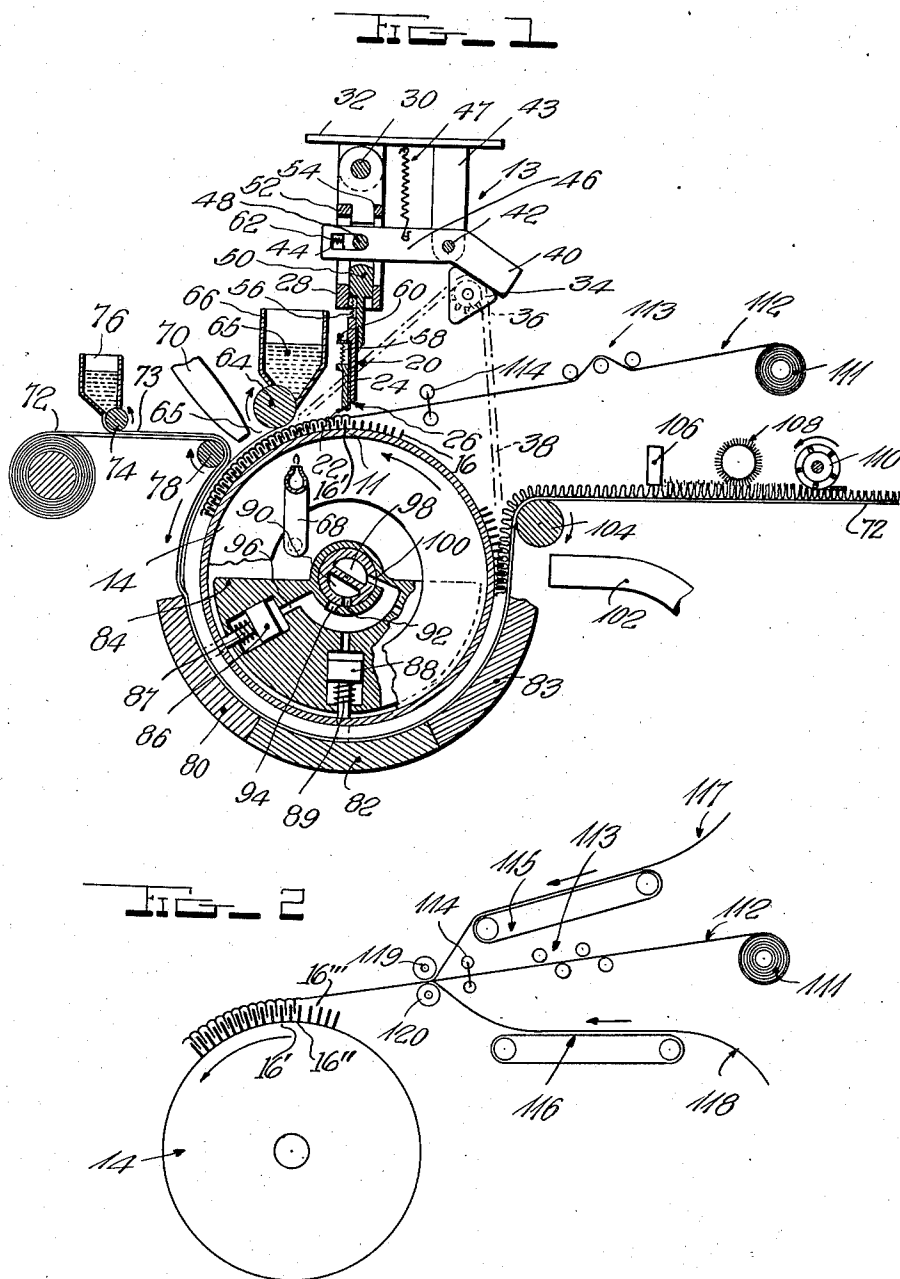
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METHOD OF MAKING FILE FABRICS

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METHOD OF MAKING PILE FABRICS

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This invention relates to a method of making a pile fabric product. More particularly it relates to a method of making pile fabric by cementing pile element material in loop form to a backing material; specifically it relates to a method of employing yarn for this purpose.

Various forms of apparatus are adapted for carrying out my method, such apparatus being disclosed in my parent application Serial No. 211,660, filed August 9, 1927, in my Patent No. 1,822,509 and also in my joint Patent No. 1,784,552.

While carpets made from unspun or unspinnable fibres in accordance with my application Serial No. 211,660 are characterized by low cost of production, beauty, resiliency and durability, they lack the sustaining power of carpets made of the same weight of fibre per unit of area when spun into yarn.

Where low cost of production, however, is not the primary object, yarn of various qualities may be utilized with no departure from the method of my invention referred to excepting such modifications in the arrangements for feeding the pile material as are inherent in the use of a warp of yarn instead of a bat of loose fibres.

The carpets of yarn made by the method of my invention possess certain advantages as compared with woven carpets. For instance, in pile carpets of common construction the bights of the pile tufts are held between the filling yarns and the stuffer warp, both of which elements are so hard and immovable as to form a practically rigid and unyielding support. In yarn carpets made by my method, on the other hand, the bights of the pile tufts are embedded in a rubber mass which constitutes an elastic and yielding support, contributing materially to the life of the carpet.

Furthermore, in pile carpets of ordinary construction, the pile tufts are held in place more or less securely against withdrawal by the filling yarns inside the bights of the tuft loops, the filling yarns being retained therein by the tension of the chain warp. This system of retention is only relatively effective, as individual pile tufts may be withdrawn either in whole or in part under conditions of severe service. This effect is impossible in carpets made by my method, where the bight of each loop is firmly embedded in a cement material, such as vulcanized rubber.

The use of yarn by this method, as distinguished from that of a bat of loose fibre, permits the production, in addition to plain effects, of certain designs in the form of stripes, borders,

etc., by the inclusion in the warp, at designated points, of yarns of colors differing more or less from the color of the yarns constituting the body of the carpet. Moreover, by the use of double or triple yarns of different colors, mottled, or so-called "Moresque" effects may be readily produced. Furthermore, by the use of "printed warps" in connection with the method of my invention, figured designs of any degree of complexity and in any number of colors may be produced.

This method makes possible the manufacture of a composite type of carpet; i. e., one comprising pile tufts consisting of both yarn and unspun fibre, a result which is possible by no other method, so far as known. That such a composite carpet possesses certain advantageous qualities is evident from the following considerations.

In carpets whose pile consists solely of tufts of yarn, ordinary use as floor-coverings involves a constant breakage and destruction of individual fibres due to compression, flexure, and mutual friction. While these destructive effects are, to some extent, inherently unavoidable, they may be considerably mitigated by the inclusion in the individual yarn tufts of a certain amount of unspinnable fibre to act, so to speak, as an anti-friction element, or lubricant. The use of such fibre in conjunction with yarn pile elements, while it obviously cannot prevent internal friction between the fibres constituting the individual yarns, is highly effective, by virtue of its inherent lack of felting power, in obviating felting of adjacent tufts and between the adjacent side portions of the individual loops or tuft elements, in avoiding destructive friction therebetween, and in improving the power of the tufts to recover their original stand after being crushed. The manner of producing this composite pile structure will be described in connection with the drawing.

The method of my invention, while not offering substantial savings in material costs over the production of a corresponding yarn carpet by means of weaving, does nevertheless afford substantial savings in respect of investment, floor space and labor. A commercial machine constructed in accordance with my joint Patent No. 1,784,552, and designed to carry out the method of this application with a bat of loose fibre as disclosed in my application Serial No. 211,660 has been shown to have a capacity equivalent to that of fifteen looms of the same width. The cost of such a machine is approximately half that of this number of looms, while it requires only one sixth of the

floor space, and can be operated with only one sixth the number of men required by the loom equipment.

It will be apparent that the pile fabric herein-
5 after described may be made according to my method in any desired commercial sizes or lengths, and that the character of yarn, or of combinations of yarn and fibres, used, and the quality of the backing employed, may be varied
10 in accordance with the character of the product which is to be produced.

With the object of securing the foregoing advantages, the invention comprises the various features hereinafter more fully described and
15 particularly defined in the claims.

Figure 1 illustrates a form of apparatus for carrying out the method of my invention, showing the manner in which the various method steps may be carried out in connection with a
20 feeding device or arrangement particularly adapted to the utilization of a warp of yarn as a pile element material; and

Figure 2 shows a diagrammatic side elevation of an arrangement particularly adapted to the
25 utilization, in conjunction with a warp of yarn of one or more webs of unspun fibre for the purpose of producing a composite pile in the pile fabric product.

In carrying out my invention the material to be
30 used for forming the pile, consisting of yarn, is warped on a beam in the well-known way, the yarn being of such weight and effective diameter as to correspond to the pile weight per unit of area desired in the finished product.

Referring to Figure 1 of the drawing, 111 represents a beam on which is wound a warp 112, adapted to pass through a tensioning device, which may consist of a group of bars 113, or of any other device commonly employed for the
40 purpose of maintaining warps under tension while passing from a warp beam to a loom or other textile machine. 114 is a reed of any well-known form, providing a suitable number of splits, and adapted to maintain the tensioned
45 yarns in the warp 112 in alignment as it proceeds to the inserting mechanism of the machine shown more or less diagrammatically in Fig. 1.

Referring to Figs. 1 and 2, 111 again represents a beam on which is wound a warp 112, 113 being a tensioning device and 114 being a reed. 115
50 and 116 are conveyors adapted to support and move in the direction of the arrows the respective bat sections 117 and 118, which may be supplied continuously by a card or garnett in conjunction with a lapper. 119 and 120 represent
55 two pressure rollers adapted to consolidate the fibrous webs 117 and 118 with the warp 112.

Referring more particularly to Fig. 1 of the drawing, this figure illustrates a form of machine
60 for carrying out my invention adapted for continuous operation, which comprises a drum 14 having a width preferably somewhat greater than that of the pile fabric which is to be made. The drum may be suitably mounted on bearings and
65 is preferably driven at a low constant speed. The drum may be driven by any suitable means, although I preferably employ a worm wheel which is attached to the circumference of the drum and engaged by a worm.

To the cylindrical surface of the drum are attached a multiplicity of spacing elements comprising thin plates or so-called "wires" 16 which
70 are preferably arranged parallel to the axis of the drum and are spaced apart at the desired
75 intervals so as to provide the desired number

of loops per inch in the final product. These "wires" or separators are preferably rigidly fastened to the drum and correspond in function substantially to that of the loose wires of a loom, which are used to form the pile in the ordinary
5 woven pile fabric.

The "wires" or spacing elements have been illustrated in the drawing, for the sake of simplicity, as being arranged radially to the drum, whereby the fibres in the loops formed in the
10 pile element material will lie in a direction substantially at right angles to the surface formed by the base of the loops. It is to be understood, however, that the "wires" or plate members may be sloped or inclined to the radial direction of
15 the drum, so that the looped pile elements, or the pile in the final product, may have a definite angular direction or "lay".

In cases in which the pile is to be thus inclined a "lay" of about 30° with the vertical is preferably
20 employed, and the plates are preferably arranged at an angle sloping in the direction of movement of the bat, in which case the loop-forming mechanism hereinafter described will be inclined at substantially the same angle in a
25 direction toward the pile element supply.

Immediately above the drum 14 is arranged a so-called piling mechanism 13 which comprises a loop-forming blade 20 adapted to pass centrally
30 between the "wires" 16 on the drum, forcing the pile element material into the space between the "wires" to a distance depending on the adjustment of the mechanism, the travel of the loop-forming blade being adjusted to provide the desired depth of the loop sections. In order
35 to hold the pile element material in place during the operation of the loop-forming blade, so as not to displace the loops already formed, a holding means for the last-formed loop is provided, which preferably comprises means for holding
40 each side of the loop in contact with the adjacent "wires", and a blade, hereinafter termed a holding blade, adapted to pass between the sides of the last-formed loop to hold the remaining
45 portion of the loop in place. The means which I employ preferably comprises a presser-foot 22 adapted to hold one side of the base portion of the last-formed loop against the adjacent "wire" or separator 16' as shown in Fig. 1 of the drawing. A holding blade 24 is next forced down-
50 wardly into the last-formed loop into the position previously occupied by the loop-forming blade. In order to hold the remaining side of the base portion of the loop, a second presser-foot 26 is provided which is moved downwardly
55 to engage the portion of the loop above the "wire" 16'', whereby the last-formed loop is held rigidly in place, permitting a new loop to be formed without disturbing the previously formed loops. During the inserting operation, in the
60 formation of the new loop, the loop-forming blade 20 descends on the adjacent pile element material section between the "wires" 16'' and 16''', forcing a portion of the pile element material into the space between the "wires" in the
65 form of a loop. In the loop-forming mechanism illustrated, the holding blade 24 is made integral with the presser-foot or loop-holding means 26, although it is to be understood that these may be made separately and separately operated, if desired.
70

The presser-feet 22 and 26, and loop-holding and loop-forming blades 24 and 20 are preferably held in a frame 28 in which they are actuated
75 by suitable means. In the form illustrated in 75

Fig. 1 of the drawing, the frame 28 is pivoted at 30 on a bracket 32, which may be attached or held in place in any suitable manner.

In order to operate the mechanism, a cam 34, mounted in any suitable way, is operatively connected to the cylinder or drum 14 so as to be rotated in timed relation therewith. For this purpose, a gear 36 may be mounted on the cam shaft and a chain passing over the gear and connected to a corresponding gear mounted on the drum 14 may be used, although any other suitable driving means may be employed.

Operatively connected to the cam 34 is a lever 40 which is pivoted at 42 on an arm 43 of the bracket 32, and is connected to the frame 28 by means of a pin and slot connection 48, 44, a slot 44 being formed in the arm 46 of the lever 40, and a pin 48 being connected to a sliding member 50, which is arranged to move in the frame 28 between guides 52 and 54. As shown in the drawing, the loop-forming blade 20 is rigidly connected to the sliding member 50, and the presser-foot 26 is mounted so as to be movable with respect to the member 50, being preferably held in spring-pressed engagement with a portion of the member by a spring 56, the presser-foot 22 being similarly mounted with respect to the presser-foot 26, being resiliently held by means of a spring 58 engaging a lug 60 on the loop-holding blade and adapted to force the presser-foot 22 downwardly. A spring 62 is employed for forcing the pin 48 in a direction to move the inserting mechanism forwardly when it is released from engagement with the last-formed loop, so as to bring it into position for forming the next or new loop in the pile element material. When the drum and loop-forming mechanism have been brought into the required relative position for operation, the cam 34 operates the lever 40 to bring the loop-forming parts of the piling mechanism into engagement with the loop-holding separators or "wires" of the drum.

In the operation of the loop-forming mechanism, the presser-foot 22 first descends on one side of the base portion of the loop which has just been formed and is held in pressure engagement by means of the spring 58 against the base portion of the loop above the wire 16'. After the presser-foot 22 has been seated, the loop-holding blade 24 is forced downwardly in the space between the "wires" 16' and 16'' and between sides of the loop therein until the blade reaches the extreme end portion of the loop which corresponds to the exposed end of the pile when the cemented product is withdrawn from the chase 11. Simultaneously with the movement of the loop-holding blade 24 into position, the presser-foot 26 which is integral therewith, moves into engagement with the other side of the loop above the wire 16'', and is held in pressure engagement therewith by means of the spring member 56. In the subsequent downward movement of the loop-forming blade 20 which is moved into loop-forming position and actuated by the corresponding additional movement of the arm 46, being operated through the action of the cam 34 against the lever 40, the pin 48 moves forwardly in the slot 44, as the drum progressively rotates, compressing the spring 62. The loop-forming blade 20 is forced downwardly during operation against the adjacent portion of the pile element material 112, dragging it into the space between the "wires" 16' and 16''.

During the time that each loop is being formed, the cylinder is being rotated at a constant speed

and the loop-forming and loop-holding means move around the pivot 30, and remain in contact with the "wires" until the cam 34 is rotated into the position in which the lever 40 is released, the lever 46 being then returned or moved upwardly in a clockwise direction around the pivot 42 to its original position, thus raising the part 50 in its guides 52 and 54 and withdrawing the loop-forming elements out of contact with the pile material, into the position shown in Fig. 1 of the drawing.

In the withdrawing operation, the loop-forming blade 20 is first withdrawn, then the presser-foot 26 is released, and the holding blade 24 is raised from between the sides of the held loop, and finally the presser-foot 22 is moved out of engagement with the other side of the base of the held loop. As soon as the presser-foot 22 moves out of engagement with the loops of pile element material, the spring 62 operates to return the pin 48, in the slot 44, into its original or initial position, moving the operative portion of the inserting mechanism into its original position, as above explained, so as to be ready to form a new loop when the cam 34 operates again to bring the loop-forming mechanism into engagement with the pile element material.

It will be understood that in the operation of the mechanism the pile element material is considerably compressed on being inserted between spacing elements by the inserting mechanism. When the inserting blade is withdrawn from between the spacing elements after the formation of a new loop, the pile element material in the loop portion expands so that the side portions of the loop come into direct contact. The base portions of the loop which thus come into contact, extending over the edges of the spacing elements, form a continuous surface with no intervening spacing elements, permitting cement material to be readily applied to form an integral loop structure.

After forming the looped or folded portions in the pile element material, over the edges of the "wires" or separators on the drum and in the spaces between them, in the manner described, a cement material is preferably applied to bases of the loops or, in other words, to the exposed continuous surface of the folded pile element material so as to form a continuous even coating.

The cementing material might obviously be applied only to the loop structure to form an integral pile fabric product by the use of a proper cementing medium such as a rubber cement which may be vulcanized in the manner hereinafter described, after which the looped structure may be readily withdrawn from between the spacing elements. In the preferred form of the invention, however, a backing material is attached to the base portions of the loops so as to form a more permanent structure adapted more particularly for use as rugs, carpets, etc. It is obvious that the pile fabric product might be formed by applying the cementing material only to the backing and then forcing the backing into contact with the compressed loops rigidly held in place between the spacing elements and then withdrawing the product from between the spacing elements after the backing has been securely or permanently attached to the looped structure.

The cementing material which I preferably employ is an aqueous rubber dispersion such as synthetic latex, the viscosity of which may be readily controlled so as to determine the extent

of penetration into the fibres of the pile element material at the base of the loop structure. While an aqueous rubber dispersion is the preferred form of cementing material, it will be understood that rubber solutions might be used for the purpose, although the use of such material is to be ordinarily avoided because of fire hazard, additional cost and other disadvantages.

The coating of cement material may be applied by means of a roller 64, which is fed with the vulcanizable rubber cement material 65' from a tank 66.

It is to be understood that the cementing material may be sprayed onto the bases of the loops or applied by means of a scraper, or a brush, or by other means, to obtain a uniform surface. It will be understood that the rubber cement penetrates to a certain extent into the base of the pile loops, thus embedding not only the outer exposed surface thereof, but also the inner or interior fibres in the base portions of the loops. The amount of rubber cement employed and the fluidity thereof should be controlled so as to prevent penetration to a depth beyond the curved base portion of the loops, so as to attain a maximum binding action with a minimum amount of cementing material. By the use of such a minimum amount of cement material the portions of the loops upstanding from the base will contain substantially no cement material, and after the rubber cement material has been vulcanized and the finishing operations have been completed, the upstanding pile in the final cemented pile fabric product will be substantially free from adhering cement portions.

After the rubber cement coating has been applied to the base of the loop sections, the dispersing medium, or excess solvent if a rubber solution is used, is preferably removed by means of blasts of air, which may be heated if desired, from one or more nozzles 70. In order to assist in the removal of such dispersing medium or excess solvent, a heating means, such as hot air jets 68 may be applied to the interior of the drum.

After the rubber cement coating has been dried sufficiently a suitable textile fabric, or other flexible material, is preferably applied to the cemented surface of the folded or looped pile element material. I preferably employ for this purpose a burlap or other cheap textile material, although other more expensive fabric or other material may be used, the choice of material depending on the purpose for which the resultant product is to be used, as will be apparent to those skilled in the art. If an upholstery material is to be formed, for example, I preferably employ a fine canvas or linen, and the yarn which is used in this case should be correspondingly of fine quality. The material 72 to be used as a backing is preferably first coated with a thin coating 73 of a vulcanizable rubber cement material, which is preferably similar to the coating employed for coating the exposed surface 63 of the looped pile element material.

After the textile backing has been coated and suitably dried, it is united to the coated pile loop surface by passing it over a suitable roller 78 into pressure engagement with the coated pile loop surface, and the cement material is then preferably vulcanized to form a substantially integral medium between the bases of the pile loops and the textile material applied thereto.

The step of vulcanizing may be carried out by the use of steam heated molds 80, 82, and 83, for example, and the process may be made a con-

tinuous one by means of the form of apparatus indicated in Fig. 1 of the drawing. This device comprises a weighted member 84 suspended on the axle of the cylinder or drum, said weighted member having a center of gravity below the line of support at the axis of the drum. The molds or vulcanizing members 80, 82, and 83 are preferably applied to the back or uncoated surface of the flexible backing member 72.

In order to apply the molds to the material with a suitable pressure during the vulcanizing step, a series of piston-cylinder units 86, 88, which are spring-actuated to apply pressure, are preferably employed, a pressure fluid being used for releasing the pressure and permitting return of the molds to the initial position, after having moved through a predetermined distance in pressure contact with the drum.

The operation of the vulcanizing molds is substantially as follows:

After the molds have traveled in contact with the united backing and coated looped pile element material through a predetermined distance, which may be regulated as desired, depending upon the set of the ports 92 and 94, a pressure fluid from the central chamber 90 passes through the port 92 and through port 94 which is then in registration therewith, and passes through the passageway 96, for example, into the cylinder of the piston-cylinder unit 86, and exerts a pressure on the piston against the spring 87 whereby the mold 80 is released from pressure engagement with the corresponding surface of the product.

In a similar way the molds 82 and 83 are released simultaneously with the release of the mold 80, and the center of gravity of the element 84, to which the molds and cylinder units are attached, having been displaced to the right during the counterclockwise rotation of the drum, the weight element 84 returns to the position, shown in Fig. 1 of the drawing, in which the center of gravity of the combined elements is directly below the axis of the drum. When this position is reached, the pressure fluid in the cylinders exhausts into the chamber 98 through the passage 100, and the molds 80, 82, and 83 are then again brought into pressure contact with the surface of the drum by means of the springs 87, 89, and the corresponding spring forcing the mold 83 to the surface of the drum. A new section of the coated material is thus brought under the vulcanizers, and the vulcanization of the material then proceeds until the operation, as above described, is repeated, whereby the product is gradually fed around the cylinder or drum 14 in a continuous movement and is drawn out of the "wires" or chase continuously by a suitable mechanism.

Instead of completing the vulcanizing operation on the drum as has been described, it is apparent that the material might be vulcanized by giving it only a set-up cure on the drum, thereafter completing the cure by passing it in the form of festoons through a heated chamber, although the method which has been above described is preferable in most cases.

Before being drawn out of the chase, the material on the drum is preferably cooled by means of a cold air blast or other suitable cooling means 102, the material being then stripped from the chase by passing it over a roller 104 or other suitable means.

The product thus obtained is suitable for many purposes without opening the loops. For most

purposes, however, a product, in which the loops are opened or sheared at the top, is desired and in order to open the loops the product may be passed into contact with a loop-opening device or into engagement with a shearing device or cutter 106 for cutting the exposed tops of the loops, thus releasing the individual fibres in the material and producing a pile surface.

It will be apparent that this cutting operation to release the individual fibres may be accomplished either by a suitable cutting mechanism to open the loops without discarding a portion of the fibres or a cutting mechanism by which the tops of the loops are removed to provide individual fibres separately attached to the backing material.

After the loops have been opened or cut, the material may be steamed, if desired, and is then preferably tigered by means of a brush 108 to remove dead stock or loose fibres and to straighten the fibres of the pile.

The material is then preferably put through a finishing operation including a re-shearing of the pile by means of a cutter or shearing device 110 to produce a uniform height, or level pile surface, and thereafter the material may be brushed or cleaned and rolled or cut into any desired lengths.

It will be understood from the above description that in carrying out the method of making the pile fabric product of my invention, I preferably employ yarns or a yarn warp, but it will be understood that thread or cords or other strands may equally well be used, depending upon the character of product desired.

It will also be apparent from the above description that I may incorporate fibres into the product by the use of a bat which may be fed into contact with the inserting mechanism in combination with the yarn, being fed above or below the yarn as may be desired, to obtain rows of free fibres between the tufts of the loops. By feeding a bat both above and below the yarn warp, the pile yarns in the pile fabric product are cushioned and wear is thus reduced to a minimum in addition to obtaining the body and other properties and advantages of both a yarn product and free fibre product.

It will be understood that various changes or modifications may be made in the method of my invention without departing from the spirit or scope thereof as defined by the annexed claims.

Having thus described the invention, what I claim is:

1. A method of making a pile fabric product which comprises feeding a longitudinally extending pile element material comprising a yarn warp embedded between two fibre bats into the spaces between spacing elements to form alternate loops extending in the same direction with the intervening spacing elements between said alternate loops, and opposed loops extending over and supported by said spacing elements so as to expose the bights thereof in a substantially continuous surface, cementing a backing material to said exposed bights while the said alternate loops are held under pressure between the said spacing elements, withdrawing the combined product from between the said spacing elements to release the pressure on the said material and opening the said alternate loops to form a pile fabric product in which the yarn loops are held between rows of free fibres and in which the side portions of the yarn loops are held separated, thus reducing the internal friction of the pile fabric product.

2. A method of making a pile fabric product which comprises forming a bat in which unspun fibres are arranged in a general longitudinal direction, feeding a series of yarns into contact therewith, folding the bat and yarns in a series of compressed loops arranged longitudinally of the yarns and bat and extending transversely thereof so that the bases of the loops are exposed, covering the said exposed surface with a rubber cement coating, coating a sheet of textile fabric with a rubber cement coating, bringing the coated surfaces together, vulcanizing the said rubber cement in contact with a mold, removing the product out of contact with the mold, and opening the loops at the surface opposite to that to which the textile sheet is attached so that the fibres of the bat are free at one end.

3. A method for the manufacture of pile fabrics which comprises forming a bat in which unspun fibres are laid substantially lengthwise thereof, drawing the bat between surfaces to further arrange the fibres thereof lengthwise of the bat and mainly in parallelism, forming a warp of yarns, feeding the said yarns under tension into contact with the said bat, forming a series of loops lengthwise of the combined yarn warp and bat extending transversely thereof, the said loops being arranged in close proximity to each other so as to form a substantially continuous surface at the base portions of the loops, applying a vulcanizable rubber cement to the said substantially continuous surface, applying a backing to the said surface, vulcanizing the said cement so as to permanently attach the base portions of the said loops to the said backing and thereafter cutting the tops of the loops to form a pile surface.

4. A method for the manufacture of pile fabric which comprises passing yarns into transverse alignment from a source of supply, tensioning and guiding the said yarns during the said aligning step, arranging the yarns into a series of loops with the base portions thereof forming a substantially continuous surface with no intervening holding means or spacing elements between the bases of the adjacent loops and cementing the base portions of the loops together.

5. A method for the manufacture of pile fabric which comprises passing yarns into transverse alignment from a warp beam, tensioning and guiding the said yarns during the said aligning step, arranging the yarns into a series of compressed loops with the base portions thereof forming a substantially continuous surface with no intervening holding means or spacing elements between the bases of the adjacent loops, cementing the base portions of the loops together and opening the loops above the said base portions to form free ends of the pile.

6. A method for the manufacture of pile fabric which comprises passing yarns in parallel and transverse alignment from a warp beam, tensioning and guiding the yarns during the said passage, arranging the yarns into a series of compressed loops with the base portions thereof forming a substantially continuous surface with no intervening holding means or spacing elements between the bases of the adjacent loops, cementing a backing material to the base portions of the loops and opening the loops above the said base portions to form free ends of the pile.

7. A method for the manufacture of pile fabric which comprises passing yarns in transverse alignment from a warp beam to a tensioning device, passing the yarns therefrom into the spaces

between spacing elements to form a series of compressed loops over the said spacing elements with the bights thereof forming a substantially continuous surface having no intervening spacing elements between the bights of adjacent loops, cementing the bights of the loops together so as to form a substantially continuous surface, withdrawing the loops from between the spacing elements and opening the loops extending upwardly from the said cemented portion to form the free ends of the pile.

8. A method for the manufacture of pile fabric which comprises passing yarns in parallel and transverse alignment to a tensioning means to provide the desired amount of tension in the yarns, passing the yarns therefrom to a guiding means while maintaining the yarns in parallel alignment, folding the said yarns into the spaces between spacing elements to form two series of compressed reverse loops, having the sides thereof substantially parallel, one series of loops having the bights extending in one direction with the adjacent side portions in direct contact, the other series of loops extending in the opposite direction and having their side portions separated or spaced by means of a spacing element so that the bights form a substantially continuous surface with no intervening spacing elements between the bases of the loops, cementing a backing material to the said bases, withdrawing the loops from between the said spacing elements and opening the first named series of loops to form a pile fabric product.

9. A method of making a pile fabric product which comprises passing yarn strands of different colors to a tensioning device, passing the yarns therefrom through a reed device to position the yarns in the same plane and in the desired sequence, folding the yarn strands into a compressed series of alternately reversed loops between substantially parallel spacing elements and extending over the edges thereof, the loops extending in one direction having their side portions adjacent the bights expanded into direct contact, the other series of loops having the side portions separated by means of spacing elements, cementing a fabric backing material to the exposed bights held over the said spacing elements, withdrawing the loops having the side portions in contact from between the said spacing elements and opening the last named loops to form a pile fabric product.

10. A method of making a pile fabric which comprises passing yarn strands under tension through a reed device to position the yarn strands into parallelism in the same plane, passing a supported bat of fibres into contact with the said yarn strands, passing the yarns and bat associ-

ated therewith into the spaces between spacing elements to form reverse loops, the bights of which lie in substantially parallel surfaces, the loops extending in one direction having their adjacent side portions in direct contact so as to form a substantially continuous surface to which a backing material may be attached, the loops extending in the opposite direction being supported at the bight portions over the said spacing elements so that the side portions thereof are spaced apart, cementing a fabric backing material to the said continuous surface of the supported bight portions, withdrawing the loops from between the spacing elements and opening the said loops having side portions in direct contact to form a pile fabric in which the yarn tufts are separated by upstanding free fibres.

11. A method of making pile fabric which comprises feeding a yarn warp under tension to a tensioning means and from thence to a reed device to position the yarns in parallelism, separately feeding a supported bat of fibres into contact with said yarn warp, feeding the combined yarn and bat onto the surface of a series of spacing elements, inserting the same into the spaces between the said spacing elements by means of an inserting mechanism, thereby folding the yarn and bat into a series of transverse loops, said loops providing a substantially continuous exposed surface over the said spacing elements, coating the said exposed surfaces of the loops with a vulcanizable rubber cement to unite the adjacent end portions of the loops at the said exposed surface, attaching a textile fabric to the said exposed surface to the loops, vulcanizing the said rubber cement and thereafter opening the loops to form a pile surface having free ends of the fibres extending upwardly from the said textile fabric.

12. A method for the manufacture of pile fabric which comprises arranging yarns in transverse alignment, guiding the yarns during the said aligning step, arranging the yarns into a series of loops with the base portions thereof forming a substantially continuous surface with no intervening holding means or spacing elements between the bases of the adjacent loops and cementing the base portions of the loops together.

13. A method for the manufacture of pile fabric which comprises guiding yarns into transverse parallel alignment, arranging the yarns thus aligned into a series of loops with the base portions thereof forming a substantially continuous surface with no intervening holding means or spacing elements between the bases of the adjacent loops and cementing the base portions of the loops together.

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