

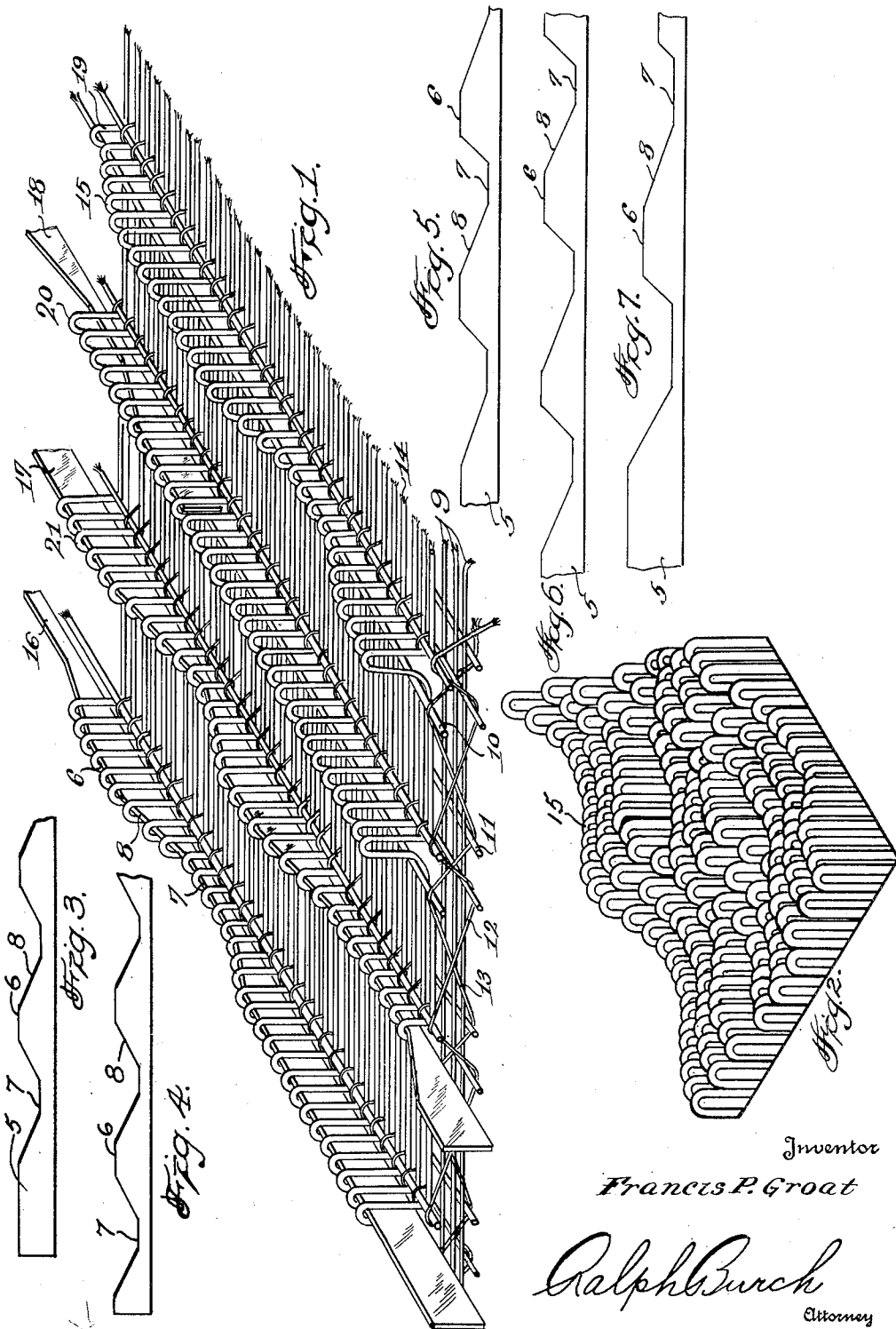
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PILE WIRE AND METHOD OF WEAVING PILE FABRICS

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PILE WIRE AND METHOD OF WEAVING
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1

This invention relates to improvements in pile wires for looms and a method of weaving pile fabrics in which the pile surface is formed by loops of different height in the same weftwise row to produce a loop pile fabric having a textured or relief effect.

In the manufacture of loop pile fabrics in which the loops are of different height it has been the practice to form the loops by the use of pile wires of different height. As each individual wire is of uniform height throughout its length, the loops formed thereon will all be the same height. Thus, the fabric produced will have rows of loops of different height but the loops of each weftwise row will all be the same height. While methods are known for producing a fabric in which the loops in the same weftwise row are of different height, these methods require that a Jacquard mechanism be employed to selectively raise the yarns forming the loops according to a pre-arranged design or pattern. The cutting of the pattern cards for the Jacquard requires considerable time and is expensive. Also fabrics of this type woven on Jacquard machines contain spaces devoid of loops thus detracting from the appearance of the fabric.

It is an object of the present invention to provide a novel pile wire that is shaped so the loops formed thereon will be of different height, with some of the wires in a series being of different shape so the high and low loops will be in diverse relation to the high and low loops of other wires whereby the withdrawal of a wire will raise all the loops thereon to a uniform height while at the same time altering the height of the loops in the preceding row to form a row of loops of varying height.

A further object of the invention resides in providing a series of pile wires having their upper edges of substantially undulating contour to form rows of loops of graduated height with some of the wires having their undulations in diverse relation to the undulations of other wires according to the design of the fabric to be produced.

A still further object of the invention resides in a method of weaving a loop pile fabric to provide a full complement of loops in the weftwise rows, with the loops in each row being of different height which requires only one frame of pile warp.

The present invention is accordingly directed to producing a loop pile fabric having a textured or relief effect by the use of novel shaped pile wires which eliminates the need of a Jacquard

2

mechanism and requires only one frame of pile warp, thus reducing the cost. By using my novel wires only one frame of pile warp is necessary to obtain the irregular appearance of the loop pile rows whereas in other weaves of this type it is necessary to employ two or more frames of pile warps. The wires are so shaped that the height of the loops at the desired points may be varied to produce the desired effects, and each transverse row of loops contains its full complement of loops so there are no vacant spaces in the pile surface.

In the accompanying drawings forming a part of this specification and in which like numerals are employed to designate like parts throughout the same,

Fig. 1 is a perspective view of a section of the fabric with the rows of loops spread apart showing two of the novel pile wires in loop forming position and one of the wires being withdrawn.

Fig. 2 is a fragmentary perspective view of a loop pile surface produced by my invention.

Figs. 3 and 4 are fragmentary side elevations of the novel wire showing the ridges and valleys of each wire arranged in diverse relation, and

Figs. 5, 6 and 7 are similar views of wires of different shapes which may be employed to produce different textured effects.

Referring to the drawings, the novel wires are formed from a flat strip of metal or other suitable material having its upper edge notched at spaced intervals to form ridges 6 and valleys 7 throughout its length. The width of the ridges and valleys may vary in the same wire or a series of wires may have ridges and valleys of different widths. The sides of the valleys connecting with the ridges are inclined, as at 8, but if desired may be of stepped formation. The height of the ridges may vary and may be spaced apart at varying distances with the ridges of one wire of a series being arranged in diverse relation to the ridges of another wire.

In looms for weaving fabrics having loop pile surfaces it is customary to insert a series of pile wires in the fabric as it is being woven for a distance of about three inches from the fell or opening of the shed. The number of wires inserted in the fabric before a wire is withdrawn depends on the quality of the fabric to be woven. When employing my novel wire some of the wires in a series are of different shape, in that the ridges and valleys are arranged in diverse relation. Also the shape, width and height of the ridges of a single wire may vary so that by combinations of the different shaped wires a fabric

having a loop pile surface with the loops of irregular height may be woven in accordance with a desired pattern.

In Fig. 1 I have shown a loop pile fabric being woven in accordance with my invention. The backing of the fabric may be of any suitable construction but in the form illustrated there are stuffer warps 9 and two series of weft threads 10 and 11 lying, respectively, above and below the stuffer warps and bound in place by crossed binding warps 12 and 13. The pile forming warps 14 extend along the fabric in the body thereof between the stuffer warps and the upper series of weft threads 10. When weaving the fabric the pile warps 14 are raised to allow the novel shaped wires 5 to be inserted in the shed formed by the raising of the warps, after which the yarn is looped over the wire by lowering of the warps to pass under the next upper weft thread thus forming the weftwise rows of loops 15. In a like manner, the series of wires are successively inserted in the sheds formed by raising the pile warps. Owing to the irregular or undulating contour of the upper edge of the wires the loops formed thereon will be of irregular height. The irregularity in the height of loops in each row is governed by the shape of the wire on which they are formed. When a predetermined number of shaped wires according to a design have been woven into the fabric, the wires are successively withdrawn and re-inserted in the shed formed immediately following the last wire in a series. As shown in Fig. 1 wires 16 and 17 are woven in the fabric and wire 18 is being withdrawn. The wire 16 is of corresponding shape to the wire shown in Fig. 3 and the wires 17 and 18 correspond in shape to the wire shown in Fig. 4. The withdrawal of a wire raises all the loops formed thereon to a height corresponding to the height of the highest ridge, and if all the ridges are of uniform height the loops will all be raised when the wire has moved a distance equal to the distance between adjacent ridges. Before withdrawal of wire 18 all the loops in the preceding row 19 were of uniform height but as the low loops in row 20 are raised the pile warps are pulled which causes the loops in row 19 formed from these warps to be reduced in height whereby the irregularity of the height of the loops in row 19 conforms to the contour or shape of wire 18. Likewise when wire 17 is withdrawn the loops in row 20 will be adjusted in height to conform to the shape of wire 17. Wire 16 is of a different shape from wires 17 and 18, so that when this wire is withdrawn the loops in row 21 will be adjusted in height to conform to the shape of wire 16. By a combination of the shaped wire shown in Figs. 3 and 4 a fabric having an uneven loop pile surface, such as shown in Fig. 2, may be produced and it is apparent the contour of the pile surface may be changed by using wires of different shapes, such as shown in Figs. 5, 6, and 7. Thus, it is seen that by the use of my novel shaped wires, a fabric having weftwise rows of loops of irregular height may be produced without the use of a Jacquard mechanism thus reducing the cost of manufacture.

Having thus described my invention, I claim:

1. The method of weaving on a pile wire loom a pile fabric floor covering having a warp pile face including pile elements of graduated height which comprises inserting a pile wire having high loop forming portions and intervening low loop forming portions, the connecting portions between

the low and high portions being inclined in opposite directions, weaving the pile warps over the high, low and inclined loop forming portions to form a weftwise row of high and low loops with loops of graduated height between each group of high and low loops, inserting a second pile wire having high and low loop forming portions and connecting portions between the high and low portions inclined in opposite directions, weaving the pile warps over the high, low and inclined loop forming portions of said second pile wire, withdrawing said first wire to convert all the loops thereon to a uniform height and converting the loops in said first-mentioned row in pile warps woven over the low and inclined loop forming portions of said second-mentioned wire to low loops and loops of graduated height by withdrawing said second-mentioned wire.

2. A method of weaving on a pile wire loom a pile fabric floor covering having a warp pile face including pile elements of graduated height which comprises inserting into a shed a pile wire having high and low loop-forming portions with the connecting portions between the high and low portions inclined in opposite directions, weaving pile warps over the high, low and connecting portions to form high and low loops with intervening loops of graduated height between the high and low loops, inserting into a subsequent shed a pile wire having high and low portions with intervening inclined connecting portions, the low portions being in warpwise alignment with the high portions of the first-mentioned wire, weaving the pile warps over the high, low and connecting portions of said second wire, withdrawing said first-mentioned wire to form a row of high loops and then withdrawing said second wire whereby the loops in said first row in pile warps woven over the low and connecting portions of said second wire will be reduced in height.

3. In a pile wire carpet loom adapted to produce a pile fabric having a surface composed of groups of high and low loops with intervening groups of loops of graduated height arranged in a repeat pattern having means for inserting pile wires into a shed, removing them from the woven fabric and reinserting them into a subsequent shed in regular order, the combination therewith of a set of pile wires including a pile wire having horizontal high loop-forming portions, an intervening horizontal low loop-forming portions, and loop-forming portions connecting the low loop-forming portion to adjacent high loop-forming portions inclined in opposite directions, the arrangement of said loop-forming portions of different heights in the set of wires corresponding to the arrangement of the loops of different heights in said pattern.

4. A set of pile wires for use in a pile wire carpet loom adapted to produce a pile carpet having pile loops of graduated heights arranged in rows in a repeat pattern and having means for inserting pile wires into a shed, removing them from the woven fabric and reinserting them into a subsequent shed in regular order, said set of pile wires comprising a plurality of pile wires having horizontal loop-forming portions of different heights at different lengthwise positions on the wire with a low portion intermediate the high portions and connected therewith by oppositely inclined loop-forming portions, the location of said loop-forming portions of different heights in the assembly of the wires corresponding to the locations of the loops of different heights in said pattern.

5

5. A set of pile wires adapted to be used in a wire loom to produce a pile floor covering having a repeat surface pattern composed of groups of high and low loops and intervening loops of graduated height, said set including flat wires having upper edge surfaces composed of a plurality of high portions, low portions intermediate the high portions and oppositely inclined loop-forming portions connecting the ends of the low portions to the ends of adjacent high portions, the relative positions of said high portions and low portions in the assembly of the wires corresponding to the relative positions of high and low loops in said pattern and a high portion of one of the wires being disposed in alignment with a low portion of another wire.

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6

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