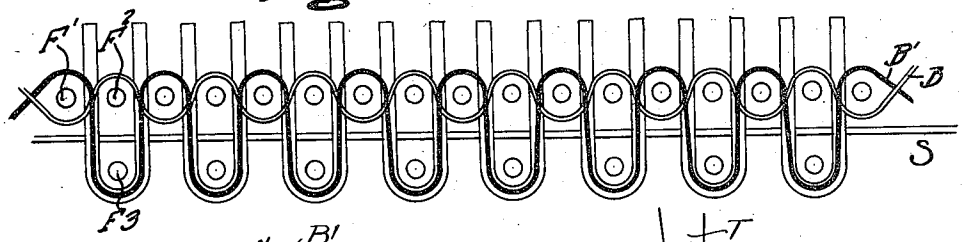
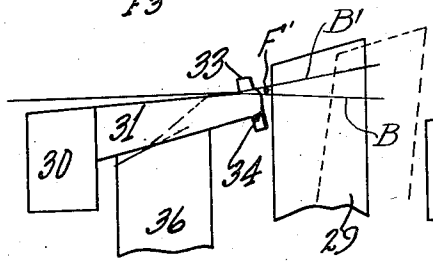
Dec. 31, 1935. E. J. DACEY 2,025,850

METHOD OF WEAVING PILE FABRICS

Filed Oct. 12, 1933

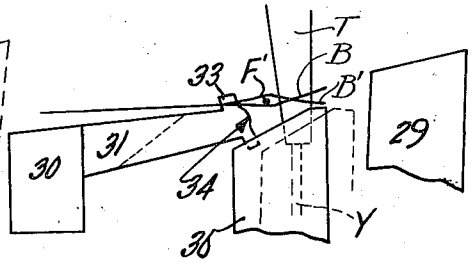
Fig. 1.





FIRST PICK

Fig. 2.



TUFT PRESENTING

Fig. 3

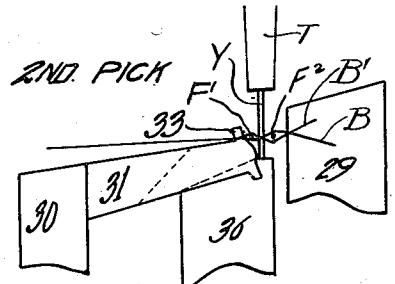
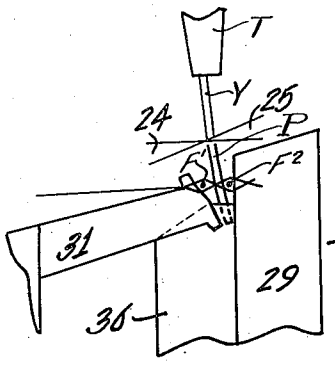


Fig. 4.



CUTTING

Fig. 5.

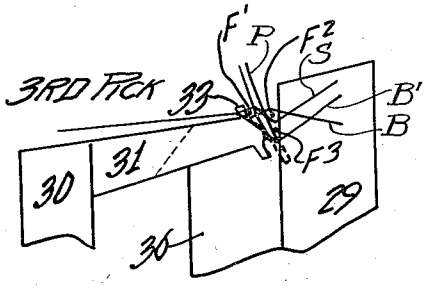
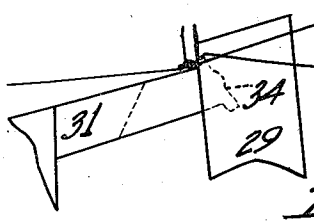


Fig. 6.



BEAT UP

Fig. 7.

Inventor

EDWARD J. DACEY.

Southgate Gray & Hawley

Attorneys

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UNITED STATES PATENT OFFICE

2,025,850

METHOD OF WEAVING PILE FABRICS

Edward J. Dacey, Philadelphia, Pa., assignor to Crompton & Knowles Loom Works, Worcester, Mass., a corporation of Massachusetts

Application October 12, 1933, Serial No. 693,332

4 Claims. (Cl. 139—7)

This invention relates to improvements in pile fabrics having the pattern showing on the back and also to the method of weaving the same and it is the general object of the invention to provide a fabric the tufts of which will be very tightly bound to the ground weave.

In fabric where the pattern shows one hundred per cent on the back the tuft or color yarns usually pass down from the top of the fabric entirely through the ground weave, around a pick of filling in the bottom plane of the weave, and bend back up through the body of the fabric to the upper face. The color yarns are therefore subjected to the tensions of all the threads which enter into the ground weave with the result that where the strains are unbalanced one side or the other of the tufts will be oblique and not stand erect. It is an important object of my present invention to require the tuft yarns to go straight down along two shots of filling, bend around the lower shot, and extend along the other side of said two shots. By such a construction there is no unbalanced strain brought to bear upon the tufts and accordingly they are vertical and therefore produce a smooth satisfactory surface.

It is a further object of my invention to use in addition to the two picks already mentioned a third pick which shall be in the upper plane of the fabric to bind the tufts against the top pick of the pair around which it extends. In this way each tuft lies between two shots of filling which press the tufts against the upper shot, the pressures being at the same level and substantially equal to produce the aforesaid smooth surface. The nature of my invention is such, however, that variations in the tension of the different systems of threads can be present without materially affecting the quality of the fabric due to the arrangement to be set forth more in detail hereinafter.

It is a further object of my invention to provide a novel method for accomplishing the aforesaid weave and one feature of this method is to beat up two shots of filing behind the color yarn at the same time. Where a single needle loom is employed the top shot may for instance be laid first while the color yarn is extending vertically through the shed, after which the sheds can change and the needle will insert the second of the pair of shots in the lower shed. I do not wish, however, to be limited to this specific order of laying the shots.

It is another object of my invention to provide a method wherein all of the shots of filling which have to do with the formation of one tuft are kept in a rearward or non-beat-up position until the entire system of color yarns and shots of filling are present after which they will all be beaten up at the same time. A particular way of carrying out this feature of my invention is to operate in a loom having a nose board and beat the first shot of filling to a position behind the nose board, then insert the tuft yarns, after which the two shots will be inserted as already described, one above the other, the stuffer preferably lying over the bottom of the pair of shots. In a single needle loom the second of the pair to be laid would be beaten up to a position behind the hooks of the nose board, and it would not be until after the third shot had been laid that all three shots together with the tuft yarn would be moved up over the hook of the nose board. The latter is so made as to bend up the rear part of the color yarn to form the tuft.

With these and other objects in view which will appear as the description proceeds, my invention resides in the combination and arrangement of parts hereinafter described and set forth in the claims.

In the accompanying drawing, wherein I have illustrated one form of the fabric and a particular method of carrying out the method of its manufacture,

Fig. 1 is a longitudinal vertical section through a fabric made according to my present invention showing the parts separated in order that they may appear more clearly, and

Figs. 2 to 7 are diagrammatic views showing the successive steps in the method to be set forth hereinafter.

Referring first to Fig. 1, it will be seen that I have provided a fabric employing two binders and one stuffer warp, which are interwoven with three shots of filling for each tuft. The stuffer S divides the shots into upper and lower planes, the shots F' and F^2 lying above the stuffers while the remaining shots F^3 lie in the lower plane. The binder B may in the present instance lie always above the stuffer, or be associated with the upper plane, passing under shots F' and over shots F^2 and F^3, while the other binder B' may pass down through the stuffers and lie over shots F' and under shots F^2 and F^3. This is one form of ground weave which may be used as a base for the pile surface.

The tufts P forming the surface of the fabric are U-shaped, and each tuft is formed of a length of yarn which passes from the top of the fabric down between the shots F' and F^2, through the stuffers S, under the shots F^2 and F^3, and

up again to the top or face of the fabric. The tufts are substantially U-shaped in form and inclose within their outline the two shots F^2 and F^3 which are preferably in vertical alignment. The face is therefore tufted and the pattern shows on the back.

The method of producing this fabric is set forth in diagrammatic Figs. 2 to 7, where I have shown parts of one particular kind of loom which may be employed to carry out the present method. A fixed nose board 30 having rearwardly projecting fingers 31 with upstanding hooks 33 and rear inclined faces 34 may be used for the purpose of assisting in the tuft formation. The reed dents 29 may be operated to move into the spaces between the fingers 31, while spaced parallel cleaner plates 36 are guided by the fingers 31 and can be projected rearwardly to be close to and in alignment with the reed dents to define with the latter guide aisles for the purpose of preventing lateral displacement of tuft yarns. Cutters 24 and 25 of usual construction may be employed.

As shown in Fig. 6, a shot of filling F′ is laid between the binders B′ and B^2 and preferably above the stuffers. The reed dents 29 are given a short forward movement and leaves this shot close to or lying against the surface 34 behind the hooks 33. The reed then moves back and the tube frame T is dipped between the warp threads to a position such as that shown in Fig. 7, whereupon the plates 36 are moved rearwardly between the tubes of the tube frame to align the yarns Y.

A second shot of filling F^2 will then be laid in a new shed above the stuffers, and the reed will again have a short forward beat, the plates 36 likewise sharing the forward movement of the reed dents to guide the yarns Y. On this second forward movement of the reed dents the shot F′ and F^2 will be held together temporarily by the reed dents so that the tube frame can be lifted for its pulling-off operation. Before lifting the parts are in the relative position shown in Fig. 8, and after the lifting the cutters 24 and 25 may sever the tuft forming ends P from the source of supply carried by the tube frame. This leaves both shots F′ and F^2 behind the hooks.

The binder warps B and B′ now change and the stuffer is raised, the effect of this movement on the part of all of the warp threads being to hold the shots F^2 against the yarn ends P so that the latter will not lose their positions.

The reed dents and plates 36 then move rearwardly for a part of the backward stroke of the reed, after which the plates will be brought to rest and the dents will continue their rearward movement to provide room for the needle to lay the third shot of filling F^3 under the raised warps B′ and the stuffer. The plates 36 are preferably kept far enough to the rear to maintain guiding relation with the cut ends P.

The reed dents now start forward on their third stroke, and when they come close to or are in engagement with the plates 36, the latter together with the reed move forwardly. On this beat the reed dents move to their extreme forward position, passing through the position shown in Fig. 6 to force the three shots of filling and the tuft ends over the hooks to the position shown in Fig. 7. In going over the hooks the lower ends of the yarn ends P are curved first rearwardly and then upwardly to form the U-shaped pile set forth in Fig. 1.

The description given herein contemplates the use of a loom having a single needle, but the method set forth is not necessarily limited to use in such a loom, inasmuch as the two shots of filling F^2 and F^3, being over each other, could if desired be laid at the same time. Certain features of the method are also independent of the specific arrangement of binder warps and stuffers, and the relation shown in Fig. 1 is to be understood merely as illustrative of one type of fabric which can be produced by my method.

A loom constructed and operated to carry out the method set forth herein, and to produce the fabric, is shown and claimed in my co-pending application Serial No. 693,321.

From the foregoing it will be seen that I have provided a pile fabric the tufts of which are substantially U-shaped in form with their upright side pinched between the shots of filling lying in the upper plane of the fabric. The lower shot F^3 places the bottom or bent part of the tuft below and symmetrical with respect to the shots F′ which lie on opposite sides of the shot F^2 so that the strains and pressures of the different sets of threads are substantially balanced with respect to the tufts and the latter are bound tightly. It will further be seen that the method set forth herein contemplates the beating up at the same stroke of the lay of the two shots of filling around which the tufts extend. So far as the particular manner of presenting the yarns as set forth herein is concerned it is desirable to have the shots F′ against which the tufts can be pressed by shots F^2 during the pulling off operation, but this feature is not an essential one so far as certain features of my invention are concerned. When the shot F′ is used it will be seen that all three shots of filling which correspond to a complete cycle of the loom are beaten over the nose board on the same stroke of the loom and forced tightly against the fell of the cloth the movement of the shots of filling and the tuft yarns up the inclined surface all together permitting the threads an opportunity to establish very close relations resulting in a tight bind of all the yarns entering into the fabric.

Having thus described my invention it will be seen that changes and modifications may be made therein by those skilled in the art without departing from the spirit and scope of the invention and I do not wish to be limited to the details herein disclosed, but what I claim is:

1. The method of producing a pile fabric in a loom employing a nose board which consists in beating a shot of filling to a position behind the nose board, laying tuft forming yarns behind said shot of filling, laying two additional shots of filling behind the tuft yarns and thereafter beating all of the shots of filling and the tuft yarns over the nose board at the same time.

2. The method of producing a pile fabric in a loom employing a nose board which consists in beating a shot of filling to a position behind the nose board, presenting tuft forming yarns behind the said shot and nose board in tufting position, laying two different shots of filling in different sheds behind said tuft yarns, and thereafter beating both said shots of filling and the tuft forming yarns over the nose board on the same beat of the loom.

3. The method of producing a pile fabric in a loom employing a nose board and operating with a supply of tuft yarns which consists in laying a shot of filling behind the nose board, presenting tuft forming yarns behind the shot of filling and the nose board, beating a second shot of filling to a position behind the nose board to force the tuft yarns against the first shot of filling, thereafter severing the tufts from the source of supply, then

laying a third shot of filling behind the severed tufts, and thereafter beating all the shots of filling and the severed tufts over the nose board at the same time.

4. The method of producing tufted pile fabrics in a loom employing a nose board which consists in laying a shot of filling between warp threads, locating tuft forming yarns behind the shot of filling and between the warp threads and extending said tuft yarns through the shed defined by the warp threads, laying two shots of filling in different sheds behind the tuft yarns, and beating all the shots of filling over the nose board to the fell of the cloth to cause the nose board to bend the tuft yarns up behind the last two shots of filling.

EDWARD J. DACEY.