UNITED STATES PATENT OFFICE

2,187,469

METHOD OF MAKING FIGURED FABRICS

Hugh J. Carragher, Brooklyn, Conn., assignor to Powdrell & Alexander, Inc., Danielson, Conn., a corporation of Massachusetts

Application March 12, 1938, Serial No. 195,458

2 Claims. (Cl. 139—391)

The invention relates to figured fabrics, and in particular to curtains, draperies, and other ornamental fabrics and method of making the same, in which figures, stripes, bands and other decorations are formed so as to have a cut pile, fringe, or beard capable of standing up out of the plane of the fabric.

In accordance with one basic principle of the invention, this pile is attained by passing the figure yarns through the fabric from one face to the other thereof at a location that is removed from the point at which the respective figure yarns are bound into the fabric by a distance equalling the length of pile desired, and thereafter floating the figure yarns idly along the fabric until again wanted to form another figure pile. Then, when the surface bearing these unwanted floats is subjected to shearing in a subsequent operation, such floats will be clipped off close to the fabric, and the subsequent pulling and stretching of the fabric in further processing the same, or a brushing or napping process purposely administered, pulls the clipped ends of the figure yarns through the fabric to form the desired pile, fringe, or beard.

This method permits the determination of the length of the pile with the greatest exactness, and makes possible the making of such decorated fabrics through the use of standard machines widely available. The method is equally applicable to the figuring of fabrics decorated with pile or fringe from either warp or weft yarns. Other features of the invention as are will be made plain hereinafter.

An illustrative embodiment of the invention is shown in the accompanying drawings, in which—

Fig. 1 is a face view of a marquisette curtain fabric made according to the invention, showing continuous warp figured chenille-like fringes or figures extending weftwise.

Fig. 2 is a schematic drawing of a small portion of the face of the fabric of Fig. 1.

Fig. 3 is a view in section on line 3—3 of Fig. 2.

Fig. 4 is a view in section on line 4—4 of Fig. 1.

Fig. 5 is a schematic drawing showing the construction of a weft-figured marquisette curtain fabric in which small isolated fringed figures occur at spaced intervals warpwise and weftwise of the material.

In Figs. 1 to 4, the invention is shown as applied to the making of pile-figured marquisette curtain materials in which the figures are made from warps. A plain loom with a dobby is all that is required to weave it. In making this fabric, which is shown face up, the standard warps 1 and doups warps 2 are or may be interwoven with the ground warps 3 in unchanging manner throughout the entire piece, except that it may be desirable to double the weft within the figure, as shown, to hold the figure yarns securely in a fabric as loosely woven as marquisette. The figure warps 4 can be inserted in any quantity, the fabric shown having a pair of warps 4 between each two pairs of associated cross-woven warps 1, 2. The doubling of the wefts within the figure indicated at 5, an optional feature of the particular pattern here shown, merely requires the suspending of the take-up motion of the loom on predetermined picks; each pick of the pair within a single stitch on the loom is woven reversely to its associated pick with the figure warps 4, to grip them tightly.

The figure warps 4 are floated over the face of the fabric as indicated at 6, 6, as they approach and leave the place 5 where the doubled wefts bind them into the figure, and are then simply passed through the fabric to float again at the back thereof, as indicated at 7, 7, until brought back through the fabric to the face thereof to form the face floats 6 of the next figure. At the end of such face floats 6, they are again bound into the ground by means of the doubled wefts at 5, thereafter being floated as before to produce the desired length of pile, and then again passed through the back of the fabric to form the floats which are to be shorn off, this process being repeated as often as desired to form the particular sequence of figures sought.

The fabric as thus woven is then subjected to the action of a warp cutting machine whose knives part the warp floats 1 at the back of the fabric at random intervals, so that they will stand up and be engaged by the shearing blade of the ordinary shearing machine, which will clip off the remaining portions of these floats flush with the back surface of the fabric, enabling their cut ends to pull through the fabric to stand free at the face thereof. It is possible to shear the floats to precisely uniform length when shearing them close to the surface, as such surface acts as a gauge to limit the extent of the cut, and thus exact uniformity of length of the fringe made by pulling the cut ends through the fabric is attained.

It will be obvious that the figures thus formed may extend continuously weftwise of the fabric from selvage to selvage, or may be spaced apart weftwise to produce isolated figures, or may be
arranged in continuous or isolated diagonal relation, or in isolated warpswise series; also, curvilinear figures, such as fringed dots, tufts, wreaths, tassels, fringed garlands, or undulating lines may be produced in any direction. Wherever the doubled warps are not set at 5 are not concealed by the resulting figure, as between disjoined dots, one of the wefts of each pair may be floated at the back of the fabric where not employed in binding the figure warps, so that it may be shorn off subsequently to avoid any change in the uniform appearance of the marquise ground.

The invention principles may likewise be utilized to produce fringed or cut-pile weft figured fabrics, as indicated in Figs. 5 and 6. As in the case of the figure warps just described, the figure wefts 18 are bound into the figure for the same or varying distances by means of the leno and standard warps passing through the figure, as indicated at 12, then floated over the face of the fabric at each side of such place of binding for the distance necessary to produce the desired length of pile or fringe, as shown at 14, then simply passed through the fabric to the back thereof and floated beneath the fabric, as throughout the interval 16, until again brought through to the face to form the pile float at one side of the next adjacent figure. The wefts 18 are therefore again bound to the ground for a sufficient distance, floated again at the surface, and then passed to the back of the fabric, and so on as required to form the desired pattern. The subsequent shearing operation performed on the back of the fabric removes the floats at such surface, freeing one end of each face float to pass through the fabric as the latter is stretched widthwise in subsequent processes. As in the case of the warp-figured fabric, the equipment required is simple and commonly available, since the fabric can be woven on a 2 x 1 loom equipped with a dobby or equivalent harness motion.

In this manner figures extending continuously in warpswise or diagonal directions can be produced, or the figures may be spaced apart both warpswise or weftwise as in the case of the material shown in Figs. 5 and 6; also curvilinear figures, such as tuffs, fringed dots, wreaths, garlands, or undulating lines may be produced in any direction, just as in the case of the warp figured fabric described herein. Also, in the case of either type of fabric, flat figures of substantial extent can be given fringed or bearded margins.

A further feature of the invention has to do with an improved method of freeing or fluffing out the free ends of the face floats forming the fringe so as to give the figures a soft, fuzzy and lofty pile which is rendered decidedly coherent by the banding together of the component fibers. For this purpose, I prefer to subject the fabric after shearing to a very strong caustic shrinking bath. I have discovered that this shrinking bath causes the twist to disappear from the ends of the figure warps or wefts which have been freed by the shearing operation and the handling incident to pulling the fabric through the shrinking bath, with the result that they unstrand and break down into their individual fibers. Thus each end becomes a tiny bundle of flaring free fibers, at liberty to interengage and mat together with adjacent similar fibers. Where the figure wefts are bound into the ground is kept small enough with respect to the length of the free ends, the fibers from opposite sides of the same figure will mat into a single very lofty row of pile which completely hides the area of union of the figure yarns with the ground. Continuous lines of high-pile figures practically identical in character with the pile described characteristic of chenille bedspreads can thus be most inexpensively formed, so as to produce curtains, chair covers, and other articles harmonizing closely with such widely used bed coverings. Or disjoined and isolated tufts may be distributed over the surface of the pile material to reproduce almost identically the appearance of the well-known "candlewick" bedspreads.

I have found that other processes analogous to the caustic shrinking bath, for example such as are contemplated under the names of acid mercerizing, "Permatex" process, and others will also serve to take the twist out of the cut ends of figure yarn to permit their component fibers to spread. Since these baths are not employed for the conventional mercerizing purpose of rendering the fibers parallel in the twisted yarns comprising the ground, but for the sake of their action in untwisting the cut ends of the figure yarns, the customary holding or stretching of the ground fabric, essential to parallelize the fibers in ordinary mercerizing, is unnecessary and can be omitted. In fact, the holding or stretching has unfavorable results in many fabrics, as it is found that the customary widthwise stretching tends to spread apart and open up the figures, destroying the desired matted-together relation of the individual fibers forming the pile of the figure, and through thus making the pile discontinuous tends to spoil the chenille-like appearance sought.

Under certain circumstances, it is possible or desirable to amplify or replace the action of the shrinkage bath in setting free or untwisting the fibers of the cut ends of the figure yarns, by the use of brushes, nap-raising devices, card-clothing, or other mechanical brushing, combing or tuft-raising means.

The principles of the present invention may be utilized in conjunction with the weave of my prior Patent No. 1,992,604, granted Feb. 26, 1938, where it is desired to produce a figure attached to the ground over an area larger than can be concealed by the frayed-out freed ends of figure yarns, but where the ground warps and wefts are desired to be concealed as completely as possible within such area by means of the figure wefts.

As is obvious, it is possible to work both figure warps and figure wefts according to the invention principles in the same figure, as where it is desired to put a fringed or tufted pile border around the entire circuit of a relatively large figure.

While I have illustrated and described certain forms in which the invention may be embodied, I am aware that many modifications may be made therein by any person skilled in the art, without departing from the scope of the invention as expressed in the claims. Therefore, I do not wish to be limited to the particular forms shown, or to the details of construction thereof, but

What I do claim is:

1. A method of making figured fabric which includes the steps of interweaving figure warps and figure wefts in alternation with the ground, floating the figure warps over the face of the fabric for a distance at both sides of the location of such in-
terweaving, passing the figure warps through the fabric without interweaving at the ends of such floats, floating such figure warps over the back of the fabric until again passed through to the face to form the face floats, cutting the back floats, and causing the cut ends of the figure warps to pull through the fabric to the face thereof.

2. A method of making figured fabric which includes the steps of interweaving figure wefts with the ground warps of the fabric, floating the figure wefts over the face of the fabric for a distance at both sides of the location of such interweaving, passing the figure wefts through the fabric without interweaving at the ends of such floats, floating such figure wefts over the back of the fabric until again passed through to the face to form the face floats, then cutting the back floats, and causing the cut ends of the figure wefts to pull through the fabric to the face thereof.

HUGH J. CARRAGER.