Dec. 17, 1940. E. S. JACOBSEN 2,225,452

METHOD AND APPARATUS FOR MAKING A PILE FABRIC

Filed July 8, 1938

Fig. 1.

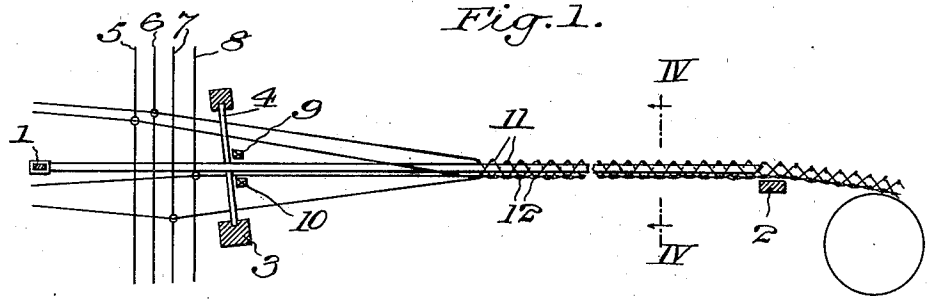


Fig. 2.

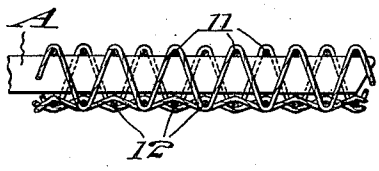


Fig. 3.

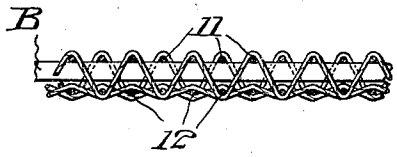


Fig. 4.

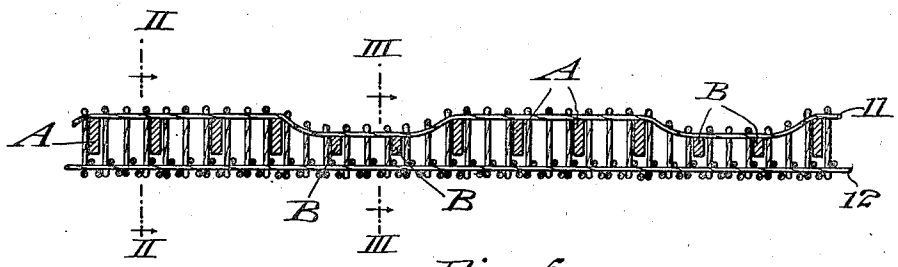
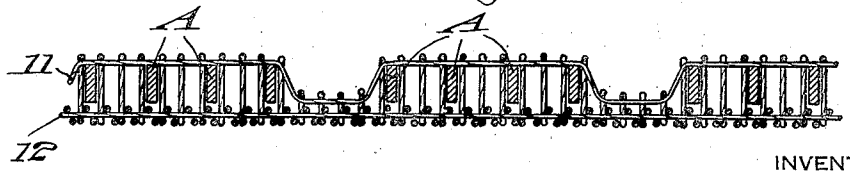


Fig. 5.



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Patented Dec. 17, 1940

2,225,452

UNITED STATES PATENT OFFICE

2,225,452

METHOD AND APPARATUS FOR MAKING A PILE FABRIC

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Application July 8, 1938, Serial No. 218,076

6 Claims. (Cl. 139—21)

This invention relates to a method and apparatus for making a pile fabric, and particularly a pile fabric of the frise type in which the pile loops are of unequal length or height at different points in the fabric.

The method of making a pile fabric of the type just described in accordance with this invention includes the use of gauge wires or blades extending warpwise of the fabric, said gauges or blades being adapted to support pile weft threads (as distinguished from weft threads in the ground) which pile weft threads in turn support the warp pile loops and determine the length or height thereof. By providing gauges or blades of different heights at selected intervals across the width of the loom, or by omitting the gauges or blades entirely in certain limited areas, the height at which the pile wefts are supported will be varied and the height or length of the warp pile tufts supported by said pile wefts will vary correspondingly. As the weaving of the fabric is completed, the material is drawn off the ends of the gauges and on to take-up rolls or the like. The pile weft yarns may be left in the material or may be withdrawn therefrom as desired and depending on the particular fabric effect to be secured. Where there is a sufficient difference in height between the high and low loop areas the fabric finishing operations may include passage through a shearing machine adapted to shear open the high loops so as to produce a pile face of loops and cut tufts.

A practical embodiment of the invention is represented in the accompanying drawing, in which

Fig. 1 represents a diagrammatic side elevation of the yarn-controlling parts of a loom in position for carrying out the novel method of weaving described herein.

Fig. 2 represents an enlarged fragmentary section taken along the line II—II of Fig. 4.

Fig. 3 represents an enlarged fragmentary section taken along the line III—III of Fig. 4.

Fig. 4 represents an enlarged section taken along the line IV—IV of Fig. 1, showing the use of gauges of different heights at different points; and

Fig. 5 represents a section corresponding to Fig. 4 but showing the use of gauges in some areas with the omission of gauges in other areas.

Referring to the drawing, there is illustrated a double shuttle loom arranged for weaving a single fabric. For the sake of clearness, the drawing shows a fabric of simple construction having only single alternating ground warp threads with a pile warp between each pair of ground warps, each pile warp being interlaced with alternate ground wefts and adjacent pile warps being in staggered relationship. While the drawing shows a loose or V-weave type of pile, the present invention is, of course, not limited to such a construction but could also be embodied in the manufacture of W or fast pile fabrics.

The portions of the loom shown herein include the gauges or blades A and B, the gauges A having a greater vertical dimension than the gauges B. All the gauges used are intended to be rigidly mounted on a suitable part of the loom frame, indicated at 1, from which point they extend warpwise of the fabric toward the breast beam 2 of the loom. The swinging lay 3 is of usual construction, being provided with reeds 4 forming dents. The warp yarns are controlled by the motion of the heddles 5, 6, 7 and 8 actuated through the usual harness and mechanical control, not shown. The weft threads are inserted by means of two shuttles 9 and 10, the shuttle 9 being operated to introduce the pile weft threads 11 above the gauges A and B, while the shuttle 10 introduces the ground weft threads 12 below said gauges. In the fabric shown in the drawing, the shuttles may conveniently be thrown simultaneously, the sequence of operation in successive picks being as follows:

Alternate pile threads are raised by their heddles to form a shed above the gauges for the passage of the upper shuttle 9, while the other pile threads are depressed below the gauges to form a shed corresponding to the shed simultaneously formed by the upward and downward separation of alternate ground warp threads to permit the passage of the lower shuttle 10, whereupon the shuttles are thrown to introduce respectively the pile weft thread 11 and the ground weft thread 12. In forming the next pick the positions of the pile warp threads are reversed and the positions of the ground warp threads are also reversed, with the shuttles again operating to introduce the respective weft threads.

In a loom set up as shown in Fig. 4 the pile weft threads pass over all the gauges A and B, by which they are supported, but the low gauges B permit these weft threads to be drawn down by the pile threads passing over them to a level lower than the level established by the higher gauges A. Since the height of the pile is determined by the height at which each loop is supported by the pile wefts, it will be apparent that the pile loops formed adjacent to the low

gauges B will be shorter or lower than the pile loops formed adjacent the higher gauges A.

In the arrangement shown in Fig. 5, the gauges used are all of the same height, but there are appreciable intervals where these gauges are entirely omitted, so that the pile weft is unsupported at these points and may be drawn down relatively close to the surface of the ground in order to form very short or low pile loops at such points. It will be understood that loops of more than two different heights can be formed by the use of appropriate gauges or by the combination of different gauges with gaugeless spaces, such modifications of the invention being obvious in view of the foregoing disclosure.

The particular spacing of the gauges may be determined by the nature of the loom set-up in any given case; thus, with a relatively open reed the gauges may be placed in every dent, whereas the use of a finer reed would make it more practicable to place gauges only in every second dent, or in every third dent as shown in Figs. 4 and 5.

It may also be noted that the loose pile shown and described herein may be additionally secured against displacement by the provision of back warps or stuffer warps in accordance with well understood weaving practice, such additional warps being omitted from the drawing in order to avoid unnecessary complication. The additional securing means might, if desired, take the form of a cementitious coating, such for instance, as shown and described in Crabtree Patent No. 2,007,078.

It will be understood that various changes may be resorted to in the form, construction and arrangement of the apparatus and in the steps of the method without departing from the spirit and scope of my invention, and hence I do not wish to be limited to the particular embodiments herein shown and described except as they may be included in the claims.

What I claim is:

1. In the manufacture of a single warp pile fabric on a double shuttle loom fitted with warpwise extending stationary gauges, the steps which include inserting pile wefts immediately above and ground wefts immediately below said gauges, supporting each pile weft at different heights above the ground wefts at different points across the width of the fabric, weaving the ground to include the ground wefts, and weaving the pile warps under ground wefts and over pile wefts, whereby pile loops are formed of different heights determined by the heights of the pile wefts above the ground wefts.

2. In the manufacture of a single warp pile fabric on a double shuttle loom fitted with warpwise extending stationary gauges, the steps which include locating said gauges to support pile weft threads at one height above the ground at certain dents and to permit depression of said threads to a different height at other dents, forming a shed above the gauges and below certain pile warp threads, forming a shed below the gauges and certain ground warp threads and above other pile warp threads and other ground warp threads, introducing a pile weft thread across the first named shed, introducing a ground weft thread across the second named shed, reversing the respective positions of the pile warp threads and reversing the respective positions of the ground warp threads, and introducing pile and ground weft threads across the new sheds thus formed, whereby the pile warp threads form pile loops of different heights determined by the heights at which the pile weft threads are supported by the gauges or to which said threads are permitted to be depressed.

3. A loom of the character described comprising, means for weaving the ground of a single loop pile fabric, means for forming warp pile loops interwoven with said ground, a gauge system consisting only of stationary gauges extending warpwise of the fabric and above said ground, means for introducing pile weft threads above and supported directly by said gauges, means for forming warp pile loops interwoven with said ground and supported by said pile weft threads, said gauges being arranged to position said pile weft threads and warp pile loops at one height at certain dents and at a different height at other dents.

4. A loom of the character described comprising, means for weaving the ground of a single loop pile fabric, means for forming warp pile loops interwoven with said ground, stationary gauges extending warpwise of the fabric and above said ground, means for introducing pile weft threads above said gauges, and means for forming warp pile loops interwoven with said ground and supported by said pile weft threads, the upper edges of certain gauges lying in one horizontal plane and the upper edges of other gauges lying in another horizontal plane, whereby said pile weft threads and warp pile loops are supported at one height at certain dents and at a different height at other dents.

5. A loom of the character described comprising, means for weaving the ground of a single loop pile fabric, means for forming warp pile loops interwoven with shaid ground, stationary gauges extending warpwise of the fabric and above said ground, means for introducing pile weft threads above said gauges, and means for forming warp pile loops interwoven with said ground and supported by said pile weft threads, certain dents being devoid of gauges for substantial distances weftwise of the loom, whereby said pile weft threads and warp pile loops are supported at one height by said gauges and at a lower height at the dents which are devoid of gauges.

6. In the manufacture of a warp pile fabric on a loom fitted with upper and lower shuttles and a single horizontal line of warpwise extending stationary gauges, the steps which include locating said gauges to support weft threads carried by the upper shuttle at one distance above the weft threads carried by the lower shuttle at certain dents and to permit said weft threads to be separated by a lesser distance at other dents, forming a shed above the gauges and below certain pile warp threads, forming a shed below the gauges and certain ground warp threads and above other pile warp threads and other ground warp threads, passing the upper shuttle across the first named shed to introduce an upper weft thread, passing the lower shuttle across the second named shed to introduce a ground weft thread, reversing the respective positions of the pile warp threads and reversing the respective positions of the ground warp threads, and passing the upper and lower shuttles across the new sheds thus formed to introduce weft threads therein, whereby the pile warp threads in different dents extend above the ground different distances determined by the extent of separation of the upper and lower weft threads.

EARL S. JACOBSEN.