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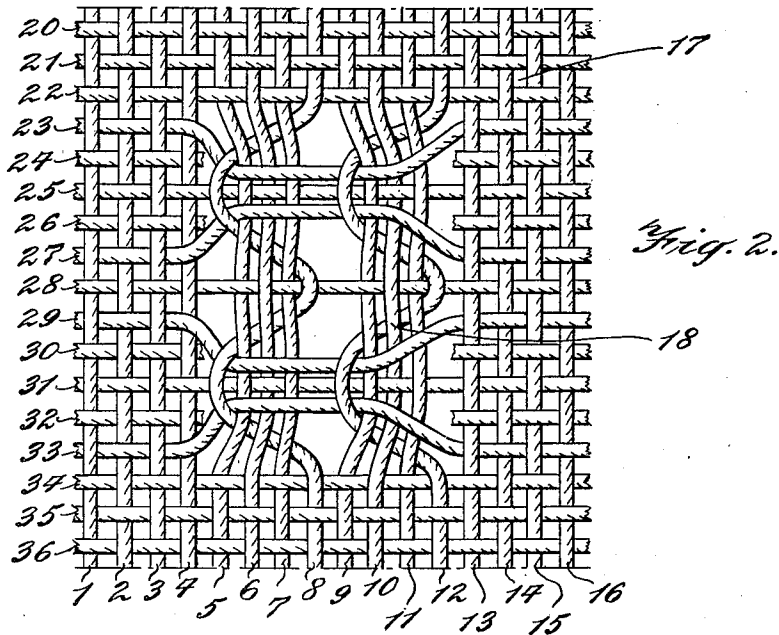
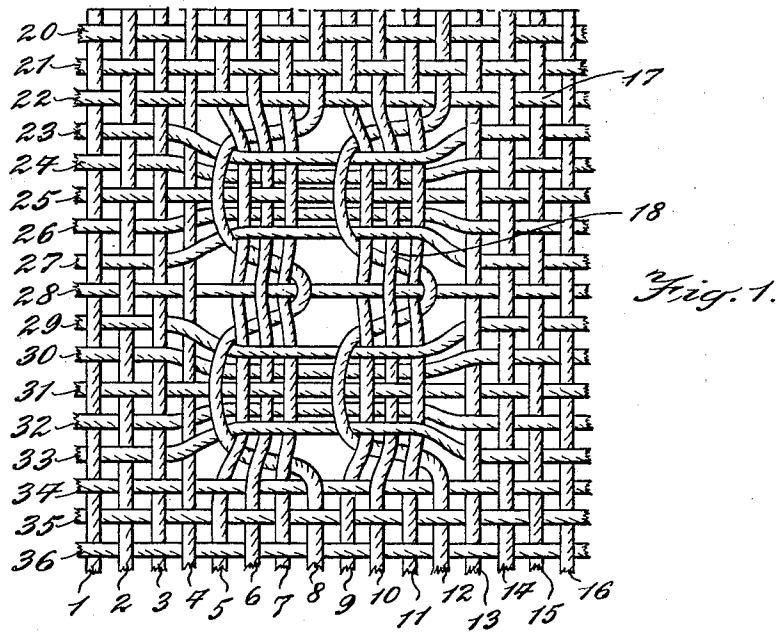
R. WHEWELL ET AL

2,367,744

WOVEN FABRIC AND METHOD OF PRODUCING SAME

Filed Sept. 15, 1942

2 Sheets-Sheet 1



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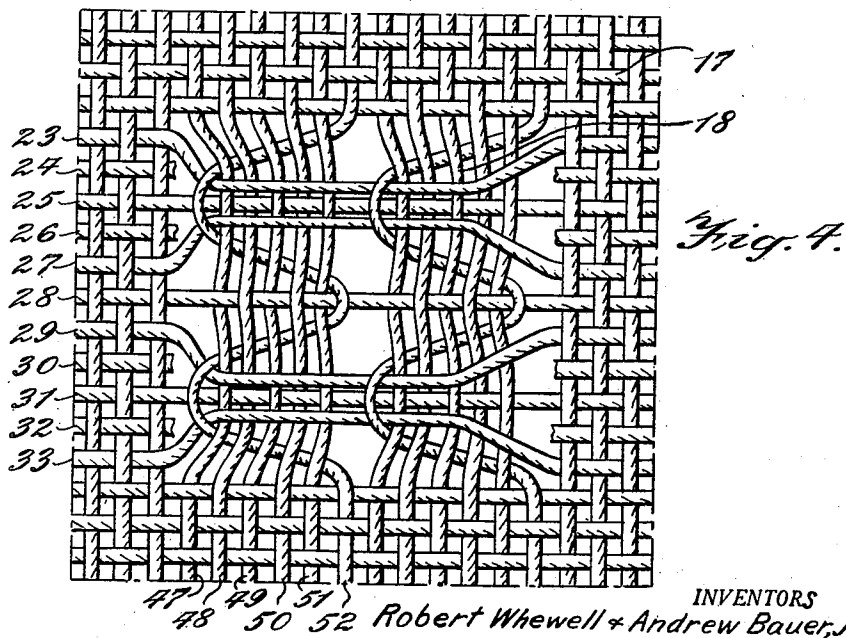
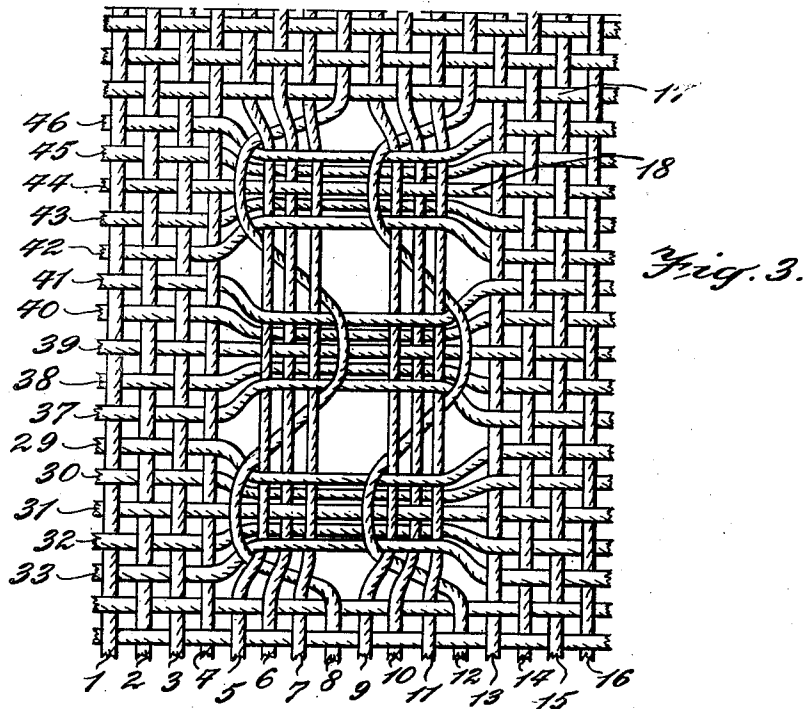
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## UNITED STATES PATENT OFFICE

2,367,744

WOVEN FABRIC AND METHOD OF  
PRODUCING SAME

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Application September 15, 1942, Serial No. 458,384

14 Claims. (Cl. 139—419)

This invention relates to a woven fabric having a plain body portion of a relatively close weave and contrasting portions of an open weave and the method of weaving such fabric.

An object of this invention is to produce a woven fabric having a plain body with contrasting portions of an open weave forming a pattern or design therein simulating filigree work. Other objects and advantages of this invention will be apparent from the following description and the annexed drawings in which selected embodiments of the invention are shown and in which

Fig. 1 is an enlarged plan view of the front or face of a fabric embodying the invention;

Fig. 2 is an enlarged plan view of the front or face of a fabric with certain modifications over the fabric shown in Fig. 1;

Fig. 3 is an enlarged plan view of the front or face of a fabric embodying the invention but having a slightly different weave; and

Fig. 4 is also an enlarged plan view of the front or face of a fabric embodying the invention and having further variation in the weave.

Referring to the drawings in detail, in Fig. 1 there is a woven fabric in which the warp threads are numbered from 1 to 16, inclusive, and the weft threads from 20 to 36, inclusive. As is well known, the warp threads pass through and are manipulated by the harness of the loom to engage the weft threads in the manner hereinafter described.

In the body 17 of the fabric, the warp and weft threads are woven in a relatively close plain weave. In contrast to the body portion 17, the warp and weft threads in certain other portions 18 of the fabric are interwoven in a manner to form an open weave resembling what is commonly referred to as filigree work. The portions of the fabric consisting of this open weave are arranged to form a desired pattern in the fabric. The close weave of the body portion illustrated herein is an ordinary square weave, but it is possible to vary this by utilizing any weave of a relatively close character, such as a 1 x 2 weave for this portion of the fabric. The term "relatively close" weave is intended to include weaves of such a character that they will present a contrast to the portions of open weave.

The portions 18 of the open weave are formed by weaving two or more warp threads in even numbers in a leno weave. This leno weave consists of crossing a warp thread 8 under an odd number of adjoining warp threads, namely, warp threads 5, 6 and 7 and then carrying it over an odd number of weft threads, namely, weft threads

29, 30, 31, 32 and 33. Thereafter, this warp thread 8 is again crossed under the adjoining warp threads 5, 6 and 7 to its initial position, thereby forming a leno weave consisting of an even number of warp threads with an odd number of weft threads under the loop of said leno.

The warp thread 8 is then carried over the next weft thread 28 and thereafter the procedure which has just been described is repeated with the warp threads and the succeeding weft threads and this is continued until the desired pattern is formed. The number of weft threads included in succeeding loops of the leno may be varied as the five and one arrangement already described or, as will be described more fully in connection with Fig. 3, the number of weft threads included in succeeding loops of the leno weave may be kept uniform (with the exception there noted). However, an arrangement such as the five and one alternation in weft threads illustrated in Fig. 1 has been found to have certain desirable features in that it tends to emphasize the open effect and to form a firmer weave.

Continuing with the description of Fig. 1, the weft threads 29, 30, 31, 32 and 33 included under the loop of the leno are interwoven with the warp threads 5, 6 and 7 in the following manner: The central weft thread 31 of this group is interwoven with the warp threads 5, 6 and 7 forming the leno and adjacent the loop thereof in the usual manner, i. e., over one warp thread and under the next warp thread. Weft threads 30 and 32 immediately adjacent said central thread are floated under the warp threads 5, 6 and 7, thus leaving these weft threads entirely free of the warp threads in the leno. The outer weft threads 29 and 33 of this group are carried over the warp threads 5, 6 and 7, although, as previously pointed out, the loop formed by warp thread 8 extends over these weft threads, thereby holding them to the fabric. With such an arrangement the loop of the leno weave formed by the warp thread 8 engages with the weft threads 29, 30, 32 and 33 and urges them toward the central weft thread 31 and since these threads are not interwoven with the warp thread in the usual manner, they are more or less free to move relative to the warp threads and toward the central weft thread 31. The single weft thread 28 under the second loop of the leno is treated as a central thread and is interwoven with the warp threads 5, 6 and 7. Succeeding sets of weft threads are thereafter woven in a similar manner with these warp threads until the desired pattern has been formed.

In the drawings, the individual weft threads comprising the open portions 18 have been shown somewhat separated for clarity, but actually these threads have a tendency to overlap each other to a certain extent.

Where there are more weft threads under the loop of the leno, the same procedure is followed as has already been described and the additional weft threads are alternately woven under and over the warp threads in the order just described.

The procedure in weaving the warp threads 9, 10, 11 and 12 adjoining the warp threads just discussed is the same as that which has been discussed and this procedure may be followed with adjoining warp threads and will be continued until the desired pattern is formed.

After the fabric has been woven in the manner just described, it is preferably subjected to further treatment to produce the fabric illustrated in Fig. 2.

The fabric shown in Fig. 2 is the same as that which has been described in connection with Fig. 1, but in this figure the weft threads 30 and 32 immediately adjacent the central weft thread 31, which were floated under the warp threads throughout the pattern area, have been removed. The removal of these weft threads is done after the fabric is woven as described above and may be done in a manner well known in the art, such as putting the cloth on a shearing machine and shearing these threads from the fabric throughout the pattern area. This permits the loops of the leno to draw the remaining weft threads 29 and 33 more closely to the central weft thread 31 and thus produces a decidedly more open effect.

Fig. 3 illustrates a fabric woven in accordance with our invention but differing from the previously described fabrics in that each loop of the leno formed by the warp thread 8 is carried over an equal number of weft threads. In this figure, the successive sets of weft threads have been numbered 29' to 33'; 37 to 41, and 42 to 46, inclusive. Where an equal number of weft threads are included in each loop in the leno, the number of weft threads in such instances must be more than a single weft thread in order to produce the desired open effect.

As a practical matter, it is not desirable to include more than nine weft threads in a single loop of the leno. Further variations over the fabric shown may be made by varying the number of weft threads included in different loops of the leno weave so long as the requirement that there be an odd number is adhered to; thus there may be five weft threads included in the first loop of the leno; three weft threads included in the second loop of the leno and five weft threads included in the third loop of the leno, and so forth.

Fig. 4 illustrates a further variation in the open weave of a fabric woven in accordance with our invention. The fabric differs from the others in that the number of warp threads forming the leno has been increased to six. In this weave, the warp end 52 is crossed under the adjoining five warp threads 47, 48, 49, 50, and 51. Aside from this difference, the procedure and weave of this fabric is the same as that which has already been described. Other variations in the number of warp threads forming the leno are possible so long as there is an even number of such warp threads, but it is not practical with the present machinery of a loom to cross more than five warp threads in a leno weave.

The same numbering has been applied to the various elements in the different figures in so far as possible.

While the invention has been shown as embodied in certain selected forms, it is to be understood that various changes in details may be made without departing from the scope of the invention as defined by the appended claims.

We claim:

1. A woven fabric consisting of a series of warp threads and a series of weft threads interwoven to form a body portion of a relatively close weave and contrasting portions of an open weave, said open weave comprising a leno weave consisting of two or more warp threads in even numbers with three or more weft threads in odd numbers included in the loop of the leno, the central weft thread being interwoven with the warp threads forming the leno and adjacent the loop thereof in the usual manner, and the weft threads on either side of said central weft thread being alternately under or over said warp threads.

2. A woven fabric consisting of a series of warp threads and a series of weft threads interwoven to form a body portion of a relatively close weave and contrasting portions of an open weave, said open weave comprising a leno weave consisting of from two to six warp threads in even numbers with three or more weft threads in odd numbers included in the loop of said leno, the central weft thread being interwoven with the warp threads forming the leno and adjacent the loop thereof in the usual manner, and the weft threads on either side of central weft thread being alternately under or over said warp threads.

3. A woven fabric consisting of a series of warp threads and a series of weft threads interwoven to form a body portion of a relatively close weave and contrasting portions of an open weave, said open weave comprising a leno weave consisting of from two to six warp threads in even numbers with from three to nine weft threads in odd numbers included in a loop of said leno and with from one to three weft threads included in a succeeding loop of the leno, the central weft threads in each set of weft threads enclosed in one loop of the leno being interwoven with the warp threads forming the leno and adjacent the loop thereof in the usual manner, the weft threads on either side of the central weft thread being alternately under or over said warp threads, whereby said weft threads are free to move relative to said warp threads.

4. A woven fabric consisting of a series of warp threads and a series of weft threads interwoven to form a body portion of a relatively close weave and contrasting portions of an open weave, said open weave comprising a leno weave consisting of two or more warp threads in even numbers with three or more weft threads in odd numbers included in the loop of the leno, the central weft thread being interwoven with the warp thread forming the leno and adjacent the loop thereof in the usual manner, and the weft threads on either side of said central weft thread being alternately under or over said warp threads, said openly-woven portions having the weft threads extending under said warp threads sheared off adjacent the closely woven portion of the fabric.

5. A woven fabric consisting of a series of warp threads and a series of weft threads interwoven to form a body portion of a relatively close weave and contrasting portions of an open weave, said open weave comprising a leno weave consisting of from two to six warp threads in even numbers

with three or more weft threads in odd numbers included in the loop of said leno, the central weft thread being interwoven with the warp thread forming the leno and adjacent the loop thereof in the usual manner, the weft threads on either side of said central weft thread being alternately under or over said warp threads, said openly-woven portions having the weft threads extending under said warp threads sheared off adjacent the closely woven portion of the fabric.

6. A woven fabric consisting of a series of warp threads and a series of weft threads interwoven to form a body portion of a relatively close weave and contrasting portions of an open weave, said open weave comprising a leno weave consisting of from two to six warp threads in even numbers with from three to nine weft threads in odd numbers included in a loop of said leno and with from one to three weft threads included in the succeeding loop of the leno, the central weft threads in each set of weft threads enclosed in one loop of the leno being interwoven with the warp threads forming the leno and adjacent the loop thereof in the usual manner, the weft threads on either side of the central weft thread being alternately under or over said warp threads, whereby said weft threads will be free to move relative to said warp threads, said openly-woven portions having the weft threads extending under said warp threads sheared off adjacent the plain portion of the fabric.

7. A woven fabric consisting of a series of warp threads and a series of weft threads interwoven to form a body portion of a relatively close weave and contrasting portions of an open weave, said open weave comprising a leno weave consisting of four warp threads with five weft threads included in a loop of said leno and with one weft thread included in a succeeding loop of the leno, the central weft threads in the first set of weft threads and the single weft thread enclosed in the loops of the leno being interwoven with the warp threads forming the leno and adjacent the loop thereof in the usual manner, the weft threads immediately adjacent the central weft thread being under said warp threads and the weft threads immediately adjacent said last-mentioned weft threads being over said warp threads, whereby said weft threads will be free to move relative to said warp threads.

8. A woven fabric consisting of a series of warp threads and a series of weft threads interwoven to form a body portion of a relatively close weave and contrasting portions of an open weave, said open weave comprising a leno weave consisting of four warp threads with five weft threads included in a loop of said leno and with one weft thread included in a succeeding loop of the leno, the central weft thread in the first set of weft threads and the single weft thread enclosed in the loops of the leno being interwoven with the warp threads forming the leno and adjacent the loop thereof in the usual manner, the weft threads immediately adjacent the central weft thread being under said warp threads and the weft threads immediately adjacent said last-mentioned weft threads being over said warp threads, whereby said weft threads will be free to move relative to said warp threads, said openly-woven portions having the weft threads extending under the warp threads removed from the fabric.

9. The method of weaving a portion of a woven fabric in an open weave comprising weaving two or more warp threads in even numbers in a leno weave with three or more weft threads in odd

numbers in each loop of said leno weave, weaving the central weft thread of each set of weft threads included in one loop of the leno weave with the warp threads forming the leno and adjacent the loop thereof in the usual manner, floating the weft threads immediately adjacent the central weft thread under said warp threads, and carrying the weft threads immediately adjacent the last-mentioned weft threads over said warp threads and thereafter alternating said procedure in sequence for additional weft threads included in the loop of the leno, thereby producing an open weave at such portion of the fabric.

10. The method of weaving a portion of a woven fabric in an open weave comprising weaving two or more warp threads in even numbers in a leno weave with three or more weft threads in odd numbers in each loop of said leno weave, weaving the central weft thread of each set of weft threads included in a loop of the leno weave with the warp threads forming the leno and adjacent the loop thereof in the usual manner, floating the weft threads immediately adjacent the central weft thread under said warp threads and carrying the weft threads immediately adjacent the last-mentioned weft threads over said warp threads and thereafter alternating said procedure in sequence for additional weft threads included in the loop of the leno, and shearing the weft threads floated under the warp threads from the fabric, thereby producing an open weave at such portion of the fabric.

11. The method of weaving a portion of a woven fabric in an open weave comprising weaving of from two to six warp threads in even numbers in a leno weave with from three to nine weft threads in odd numbers in each loop of said leno weave, weaving the central weft thread of each set of weft threads included in one loop of the leno weave with the warp threads forming the leno and adjacent the loop thereof in the usual manner, floating the weft threads immediately adjacent the central thread under said warp threads and carrying the weft threads immediately adjacent the last-mentioned weft threads over said warp threads and thereafter alternating said procedure in sequence for additional weft threads included in the loop of the leno.

12. The method of weaving a portion of a woven fabric in an open weave comprising weaving of from two to six warp threads in even numbers in a leno weave with from three to nine weft threads in odd numbers in each loop of said leno weave, weaving the central weft thread of each set of weft threads included in one loop of the leno weave with the warp threads forming the leno and adjacent the loop thereof in the usual manner, floating the weft threads immediately adjacent the central thread under said warp threads and carrying the weft threads immediately adjacent the last-mentioned weft threads over said warp threads and thereafter alternating said procedure in sequence for additional weft threads included in the loop of the leno, and removing the weft threads floated under the warp threads from the fabric.

13. The method of weaving a portion of a woven fabric in an open weave comprising weaving four warp threads in a leno weave with five weft threads in one loop of the said leno and a single weft thread in a succeeding loop of said leno,

weaving the central weft thread of the first-mentioned weft threads and the single weft thread with the warp threads forming the leno and adjacent the loop thereof in the usual manner, floating the weft threads immediately adjacent the central weft thread under said warp threads, and carrying the weft threads immediately adjacent the last-mentioned weft threads over said warp threads.

14. The method of weaving a portion of a woven fabric in an open weave comprising weaving four warp threads in a leno weave with five weft threads in one loop of said leno and a

single weft thread in a succeeding loop of said leno, weaving the central weft thread of the first-mentioned weft threads and the single weft thread with the warp threads forming the leno and adjacent the loop thereof in the usual manner, floating the weft threads immediately adjacent the central weft thread under said warp threads, carrying the weft threads immediately adjacent the last-mentioned weft threads over said warp threads, and removing the weft threads floated under the warp threads from the fabric.

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