

(Specimens.)

W. G. CONNELL.  
WOVEN FABRIC.

No. 522,555.

Patented July 3, 1894.

FIG. 1.

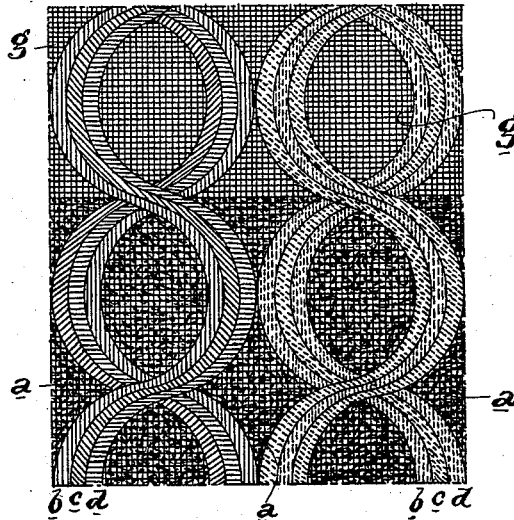


FIG. 2.

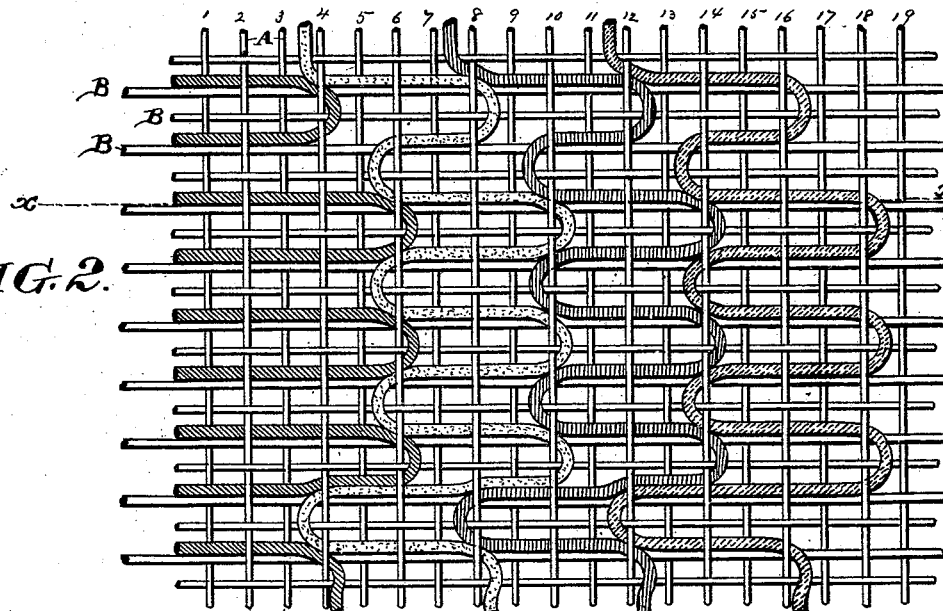
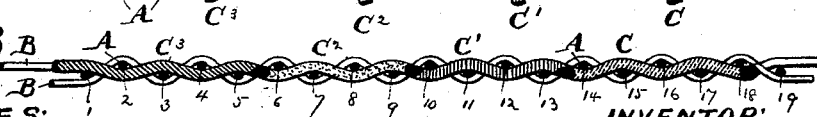


FIG. 3.



WITNESSES:

Henry Dwyer  
C. M. Pittman

INVENTOR:

Walter G. Connell  
By his atty  
*[Signature]*

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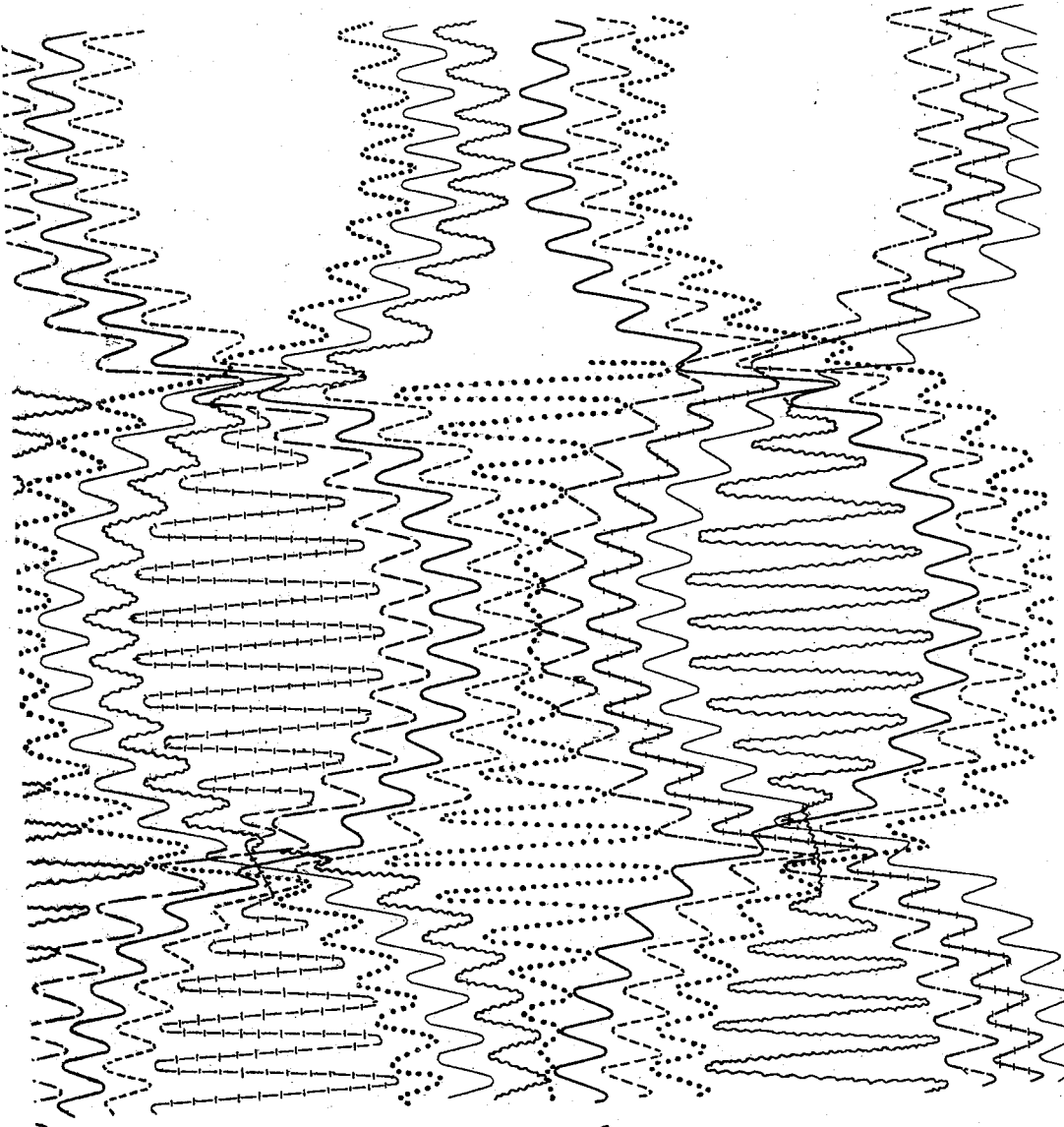


FIG. 4.

WITNESSES:

*Henry D. Duff*  
*Wm. D. Duff*

INVENTOR:

*Walter G. Connell*  
*By*  
*Wm. D. Duff*

# UNITED STATES PATENT OFFICE.

WALTER GLEN CONNELL, OF PHILADELPHIA, PENNSYLVANIA.

## WOVEN FABRIC.

SPECIFICATION forming part of Letters Patent No. 522,555, dated July 3, 1894.

Application filed November 17, 1892. Serial No. 452,265. (Specimens.)

*To all whom it may concern:*

Be it known that I, WALTER GLEN CONNELL, of the city and county of Philadelphia, State of Pennsylvania, have invented an Improvement in Woven Fabrics, of which the following is a specification.

My invention relates to woven fabrics and consists of certain improvements which are fully set forth in the following specification and are shown in the accompanying drawings which form a part thereof.

My invention is a new woven fabric in which the pattern and color effects are produced by an additional filling thread independent of the ordinary warp and weft threads of the weave. This additional filling thread is introduced during the act of weaving and is bound into the fabric by the warp threads. In one piece of fabric an indefinite number of independent filling threads may be introduced, and each of these threads may be carried from one part of the fabric to another, so that an indefinite variety of color and pattern effects may be produced in any piece of fabric. The filling threads may compose both the ground and pattern of the fabric. In the fabric employing the weft threads the ordinary warp and weft threads are utilized for the purpose of forming a body or structure into which the filling figuring threads are bound, and they need form no part of the ordinary pattern or color effects. In a modified form of the fabric, however, the ordinary weave of the warp and weft may be left as the ground, the filling threads which produce the pattern being introduced over a portion of the fabric only.

In carrying out my invention I form a woven fabric of any suitable structure of warp and weft threads, and during the act of weaving I introduce one or more, the number being practically unlimited, colored filling threads, which are independent of the warp and weft threads and are bound into the fabric, by the warp during the formation of the fabric. These filling threads as they are introduced may be moved laterally in either direction to a greater or less extent within the part of the sheds produced by the warp threads, the other sheds taking in body weft threads, thus producing a shot of the filling thread over a greater or less sectional area of the fabric;

and as these filling threads may pass one across the other and any number of them may be used, an unlimited variety of pattern and color effects may be produced.

Broadly considered it is immaterial to my invention what the particular weave of the warp and weft may be, as they may be formed of any of the usual or special weaves, such as tabby, twill, gauze or other weave, so long as they are combined with sectional filling figuring threads to produce a pattern, the latter being bound in by the warp and weft. As a general rule in the production of my improved fabric the filling figuring threads forming the sectional shots will be bound in the warp sheds at intervals, the remaining sheds receiving body weft, that is to say, one or more sheds of the warp will take in weft threads alone, and the next shed a figuring filling thread forming the sectional shot and so on.

It is immaterial to the present invention by what means or by what mechanism the fabric may be produced. I have, however, invented a new and improved loom, especially designed for the production of this fabric, which loom forms the subject matter of my application, Serial No. 452,264, filed November 17, 1892, to which reference may be had.

I shall now refer to the drawings for the purpose of more particularly describing the construction of my improved fabric.

Figure 1 is a plan view illustrating a piece of my improved fabric. Fig. 2 is a similar view of a portion thereof on a greatly enlarged scale showing the structure of the fabric. Fig. 3 is a transverse sectional view on the line  $x-x$  of Fig. 2, showing the chain of the weave; and Fig. 4 is a diagrammatic view illustrating various manipulations of the filling threads and corresponding with the piece of fabric shown in Figs. 1 and 2.

A are the warp threads. B are the weft threads. C, C', C<sup>2</sup>, C<sup>3</sup> are the filling threads, of which any number may be used, and which may be of any colors desired.

The warps A and wefts B are woven together in the usual manner, sheds being formed by the lifting of alternate series of warps and the weft shot through the successive sheds. Into a portion of the sheds so formed one or more of the filling threads C, C', C<sup>2</sup>, &c., are introduced and these threads are carried laterally

a greater or less distance between the two separated layers of warps which form the shed, so that when the shed is changed by the lowering of the one set of warp and the raising of the other, the filling threads C, C', C<sup>2</sup>, &c., are bound in by the warps, each passing successively over and under alternate warps, and extending laterally across the fabric a distance corresponding to the extent of their lateral movement within the shed. The next shed receives only the weft thread of the body fabric, and then after it is bound in, a shed similar to the first is formed. In the new shed thus formed by the raising and lowering of the warps the filling threads are introduced similarly to the first instance by being carried on laterally in either direction such a distance as may be desired, and when the next alternate shed is formed the filling threads are again bound in by the alternate warp threads. With the formation of each shed the weft B is thrown and the wefts thus pass over and under the alternate warps in the usual manner and form the body of the structure. The figuring filling threads C, C', C<sup>2</sup>, &c., are only introduced in each alternate shed in my preferred construction though I do not confine myself to it as they may be introduced transversely in different orders of the sheds.

As the filling threads, C, C', C<sup>2</sup>, &c., may be moved laterally in each shot to any extent desired, they may be bound into the fabric over a greater or less sectional width varying in fact from the distance between two adjacent warps to the entire width of the fabric. With a series of these threads each one may be introduced in any shot for a section or portion of the width, the different threads succeeding each other in successive sections entirely across the fabric, and forming a fabric in which the pattern and color effects are produced by a series of successive filling threads each extending part of the distance only across the entire width of the fabric. This construction of the fabric is clearly shown in Fig. 2. The first filling figuring thread C is shown in the second shot carried laterally under and over warps 12 to 16, the next filling thread C' is carried under and over warps 8 to 12, and the next thread C<sup>2</sup> under and over warps 4 to 8, while the filling thread C<sup>3</sup> is carried under and over 1 to 4. A weft thread B accompanies the figuring threads C, C', C<sup>2</sup>, &c., when being bound in, only the same weft thread B passes entirely across the fabric. In the construction illustrated in Fig. 2 when the threads C, C', C<sup>2</sup>, &c., cross any of the body wefts B they always lie above it. In the next shot a weft body thread B is alone thrown, the figuring threads C, C', C<sup>2</sup>, &c., extending in the direction of the warp threads A, but above the weft B. In the next succeeding or fourth shot the thread C<sup>3</sup> is carried back under and over 1 to 6, &c., the thread C<sup>2</sup> passes back under and over 4 to 10, the thread C' under and over 8 to 14, and the thread C under and over 12 to 18 and

so on throughout the fabric. In any shot the threads C, C', C<sup>2</sup>, C<sup>3</sup>, &c., form successive sections of the pattern, any one of which may be of greater or less extent than the other according to the extent of their lateral movement in each shot. It will be observed that the filling figuring threads whenever introduced always pass over and under the same warps in successive correspondingly located sheds in the width of the fabric.

In the formation of the fabric shown in Fig. 2, at the second shot shown the shed was formed by the lifting of warp threads 2, 4, 6, 8, 10, &c., the thread C was carried laterally between the warps 12 to 16, the thread C' between warps 8 to 12, the thread C<sup>2</sup> between the warps 4 to 8, and the thread C<sup>3</sup> between warps 1 to 4, so that when the weft B was thrown and the shed changed by the lowering of the warps, 2, 4, 6, 8, 10, &c., and the elevation of warps 1, 3, 5, 7, 9, 11, &c., the threads C, C', C<sup>2</sup> and C<sup>3</sup> were bound into the fabric and form successive sections of the pattern as is shown in the drawings. The next shed formed by reversing the warp threads receives the weft thread B on the return pick alone, the figuring filling threads C, C', &c., lying substantially parallel to the warp A and preferably above the weft thread when the latter is thrown alone. In the shed next formed the thread C<sup>3</sup> is moved back between the warps 1 to 6, &c.; the thread C<sup>2</sup> between the warps 4 to 10; the thread C' between the warps 8 to 14; and the thread C between warps 12 to 18, so that when the next succeeding shed is formed they are bound in by the warps, and so on in the formation of the successive sheds in the weaving of the fabric. As these filling threads may be manipulated independently one of the other not only may the extent to which any thread is bound in be varied, but each thread may be caused to traverse from one part of the fabric to another in successive shots, and the different threads may be crossed so that the color effects may be greatly varied.

In the diagrammatic view Fig. 4 I have illustrated some of the ways in which these different filling threads may be manipulated, showing how one thread may traverse from one part of the fabric to another and how different threads may be crossed. In this view the different kinds of lines are intended to indicate different threads having one or more different colors or characteristics, and the warp and weft threads are omitted.

If desired one or more of the filling threads may be used to form the ground of the pattern, the other threads producing the color or figure effects. Thus in Fig. 1, the parts marked *a* may compose the ground of the pattern, being formed with filling threads of one color, while the parts marked *b*, *c*, *d*, &c., may compose the pattern. This is, of course, a mere matter of fancy in the construction of the fabric and depends merely upon the extent of area over which filling threads of any one color may be introduced.

If desired the filling threads may be omitted in portions of the fabric as is illustrated in the upper portion of Fig. 1. The ordinary woven fabric composed of the warp and weft threads then forms the ground *g* of any well known plain, twilled or gauze weave, and the pattern is produced by the introduction of the filling threads over a portion of the area. By this means a particularly handsome fabric may be produced, suitable for upholstering purposes, curtains, dress goods, &c. The solid fabric may of course be used for any purpose, and is particularly suited for carpetings, rugs, &c.

15 If desired, colored weft threads may be used to add color effect at such parts of the fabric as they may be visible. This, however, does not relate to the structure of the fabric and is immaterial to the invention.

20 I have described the particular weave shown in Fig. 2 but it is to be understood that I do not limit myself to any particular kind of ground or body weave. My invention is broadly to the sectional shot weave of the figuring threads combined with any suitable kind of binding warp and weft weave forming the supporting structure of the sectional shot figuring threads.

In the case of a plain or tabby ground the sectional figuring threads will come in alternate sheds; in twilled grounds they will come in every third shed; in gauze grounds, they will come in every other shed, and so on, according to the grounds or body weave employed.

35 Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A woven fabric consisting of a series of warp and weft threads woven together to form a body, and filling figuring threads lying in part of the sheds for a distance less than the width of the fabric and always passing over and under the same warps in successive sheds in any part of the fabric.

2. A woven fabric consisting of warp, weft and figuring filling threads, the weft threads interweaving with the warps in the usual manner, and the filling figuring threads lying in some of the sheds with the wefts but always passing over and under the same warps in any correspondingly located portion in the width of the fabric.

3. A woven fabric consisting of warp, weft and figuring filling threads, the weft threads interweaving with the warps in the usual manner, and the filling figuring threads lying in some of the sheds with the wefts for a portion of the width of the shed only but always passing over and under the same warps in any correspondingly located portion in the width of the fabric.

4. A woven fabric consisting of warp, weft and figuring filling threads, the weft threads interweaving with the warps in the usual manner, and the filling figuring threads lying in some of the sheds with the wefts for a portion of the width of the shed only but always passing over and under the same warps in any correspondingly located portion in the width of the fabric, and a series of such independent filling figuring threads succeeding one another in the same shed.

5. A woven fabric consisting of warp, weft and filling figuring threads woven together, the weft threads interweaving with the warp threads in the usual manner and the filling figuring threads passing over and under the warps and lying across the fabric in the same sheds with the wefts but in a portion only of the sheds occupied by the warps.

6. A woven fabric consisting of warp, weft and filling figuring threads woven together, the weft threads interweaving with the warp threads in the usual manner and the filling figuring threads passing over and under the warps and lying across the fabric in the same sheds with the wefts but in a portion only of the sheds occupied by the warps, and for a distance less than the width of the fabric.

7. A woven fabric consisting of warp, weft and filling figuring threads woven together, the weft threads interweaving with the warp threads in the usual manner and the filling figuring threads passing over and under the warps and lying across the fabric in the same sheds with the wefts but in a portion only of the sheds occupied by the warps, said filling figuring threads crossing one another in passing from one part of the fabric to another.

In testimony of which invention I have hereunto set my hand.

WALTER GLEN CONNELL.

Witnesses:

ERNEST HOWARD HUNTER,  
H. L. MOTHERWELL.