

(No Model.)

A. D. EMERY.  
TWO PLY WOVEN FIGURED FABRIC.

No. 415,147.

Patented Nov. 12, 1889.

Fig. 1.

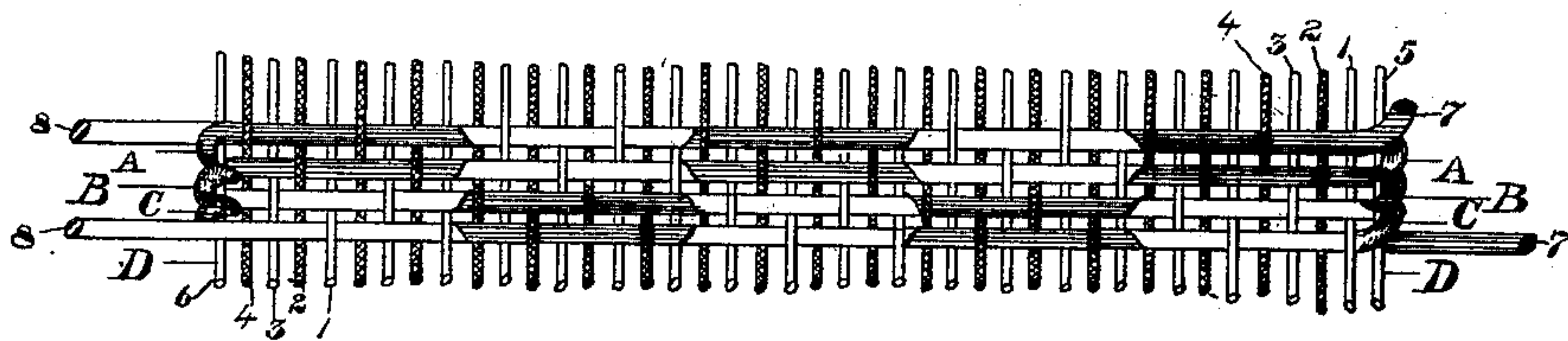


Fig. 6.

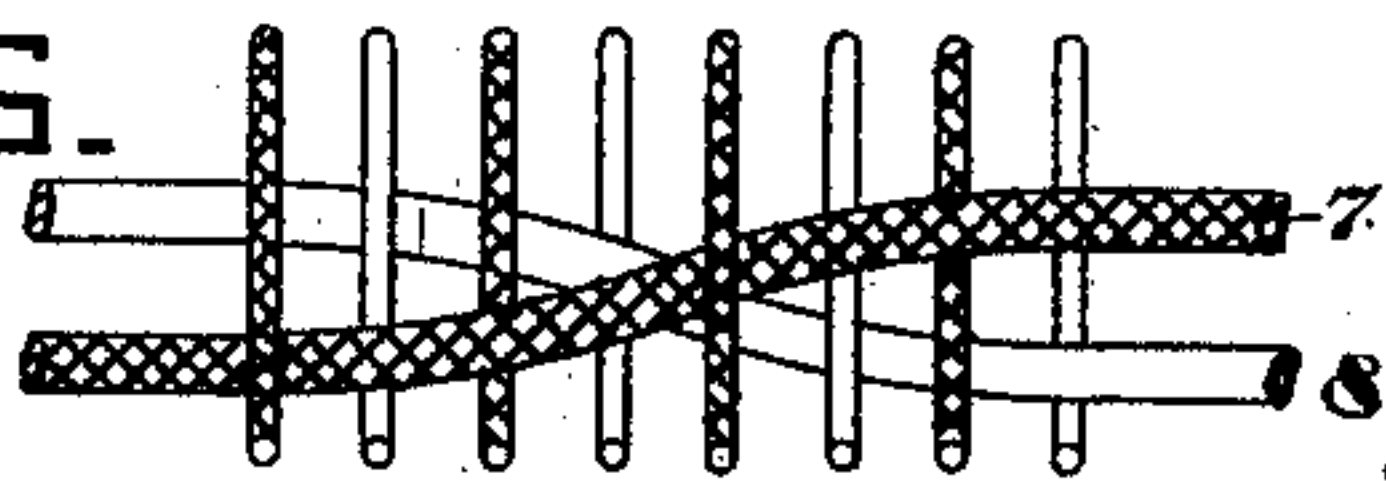


Fig. 2.

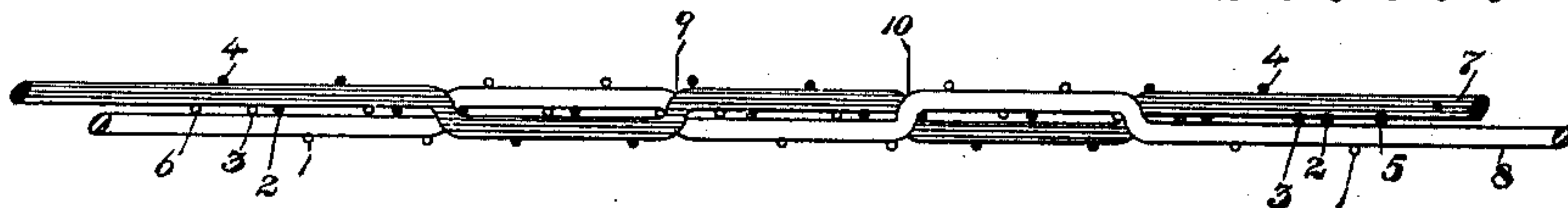


Fig. 3.

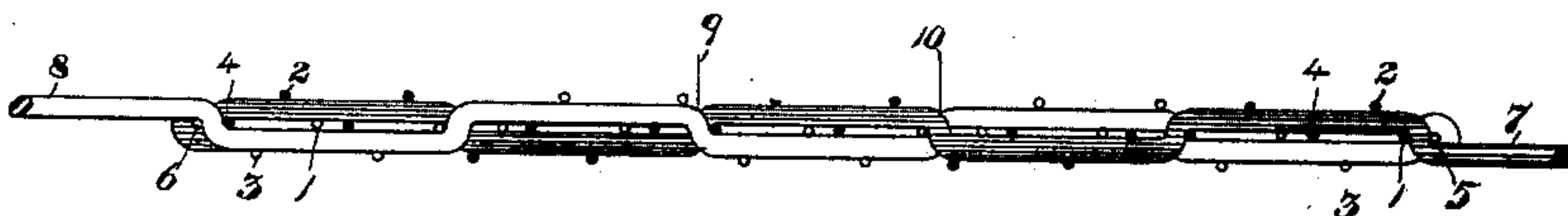


Fig. 4.

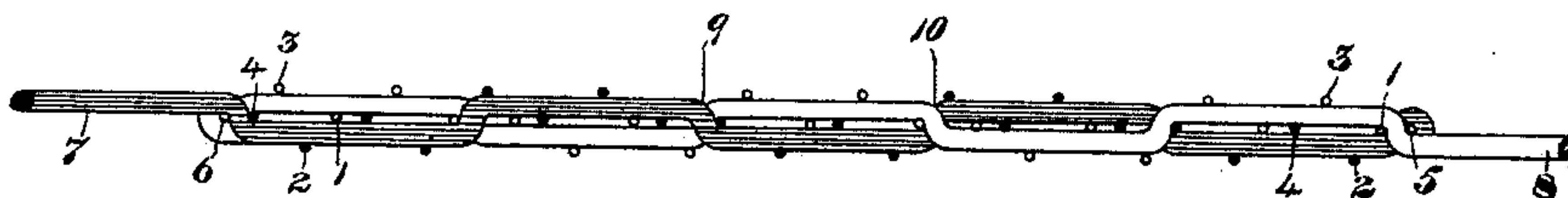
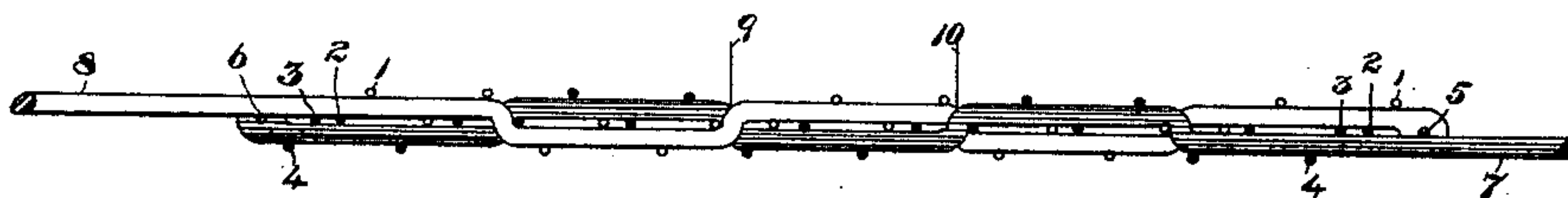


Fig. 5.



Witnesses.

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# UNITED STATES PATENT OFFICE.

ABRAM D. EMERY, OF TAUNTON, MASSACHUSETTS.

## TWO-PLY WOVEN FIGURED FABRIC.

SPECIFICATION forming part of Letters Patent No. 415,147, dated November 12, 1889.

Application filed May 31, 1889. Serial No. 312,825. (No model.)

*To all whom it may concern:*

Be it known that I, ABRAM D. EMERY, a citizen of the United States, residing at Taunton, in the county of Bristol and State of Massachusetts, have invented certain new and useful Improvements in Two-Ply Woven Figured Fabrics, of which the following is a full description.

My invention relates to two-ply figured woven fabrics in which each ply is composed of a set of chain-threads and a weft-thread. The two plies may be of the same or different colors, the pattern being formed by bringing portions of one ply to the face, as required, the remainder or ground of the fabric being occupied by the other ply. On the back of the fabric the figure is of the same character, but of the opposite ply to that of the face. The ply which forms the figure of the face forms the ground of the back, and vice versa.

My invention relates more particularly to the relative positions of the weft-threads as they cross each other at the center of the fabric; also, to their relative positions in different parts of the fabric as they pass from one side of the fabric to the other, and also to the manner in which the weft-threads pass the selvage chain-threads, and other details which will be more particularly described hereinafter, and pointed out in the claims.

In the accompanying drawings, forming part of this specification, Figure 1 is a plan view of the fabric with the threads separated and enlarged to show the arrangement of the same. Fig. 2 is a vertical cross-section on the line A A, Fig. 1. Fig. 3 is a vertical cross-section on the line B B of Fig. 1. Fig. 4 is a vertical cross-section on the line C C of Fig. 1. Fig. 5 is a vertical cross-section on the line D D of Fig. 1. Fig. 6 is an enlarged plan view showing the relative positions of the threads between the points 9 and 10 before being beaten up.

For the purpose of facilitating the description one of the weft-threads (designated by the numeral 7) is shown as shaded in all the drawings. The chain-threads 2 and 4, which are uniformly over and under the weft-thread 7 throughout the figure, are also shown as shaded, and form what I will designate as the "figure-ply." The other weft-thread (des-

ignated by the numeral 8) is shown throughout the drawings as plain in color. The chain-threads 1 and 3, which are uniformly over and under the weft-thread 8 throughout the fabric, form the ground-ply on the face of the fabric. The threads designated as 5 and 6 are selvage chain-threads, over and under which the weft-threads 7 and 8 pass to form the selvages. Considering the relative positions of the weft-threads 7 and 8 in their passage from the face of the fabric to the back and back to the face, as required by the pattern, it will be seen that one weft-thread is in front of the other weft-thread between the points 10 and the selvage on that side of the fabric, while the position of the weft-threads is reversed on the other side of the fabric. It will furthermore be observed that the weft-thread which is passing from the center to the selvage edge is always in front of the weft-thread which is passing from the selvage edge toward the center in a given half of the fabric. These principles of formation are illustrated in detail in Figs. 2, 3, 4, and 5. Thus in Fig. 2 it will be seen that the ground weft-thread 8 is in front of the figure weft-thread 7 between the point 10 and the selvage chain-thread 5 as it is passing from the center toward the selvage, while the shaded weft-thread 7 is in front of plain weft-thread 8 between the point 9 and the selvage chain-thread 6 on the left for the same reason. In Fig. 3 the shaded weft-thread 7 is in front of the plain weft-thread 8 between the point 10 and the selvage chain-thread 5 on the right, and the plain thread 8 is in front of shaded thread 7 between the point 9 and the selvage chain-thread 6 on the left. In Fig. 4 plain weft-thread 8 is in front of shaded weft-thread 7 between the point 10 and chain-thread 5 on the right, and shaded thread 7 is in front of the plain thread 8 between the point 9 and the chain-thread 6 on the left. In Fig. 5 the shaded thread 7 is in front of the plain thread 8 between the point 10 and the chain-thread 5 on the right, and plain thread 8 is in front of shaded thread 7 between the point 9 and chain-thread 6 on the left. It will thus be seen that a weft-thread which is passing from the center of a fabric to the selvage edge is in



front of the other in its passage from the selvage edge to the center. The weft-threads traverse the fabric from selvage to center, then from center to selvage after  
 5 having crossed each other between the points 9 and 10, within which space the center of the fabric is located, and as the one that is passing from the center to the selvage lies in front of the other in passing from one side of  
 10 the fabric to the other, as described, it will follow that in one half of each pick one weft-thread will be in front, while in the opposite half the other weft-thread will be in front in the passage of the threads from face to back,  
 15 and vice versa.

Referring now to Fig. 6, illustrating the formation of the fabric between the points 9 and 10, it will be observed that the weft-threads 7 and 8 cross each other, one over and  
 20 one under throughout this portion of the fabric, which always comprehends the center of the fabric. It will be understood, of course, that the weft-threads in exchanging positions in the fabric from face to back and back to  
 25 face necessarily pass one in front and one in the rear of the other, the particular formation of the fabric in this regard having been already explained. It follows, therefore, that  
 30 as one weft-thread uniformly passes in front of the other on one side of the fabric and in the rear of the other on the other side of the fabric at the completion of each double pick the two weft-threads will be crossed over  
 35 and under each other between the points 9 and 10, as between those points they pass, respectively, from front to rear of each other. This is fully shown in Fig. 6, and is apparent from the consideration of Figs. 2, 3, 4, and 5. Thus in Fig. 2 the shaded thread passes from  
 40 the rear of plain thread 5 at the point 10 to the front of the same at point 9, necessarily crossing over the plain thread between those points. The same result must follow from the construction shown in Fig. 3, except that  
 45 the shaded thread crosses over from the front at point 10 to the rear at point 9. In Fig. 4 the plain thread passes from the front at point 10 to the rear at point 9, and in Fig. 5 from the rear at point 10 to the front at point  
 50 9. The distance between the points 9 and 10 will of course vary with the requirements of the pattern, being longer or shorter, as the necessities of the pattern require the face-threads to appear for a longer or shorter  
 55 distance at that point in the fabric. The weft-threads, in other words, cross each other at or near the center of the fabric at each double pick or layer of weft from selvage to selvage.

60 With reference to the formation of the selvages it will be observed that the weft-threads at the completion of each double pick are always at the opposite selvage edges and necessarily alternate with each other in passing  
 65 a given selvage chain-thread. Thus a given weft-thread passing under a selvage chain-

thread at one pick passes over the same at the next corresponding pick, while the other weft-thread is likewise passing over and under the opposite selvage thread, thereby forming a tight selvage—a result which cannot be  
 70 produced where both weft-threads are carried straight across the fabric from selvage to selvage at each double pick, as in that case one weft-thread must pass over the other in  
 75 passing the selvage chain-thread.

In the drawings I have shown one selvage formed by a weft-thread passing under and then over, while the other weft-thread is shown as passing over and then under the  
 80 opposite selvage chain-thread; but this relation may be varied at will as desired. Thus both weft-threads may be made to pass either of the ways described, if so desired.

The fabric now described may be made by  
 85 the method of manufacture fully set forth in another application filed by me March 6, 1889, Serial No. 302,146, (Case 9,) and forming no part of the present invention.

What I claim is—

1. As a new article of manufacture, a two-  
 90 ply figured fabric composed of two sets of chain-threads and two weft-threads respectively interwoven with said chain-threads, said weft-threads passing in opposite directions  
 95 across the fabric and crossing each other, one over and one under at or near the center of the fabric.

2. As a new article of manufacture, a two-  
 100 ply figured fabric composed of two sets of chain-threads and two weft-threads respectively interwoven with said chain-threads, and in which one weft-thread lies back of the other in passing from one side of the fabric to the  
 105 other in one half of the fabric and lies in front of the other in the other half of the fabric.

3. As a new article of manufacture, a two-  
 110 ply figured fabric composed of two sets of chain-threads and two weft-threads respectively interwoven with said chain-threads, and in which the weft-thread that is passing from the center toward the selvage lies in front of the adjacent portion of the other weft-thread  
 115 passing from the selvage toward the center.

4. As a new article of manufacture, a two-  
 120 ply figured fabric composed of two sets of chain-threads and two weft-threads interwoven therewith, and in which said weft-threads respectively pass from the center of the fabric to opposite selvage edges in the  
 125 last half of one double pick and return to the center in the first half of the next double pick, thereby separately forming selvage edges.

5. As a new article of manufacture, a two-  
 130 ply figured fabric composed of two sets of chain-threads and two weft-threads interwoven therewith, and in which said weft-threads respectively pass from the center of the fabric to opposite selvage edges in the last  
 half of one double pick and return to the cen-

ter in the first half of the next double pick,  
and then pass from the center to opposite  
selvage edges from those just formed by them  
respectively, and then return to the center in  
5 the first half of the next pick, each weft-  
thread thereby separately forming first one  
selvage edge and then the other.

In testimony whereof I have hereunto set  
my hand this 29th day of May, A. D. 1889.

ABRAM D. EMERY.

Witnesses:

WM. T. DONNELLY,  
WALTER T. EMERY.