No. 622,237. Patented Apr. 4, 1899.

J. E. KERR.

WOVEN FABRIC.

(Application filed July 6, 1897.)

(Specimens.)

Fig. 1.

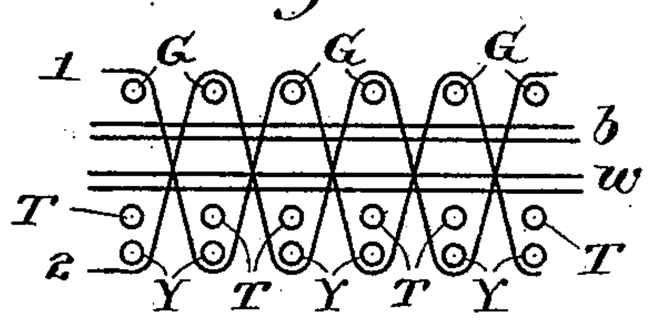


Fig. 2.

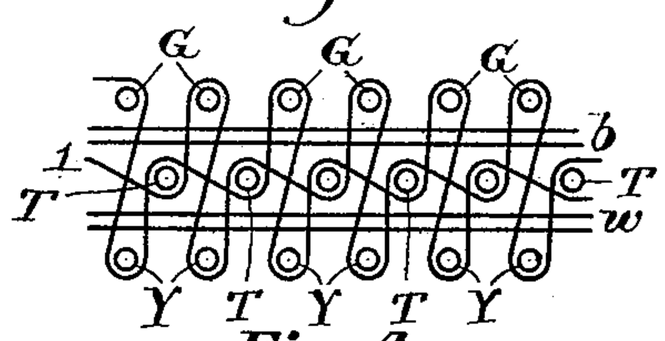


Fig. 3.

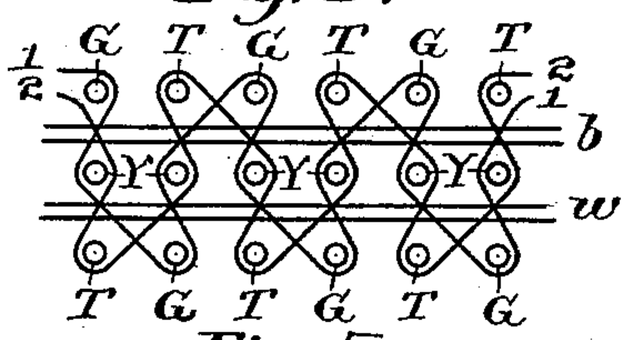


Fig. 4.

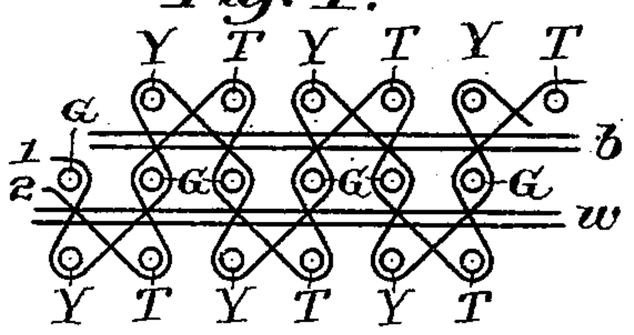


Fig. 5.

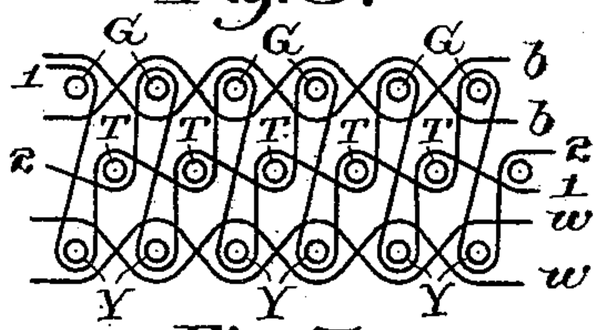


Fig. 6.

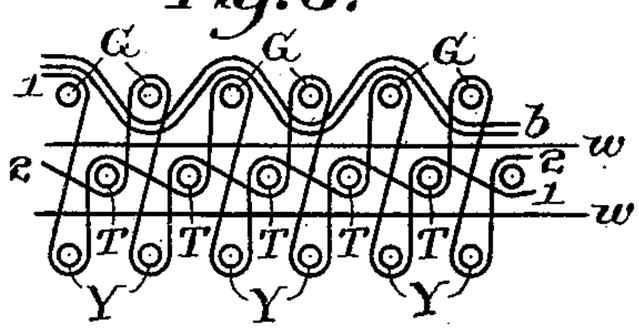


Fig. 7.

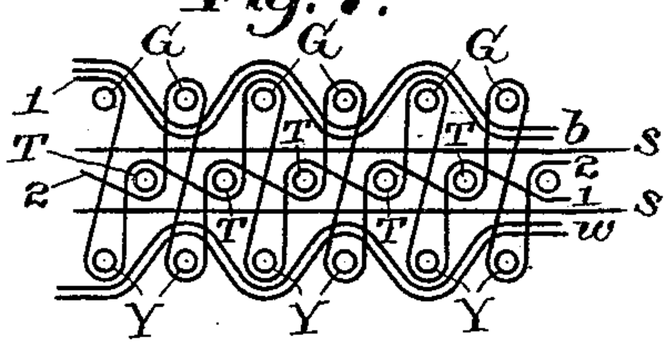


Fig. 8.

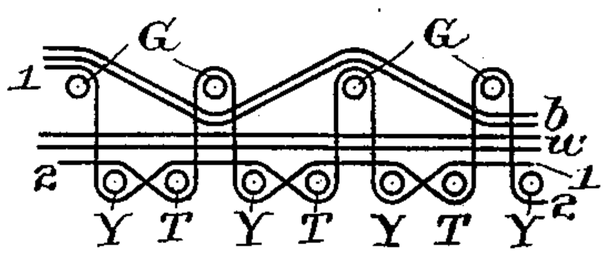


Fig. 9.

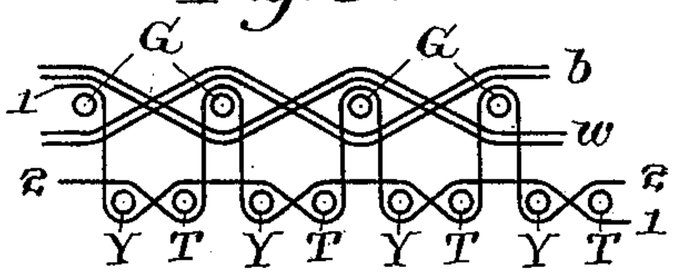


Fig. 10.

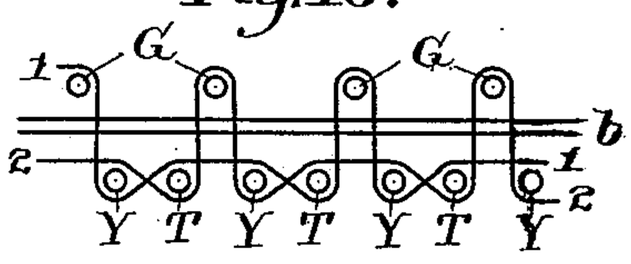


Fig. 11.

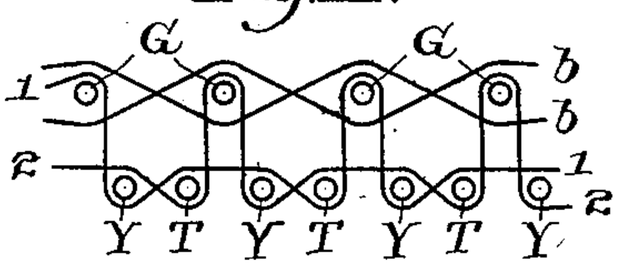


Fig. 12.

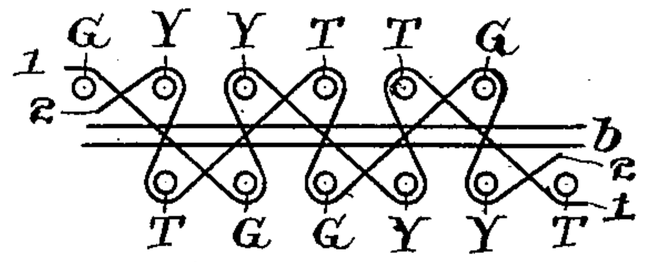
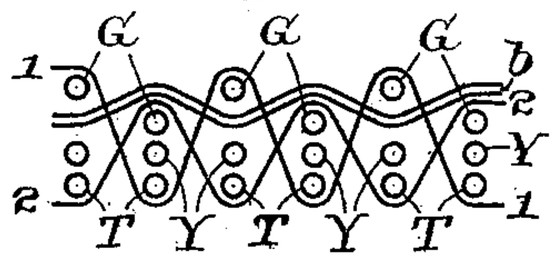


Fig. 13.



Witnesses.

Henry S. Callaway

L. L. Snyder

Inventor.

James E. Kerr

by John Dolman

Attorney.

UNITED STATES PATENT OFFICE.

JAMES E. KERR, OF PHILADELPHIA, PENNSYLVANIA.

WOVEN FABRIC.

SPECIFICATION forming part of Letters Patent No. 622,237, dated April 4, 1899.

Application filed July 6, 1897. Serial No. 643,511. (Specimens.)

To all whom it may concern:

Be it known that I, JAMES E. KERR, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a new and useful Improvement in Woven Fabrics, of which the following is a specification.

My invention is applicable to upholstery fabrics, carpets, and, in short, any figured fabric having two or more figuring weft-threads in a set and a binding-warp and one or more figuring-warps.

In producing my fabric I work the binding-warp in two heddles, each heddle operating alternate threads of the warp and working up and down alternately at every pick of the loom. This changing of the heddles at every pick of the loom produces the characteristic feature of my invention, the result of this novel method of operation being that the binding-warp in combination with the weft, which is thrown pick and pick, produces what may be termed a "plain" or "tabby" weave, with the several colors of weft disposed in regular rotation, and this plain cloth is so bent and arranged by the figuring-warp that only the required color of the weft may show on the face or back at a given point to produce any pattern or design desired, yet in a diagrammatic longitudinal section of the fabric the plain cloth formed by the weft and binding-warp may be discovered winding back and forth through the fabric in the predetermined manner, as clearly shown in all the figures of the drawings, (except Figures 1 and 13, which show the old method of weaving,) but more plainly, perhaps, in Fig. 3. In other words, the changing of the heddles at every pick of the loom causes each pick or weft-thread to have at every point a binding warp-thread passing over it and another passing under it, and is thus situated in a separate and distinct shed by itself, by which it may be firmly held in any part of the fabric desired. Although I prefer thus to work my binding-warp in heddles, it is of course obvious that the same results may be obtained by working the binding-warp from the jacquard-machine and stamping it on the cards. My invention is the new fabric, irrespective of how it may be produced. This plain cloth, sometimes called "tabby," is old, and I do not claim it. When the weft-threads all appear side by side on the face of the cloth (except where crossed by the warp) and each adds to the length of cloth woven, they are not in sets at all, unless one can be considered a set. What I mean by two or more in a set is two or more to each line of the design or to each weft-line of the cloth, only one showing on the face.

In producing my improved fabric I use any required number of shuttles or weft-threads, which are thrown pick and pick or in regular rotation, a binding-warp in two heddles, as described, and one or more, preferably two, figuring-warps, which are worked from the jacquard-machine.

In the drawings forming part of this specification I have illustrated diagrammatically longitudinal sections of a fabric made in this manner, having three shuttles or weft-threads and two figuring-warps similar to the class known as "upholstery" goods or tapestries, (except Figs. 1 and 13, which show the old method of making a similar three-shuttle tapestry, in which the binding-warp in the heddles changes only at every third pick or according to the number of shuttles used, and Fig. 7, which has three figuring-warps.) Each of these figures illustrates only a short section of the fabric, embracing but one configuration or color effect, and not a continuous fabric, showing the changes from one color to another to form a pattern. They must be combined or joined together in an actual fabric in the manner well known to weavers, which has nothing to do with my invention, which relates solely to the manner of disposing the binding-warp. No claim is made of any particular configuration or arrangement of the figuring-warp.

All the figures except Figs. 1 and 13 illustrate the various arrangements of warp and weft threads required to give the different color effects needed to produce any pattern desired.

In all the figures the weft-threads are supposed, for illustration, to be green, yellow, and turquoise and are marked G, Y, and T, respectively. The figuring-warps are supposed to be white, black, and striped and are marked

w, *b*, and *s*, respectively, and of the binding-warp that part in one heddle is marked 1 and that in the other is marked 2.

Fig. 1 shows the arrangement of threads diagrammatically in a longitudinal section of an old-style three-shuttle tapestry, in which the binding-warps 1 and 2, it will be seen, change only at every third pick. Consequently there are three weft-threads G, Y, and T shown in each shed of the binding-warp. Fig. 2 shows the arrangement of threads when different solid colors of weft are to appear on the face. Any solid color can be produced with exactly a similar configuration. Figs. 3 and 4 show the construction when shot-about effects or combination of two colors of weft are to appear as alternate lines on the face. I have shown two figures here to illustrate how different shot-about effects may be produced while retaining the same configuration. Fig. 5 shows what may be termed "solid" color of warp on the face, the solidity of these colors being of course somewhat modified by the presence of the necessary crossing weft-threads needed to bind the warp on the surface. Fig. 6 shows combinations of alternate lines of weft and figuring-warp, producing an effect similar to what with the weft alone would be called "shot-about." Fig. 7 also shows shot-about of weft and figuring-warp on both sides and has three figuring-warps. Figs. 6 and 7 also illustrate another novel feature of my improved fabric, hereinafter described. Fig. 8 shows the so-called "shot-about" of warp and weft when made with only two weft-planes, producing a cheaper fabric. Fig. 9 shows the so-called "shot-about" of the figuring-warp only as applied to a fabric with two weft-planes. Figs. 10, 11, and 12 show various arrangements of warp and weft to produce the different color effects in a fabric of two weft-planes and having only one figuring-warp. Fig. 13 illustrates the old way of producing shot-about effects of warp and weft.

It will be seen that in a fabric made according to my invention all the elements of color are absolutely at the command of the designer, who may place any color of weft or warp desired at any point of the fabric, either as solid color for one or any greater number of picks or as shot-about effects, and even three or more colors may appear in rotation side by side, as is sometimes made use of in small spots in particular designs. Each weft-thread being in a separate shed, the whole fabric must be bound together, without pockets at every point, no matter what the color effect may be on the face.

A thoroughly reversible fabric, alike or similar on each side, may be produced, firmly knit together, and solid and serviceable.

If desired, one of the figuring-warps may be a striped or shaded warp, as in Fig. 7—that is, of different colors in different parts transverse of the fabric, such as is used in Brussels carpet or such as is called a "striped" or "chintz" warp in upholstery or dress goods.

As shown in Figs. 8, 9, 10, and 11, two or more of the wefts in a set may be produced on one face of the cloth, which was impracticable in the old way of weaving, when all were together between the two binding-warps—that is, when the binding-warps changed only after the full complement of shuttles had been thrown—unless the two were crowded together in one shed, as described in Patent No. 411,040, issued September 17, 1889, to David B. Kerr.

In making the shot-about effects with alternate lines of weft and figuring-warp, as in Figs. 6 and 7, I have introduced another improvement by placing a weft-thread beneath each line of figuring-warp where it appears on the face and supporting the said weft-thread by putting half the other figuring-warp under it. This is shown in Fig. 6, where it will be seen the weft marked G is under the figuring-warp *b* when it appears on the face, and then half the warp *w* supports the weft G, the other half of the warp *w* being required to keep the necessary picks on the back. This arrangement, it will be readily seen, pushes the transverse line of figuring-warp *b* up even with the line of weft G instead of being below it, as in the old way of making shot-about effects with warp and weft, as shown in Fig. 13. Fig. 13 shows but one figuring-warp, but I am not aware that two figuring-warps have been used in this class of goods before. With only two figuring-warps this effect could be produced at the same place on only one face of the fabric, but to make it on both sides, as might be desired in a thoroughly reversible fabric, would require three figuring-warps, when it would appear as shown in Fig. 7.

In making my improved fabric I prefer to have the figuring-warp flat—that is, each thread instead of being of a single round strand to be of two or more untwisted strands side by side, which gives greater covering power, like a ribbon or tape, as is well known to weavers—and I also prefer to work my figuring-warps in pairs with a binding-warp thread between the components of each pair, as described in Patent No. 353,790, issued December 7, 1886, to David B. Kerr. The binding-warp may be a full binder or a half-binder, as desired.

I find it advantageous in choosing colors for weft to select those of medium intensity of color or shade. Then by using either the white or the black figuring-warp to cross them I can produce the effect of the same colors either light or dark. Of course considerable modification of the fabric is produced, as is well known, by the relative tension of the different warps. Thus if the binding-warp is tight and the figuring-warps comparatively loose the fabric stretches out in length and fewer picks are required in a given length; but if

the binding-warp is relatively loose and the figuring-warp tight the take-up may be regulated to make the picks beat up closer together, producing a more expensive but superior cloth.

Having as above fully described my invention and the best method known to me of producing the same, what I claim, and desire to secure by Letters Patent, is—

1. A figured woven fabric, having two or more colored weft-threads in a set, one or more figuring-warps and a binding-warp, in which fabric each weft-thread is inclosed in a shed by itself, formed of the binding-warp, irrespective of the figuring-warp.

2. A woven figured fabric, composed of two or more colored wefts to a set, one or more figuring-warps, and a binding-warp, in which the binding-warp forms a plain weave with the colored weft irrespective of the figuring-warp.

3. A figured woven fabric, having two or more colored weft-threads in a set, two or more figuring-warps and a binding-warp; in which fabric, at those portions where the pattern is produced by a "shot-about" effect of alternate transverse lines of figuring-warp and weft, each transverse line of figuring-warp on the face having a pick of weft under it, holding it up to the general level of the face, and a warp thread or threads under said pick of weft to support it.

JAMES E. KERR.

Witnesses:
JOHN DOLMAN,
HENRY S. CALLAWAY.