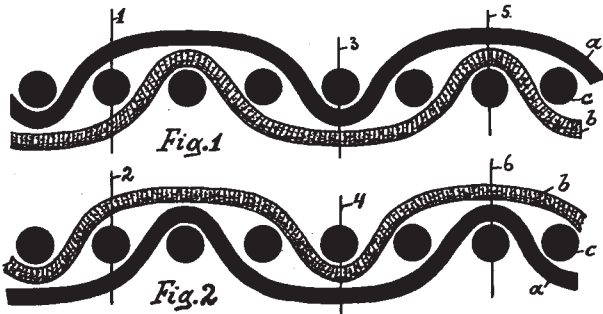


SPECIALTIES IN FABRIC-STRUCTURES.

Fabrics Constructed with One System Warp and Two System Filling, for Jacquard Designs;
With Explanation as to Procedure for Stamping Cards.

In connection with fabrics constructed until now with one system of warp and two systems of filling, whether made for the purpose of heavy-weights, or to produce figured designs impossible to be obtained by single cloth structures, the two systems of filling used, are made to cover themselves in the fabric, *i. e.*, one system of the filling rests above the other.



When dealing with fabrics, which in their process of finishing are either giggered or napped, like Bed Blankets and Bath Robes, it is desired that the effect of either system of filling is brought up to best advantage in the finished cloth, what can only be accomplished provided we arrange the interlacing of the filling at a place, where said point of interlacing is covered, in the fabric, by the two joining floating picks of the mate system. Figs. 1 and 2 explain the subject, *i. e.*, how this interlacing is to be arranged, by means of two sectional cuts through the warp threads of the fabric; *a*, dark pick, *b*, light pick, *c*, warp threads.

When planning the design for these fabrics, consider each vertical row (or line) of squares, on your point paper as representing one warp thread, and every horizontal row (or line) of squares as representing two picks (each pick of a different color, for example, one pick dark and one pick light), the latter two picks, in the fabric, covering themselves. This will indicate to us the necessity of using a collection of different colors, when painting the design for these fabrics, using for every different arrangement of warp and filling, as required for producing different effects in the fabric, a different placing of said colors on the point paper (see section of the fabric, Figs. 1 and 2, and where six different positions of one warp thread and its mate two picks are shown, indicated respectively by numerals of reference—1, 2, 3, 4, 5 and 6).

When analyzing such fabric structures, cut a section through the fabric, having previously ascertained whether you have to cut the warp or the filling. It will be found advisable to always cut the warp threads, as illustrated in Figs. 1 and 2, and where circles (*c*) indicate the sections of the warp threads: black threads (*a*) and shaded threads (*b*) indicate the two systems of filling.

Fig. 1 shows us a section of such a fabric in which

the dark pick rests on the face of the fabric and the light pick on the back; this arrangement is reversed in connection with

Fig. 2, where the light pick rests on the face, the dark pick producing the back of the cloth.

Examining our two diagrams more in detail, you will notice that on all places where the back pick rests above the warp, *i. e.*, interlaces with the latter, said place of interlacing is covered by the face pick. In the same way is the interlacing of the face pick covered by the back pick, on the back of the fabric, producing, in this way, a clear effect, of one color, on either side of the fabric.

These two sections illustrate, at the same time, other possible changes of the three systems of threads, for producing other color combinations, besides the two clear effects, referred to; *i. e.*, fabric sections Fig. 1 and Fig. 2 illustrate the following six combinations, indicated respectively by section lines 1, 2, 3, 4, 5 and 6 in our illustrations:

- (1) Dark filling on top, warp in centre, light filling on bottom.
- (2) Light filling on top, warp in centre, dark filling on bottom.
- (3) Warp on top, dark filling in centre, light filling on bottom.
- (4) Warp on top, light filling in centre, dark filling on bottom.
- (5) Dark filling on top, light filling in centre, warp on bottom.
- (6) Light filling on top, dark filling in centre, warp on bottom.

These different combinations are the result of the various interlacings of the filling with the warp, and with reference to the take up of the warp threads are of equal value.

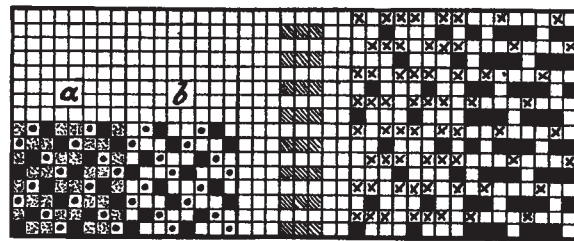


FIG 3.

When cutting the cards on the "Royle" Piano Machine, only the movement of the warp threads is taken into consideration, *i. e.*, whether a certain thread on a certain pick belongs in the upper or in the lower shed, and for which reason the various effects, previously referred to, may be painted on the point paper with different colors, after the principle of constructing these fabrics is clear to the designer, so he knows where to put a certain color to obtain a certain color combination in the finished fabric.

It will be advisable to first paint the complete design (Figure) on your point paper, in red, using afterwards two other colors, for example, blue and yellow, for indicating the interlacing.

The weaves used for interlacing these fabrics, if dealing with cotton or woollen blankets, or similar fabrics, are either the 4-harness broken twill or the 4-harness uneven sided regular twill. If dealing with a filling, composed of long fibres, for example, coarse counts of lower grades of spun silks, the five-leaf satin will then be of advantage to use.

After selecting the required ground weave, different rules for the placing of the interlacing weaves come under consideration, in order to permit a displacement, (pushing) of the straight position of the filling in the fabric (both ways, or one way only), when the latter, in the process of finishing, is subjected to gigging or napping; thus producing the new combination effects.

In connection with the broken twill and the satin weave, place both interlacing colors, blue and yellow, always to the right or left, side by side, of each other, in order to produce a permissible movement for the filling in both directions. If placing, in connection with these weaves, these points of interlacing below each other (yellow below blue) we then provide a different chance for the pushing of the filling, which will not produce a pleasing effect, after gigging or napping, in the fabric.

In order to explain the subject clearly to the reader, the accompanying seven diagrams are given, showing clearly how to proceed with the designing on the point paper, how to cut the cards, and finally illustrate, how warp and filling interlace with each other in the woven fabric, to produce the various effects (color combinations) aimed at.

In connection with the point paper designs, consider

gray squares to indicate red paint

empty squares to indicate white

full squares to indicate blue paint and

dot squares to indicate yellow paint, as the colors used by the designer.

In connection with the diagrams illustrating the interlacing of the warp with the filling in the fabric, the raising of the warp threads is indicated thus:

full squares for the dark picks

cross squares for the light picks; the dark picks being also specially indicated, at the left hand side of the diagrams, by means of a shaded effect.

POINTS ON CARD STAMPING: The operator, when cutting the cards from the design, has to observe the following plan:

Cut *two* cards from each line, *i. e.*, horizontal row of squares of your design, viz:

First card (dark pick): cut white and blue (omit red and yellow).

Second card (from the same line of your design): cut red and blue (omit white and yellow).

Now let us consider diagram Fig. 3, in connection with explanations thus far given, and where the left hand portion of the diagram indicates respectively, by *a* and *b*, the execution of two effects, Ground and Figure on point paper, for 16 warp threads and 32 picks, respectively, in the fabric. At the right hand side of the diagram, the interlacing of the fabric structure, according to effect *a* and *b*, is given, show-

ing, that both systems of filling, will cover themselves on both sides of the fabric, *i. e.*, the point of interlacing of any dark picks is always covered by the floats of the preceding, and successively following, light picks, and vice versa. This arrangement is known as a permissible displacement both ways. The 4-harness broken twill has been used for the interlacing.

Diagram Fig. 4 shows the 4-harness uneven sided-regular twill used for interlacing. Let us consider the dark pick used in two different dark colors (for example, green and red), the light pick to be of one

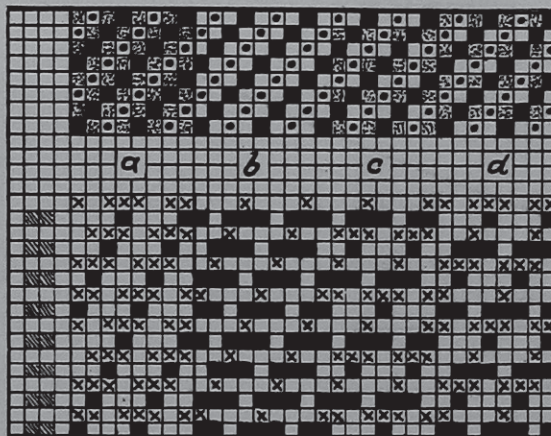


FIG. 4.

color, and when, on account of the different placing near each other of the light, green and red picks, we obtain four different color effects in the fabric. We have, according to design executed on point paper:

- a. Green and red picks for face.
- b. Light pick (throughout) on face.
- c. One pick green to alternate with one pick light on face.
- d. One pick light to alternate with one pick red on face.

Consider that the rotation of entering the filling is:

- 1 pick green
- 1 pick light
- 1 pick red
- 1 pick light

4 picks in repeat of filling arrangement.

In this way we obtain:

- a. Uniform *dark* effect.
- b. Uniform *light* effect.
- c. By mixing green and light picks, after gigging or napping of the cloth, a *light-green* effect, and in connection with
- d. By mixing of light and red picks, a *light-red* effect.

In planning the design, effects *c* and *d* must be designed so that where *green-light* has to show, that the horizontal lines 1, 3, 5, 7, etc., are painted red (see *gray* type); in the same way horizontal lines 2, 4, 5, 8, etc., and where *light-red* has to show (see *gray* type), are painted red.

In giving this explanation, we considered, that ground, on the face of the fabric, is to be light and figures colored. Provided ground, on the face of the

fabric, is to be dark and the figures to be kept light, the same arrangement, with reference to designing, and card stamping, is to be used, the only difference required being the changing of shuttles, *i. e.*, changing the colors of the filling with reference to starting to pick. Fabric sections Figs. 1 and 2, correspond to effect *a* and *b* of this diagram.

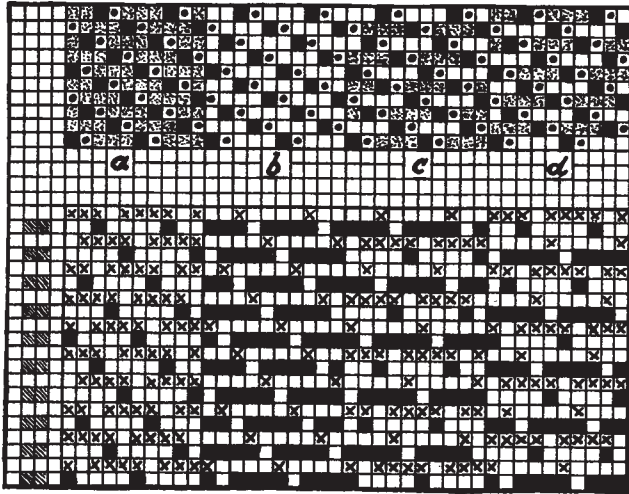


FIG. 5.

As previously referred to, the ground weave used is the 4-harness twill. The colors, for indicating the tying of the structures in the design, are in this instance not placed side by side, as was the case with the 4-harness broken twill in the previous example, the same being in this instance placed in the centre of the twill float of the mate twill.

Provided it is desired that the figures appear in the fabric in sharp, contrasting outlines, in that case do not bind the first and last warp thread of either

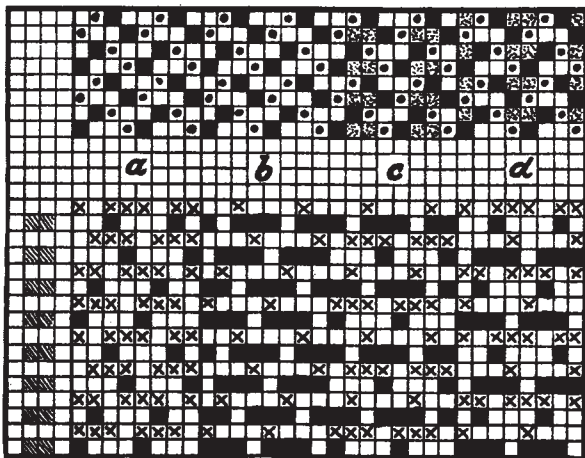


FIG. 6.

figure or ground; in the filling, however, interlace closely to the figure.

Diagram Fig. 5 shows us the 5-leaf satin, used as ground weave. The colors indicating the tying-off (*full* squares = blue paint, *dot* squares = yellow paint) are placed side by side on the point paper design, in all four effects, *a*, *b*, *c*, *d*, respectively. Below this point paper design, as executed for the card stamping, is given the analysis of the interlacing of the warp and filling in the cloth, *full* type indicating

dark picks, *cross* type, light picks, each dark pick being also indicated at the left hand side of the diagram, by means of *shaded* type.

Provided we do not care to use two binder colors in the design, and what means time to the designer, with consequent expense to the mill, we may observe the procedure illustrated in connection with diagram Fig. 7, and where the figure part of the design (as shown on the left hand side of the diagram) as executed generally in red paint (see *gray* type) by the designer, has its weave painted-in, with white paint; the white ground, in turn, is then treated in the same way, with reference to its weave, with red paint.

The cutting of the cards in this instance, is done as follows:

For every line (row of horizontal squares) on the point paper, cut *two* cards.

First card, dark pick: take white, miss red.

Second card, light pick: take red, miss white.

With reference to the plan of interlacing warp and filling in the fabric, as shown at the right hand side of the diagram, in *full* type for dark picks, and *cross* type for light picks, it will be seen, that in connection with both effects no two sided movement, *i. e.*, displacement, of the filling, but only a one sided movement (with reference to the points of interlacing of the warp with the filling) is possible for the latter. On account of this, the fabric, after gigging or napping, will not present the nice, full, hairy covering to the face, characteristic of fabrics in which the points of interlacing are so arranged as to permit a displacement of the filling, both ways.

In connection with diagram Fig. 8, four color effects are shown, produced with a single binder weave. In this instance, we use blue paint (see *full* squares) in place of white paint as used in the preceding example, since blue paint will adhere better to the point paper than white paint, the latter being apt to peel off, whereas blue paint will adhere during the life of the design. On account of using blue paint, the reader will, in this instance, have to consider the same as white, *i. e.*, it takes the place of the white paint referred to in the preceding example. The cutting of the cards, from the design, will then be, two cards for each line:

First card, dark pick: take white and blue, miss red.

Second card, light pick: take red, miss white and blue.

In connection with the diagram illustrating the interlacing of the threads in the fabric, and as is given below the point paper design, it will be seen, that effects *a* and *b* refer to possible movements, *i. e.*, displacements of the filling being possible to one side only, whereas effects *c* and *d* permit no movement either way of the filling.

Comparing effects *a* and *b* with effects *c* and *d*, will show us that the latter two effects interlace hard, resulting in a tighter weaving on the loom, compared to effects *a* and *b*, for which reason, on account of this consequent uneven take-up, poor weaving would result on the loom. At the same time, these

two kinds of interlacings would not result in the same finish, for the reason that sections of the fabric interlaced with effects *c* and *d* will not permit the same gigning, compared to sections of the fabric interlaced with effects *a* and *b*. For this reason, plan observed

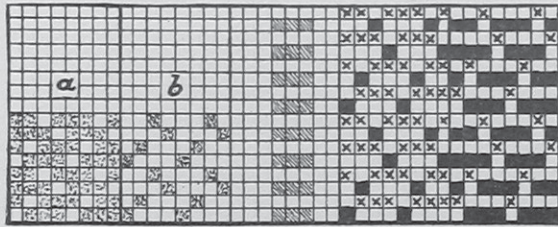


FIG. 7.

for interlacing warp and filling according to diagram thus explained, cannot be considered as practical. To overcome this trouble, change the arrangement of filling from 1 pick dark 1 pick light, to 2 picks dark to alternate with 2 picks light, *i. e.*, the plan shown in the lower diagram. The Jacquard cards in this case have to be laced thus: 1, 2, 1^a, 2^a. In this instance, we obtain, in all four color effects shown, a

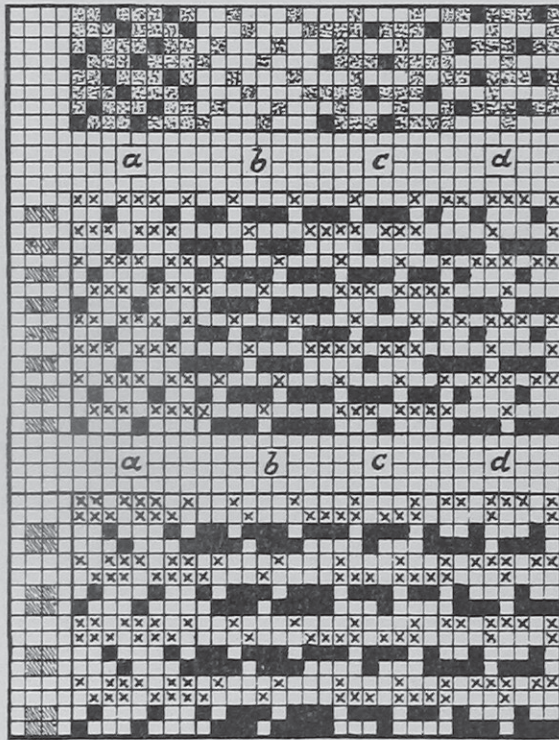


FIG. 8.

one sided permissible movement, *i. e.*, displacement of the filling (to one side, not both sides) having accomplished what we were after, *i. e.*, the uniform interlacing for all four effects, with the result of perfect work on the loom, as well as the gig or napper, *i. e.*, finishing room. By the arrangement of lacing Jacquard cards, as quoted, we save the designer the trouble of painting the two interlacing weaves, as was necessary in connection with examples Figs. 3, 4, 5 and 6.

The Manufacture of Artificial Silk from Cellulose by Improved Apparatus.

The manufacture of artificial silk, due to its increasing demand, is a subject of general interest, more so, because of its limited manufacture in this country.

In the first place, in preparing the cellulose, which is the base of the artificial silk under consideration, it is customary to wash the same in an oxidizing bath, such as a solution of caustic soda or chlorine, which act upon the same in such a way as to render it more solvent in the cupro-ammonium, known commercially as Schweitzers solution.

By the use of the new method, much of the time, trouble and expense attached to this process, alone, is eliminated, besides, the results are superior to any produced heretofore by methods of treatment now in use.

The new procedure consists, primarily, in washing the cellulose one or more times in clear water, and later extracting the surplus water by means of pressure. The cellulose, being free of dirt and other external impurities, is now straightened out, preparatory to being acted upon by the Schweitzers solution.

In connection with this simplified process, an apparatus, suitable for economically handling the cellulose, is shown in detail in Fig. 1, and comprises a lower cylindrical section 1, in which is located the agitator 4, operating on the shaft 2; pulley 3 is fixed to this shaft.

The bottom plate of the cylinder 1 is so constructed that a depression or gutter 1^a is formed, in which a pipe 5, with appropriately spaced holes 6, is located; it being designed to convey the compressed air used in circulating the ammonium gases of the Schweitzers solution.

The upper section 7, which is designed to retain the cellulose, is provided with a feeding device, which consists of a shaft 10, upon which are secured the arms 8; the feeding motion and speed with which the cellulose is delivered to the lower cylinder are regulated by the crank 9.

The entire apparatus is air-tight, and in order that the superfluous ammonical gas may be absorbed, the exit pipe 11 is provided on the upper shell of the section 7.

In operation, the cellulose, still retaining some of the water from washing, is placed in section 7, upon the distributing paddles.

The lower section is filled with cupro-ammonium solution and the compressed air turned on in pipe 5.

The agitator 4 is then put in operation, causing the compressed air to pass through the solution, and travel upwards through the cellulose, in the form of ammonium gas, and out through the discharge pipe 11, in turn, saturating the cellulose with ammonium, rendering the same more solvent to the action of the cupro-ammonium or Schweitzers solution. This prevents the water in the moist cellulose, in the upper section, from precipitating the copper oxid from the cupro-ammonium solution when coming in contact with the same in the moist condition, which would have