

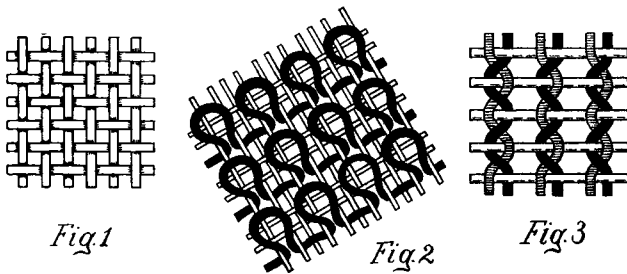
THE JOURNAL'S TEXTILE SCHOOL.

WOOL, COTTON AND SILK DESIGNING AND FABRIC STRUCTURE FOR HARNESS WORK.

Lesson 1.

The design in woven fabrics is produced by the weave, *i. e.*, the interlacing of warp and filling, either in connection with plain, or a fancy arrangement, or blending of colors. In the first case, the weave alone is the important factor with reference to design, whereas in the second instance, the effect produced by the combination or blending, or mixing of colors, (color effect) is, at least, of equal importance to that of the weave, in fact in many instances, far more.

We will for the present consider the weave of a fabric only, and take up the subject of color and fabric structure, in all its details, later on.



All woven fabrics can be divided into three main groups:

(a) **REGULAR FABRIC STRUCTURES, *i. e.***, fabrics in which one system of parallel threads is interlaced at right angles with a second system of parallel threads. For illustration see diagram Fig. 1.

(b) **PILE FABRICS, *i. e.***, fabrics produced in a similar manner as the previously mentioned system, the difference in this case being that certain threads of one or the other system of the threads are raised, either during weaving, or with some fabrics later on during finishing, so as to produce a pile structure—cut or uncut—on top of the body structure of the fabric. If the pile is produced during weaving, it refers to a warp pile fabric. For illustration, see diagram Fig. 2, in which the warp, as forming pile during weaving, is shown in full black, so as to contrast it from the other warp (body or ground warp) as well as the other system of threads—the filling, and which are shown in outline.

(c) **GAUZE OR LENO FABRICS, *i. e.***, fabrics in which one of the two systems of threads, as characteristic to any fabric structure—the warp in this instance—in addition to interlacing with the other system of threads, are twisted with threads of its own system. For illustration see diagram Fig. 3, in which the warp threads, as twisting against each other besides interlacing with the filling, are shown in full black and shaded, in contrast to the filling, as shown in outline.

Regular fabric structures. These are the fabric structures we will first consider, the same being again divided into the following sub-division:

(1) Single cloth, *i. e.*, fabrics constructed with one system of warp and one system of filling.

(2) Fabrics constructed with an extra warp, *i. e.*, using two systems of warp in connection with one system of filling.

(3) Fabrics constructed with an extra filling, *i. e.*, using one system of warp and two systems of filling.

(4) Double cloth, *i. e.*, fabrics constructed with two systems of warp and two systems of filling.

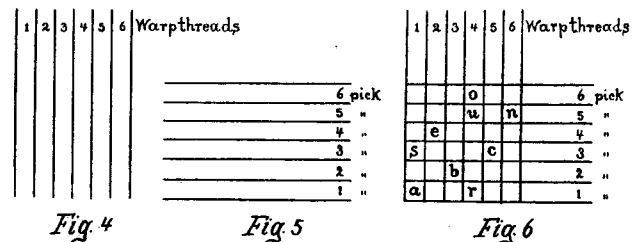
(5) Fabrics more than double cloth.

(6) Special fabric structures.

Before going into any detail with reference to weaves, we will first take up the subject of

Point Paper, or our squared designing paper, as used for representing the different weaves for textile fabrics, *i. e.*, take up its relation to the fabric structure for indicating the method of interlacing warp and filling. The object of designing on point paper is to reproduce, or to produce, on said paper, a plan of the fabric, respectively made, either from a woven structure, or to be made for a fabric to be woven with it.

There are two systems of threads which constitute a woven fabric, *viz.*: the warp and the filling, both systems crossing each other at right angles. The warp is the set of threads (consult Fig. 1) running lengthwise in the fabric, the filling crossing the latter at a right angle. In the point paper, each distance between two lines, whether they are shown by fine or heavy lines, or lines of two colors, if considered in a vertical direction, represents one warp thread, as clearly indicated in diagram Fig. 4 in connection with six warp threads. In the same way, each distance on said point paper, between two lines, considered in a horizontal direction, see Fig. 5, represents one filling thread, technically known as one pick.



Now let us unite these two series of threads, *i. e.*, diagrams Figs. 4 and 5 into one diagram, by drawing the lines of one series at right angles over the other series, as done in diagram Fig. 6; the union of these two series of lines resulting in $(6 \times 6 =) 36$ small squares. Since, as explained, the distance between each line, in either direction—whether considered horizontal or vertical—represents a thread, it will thus be seen that each square, as formed in diagram Fig. 6, indicates the place in the fabric, where a certain warp thread meets with a certain pick. Now, it is well known that in the same place where one body is, another cannot be, for which reason, the warp thread,

where it meets a pick, must then rest either above or below the filling in said place; the usual custom being to insert on the point paper in its respective place, a mark of some kind, either by pencil, pen, or, what is better, filling the square by means of a small camel's hair brush, with paint (Vermillion-water color), so as to thus indicate that in that particular spot the warp thread covers, *i. e.* rests above the filling. If the reverse should be required, (technically known as "considering sinkers in plan of weave, for warp up") such must be plainly stated in writing on said plan of weave.

Having thus shown how and for what purpose the squares are formed on the point paper, we will now consider diagram Fig. 6 more in detail, and for which reason we placed different letters of reference in the latter, quoting that:

Square *a* indicates the meeting of warp thread 1 and pick 1; square *b* indicates the meeting of warp thread 3 and pick 2; square *c* indicates the meeting of warp thread 5 and pick 3; square *e* indicates the meeting of warp thread 2 and pick 4; square *n* indicates the meeting of warp thread 6 and pick 5; square *o* indicates the meeting of warp thread 4 and pick 6, and if considering the letter of reference as a mark for said square, it then would mean that the respective warp thread is up and the respective filling down.

Through this exchanging of warp and filling, as visible on the face of the fabric, technically known as "Raisers" or "Sinkers" we thus form the interlacing of both systems of threads, known as the weave.

The usual custom for indicating warp up on the point paper, if using a pencil or pen for this purpose, is a multiplication sign (\times), a dash (/) or a circle (\circ), the multiplication sign being the most satisfactory character to use for this work; although as mentioned before, painting or filling up the square, by means of brush and paint is more satisfactory. How to proceed to do this quickly and systematically will be later on more particularly explained.

This now gives us the following *Rule*: Indications of any kind, in any square, inside the repeat of the weave upon the point paper, means "warp up" in its corresponding place in the fabric, whereas such squares as left empty, inside the repeat of the weave upon the point paper, means "filling up" in its corresponding positions in the fabric.

To explain subject more clearly to the student, Figs. 7 and 8 are given, and of which diagrams *A* in both illustrations shows one row of longitudinal squares, (considerably enlarged, if compared to our regular point paper) *i. e.*, one warp thread with its picks taken from a weave, *i. e.*, the point paper; diagrams marked *B* in both illustrations showing the respective interlacing of said two warp threads with its respective picks, and of which in both examples, 12 are used.

Examining, *i. e.*, reading off either diagram *A* or

B, in connection with Fig. 7, and beginning to read from the bottom, illustrates the warp threads alternately down and up six repeats of the affair ($6 \times 2 =$) or 12 picks being shown in either diagram.

Fig. 8 illustrates the design and working of a similar warp thread with the same number of picks in its repeat, the arrangement used in this case being 1 up and 2 down — four times repeated = 12 picks being shown in either diagram.

The object of the heavy square on point paper is only to serve as a unit of measurement, *i. e.*, to show readily and exactly, the size of a weave. The eye can readily grasp the meaning of this large square, and thus the repeat of a weave is most readily ascertained, whereas minus these heavy squares, frequent mistakes in counting the number of small squares used, would be the result.

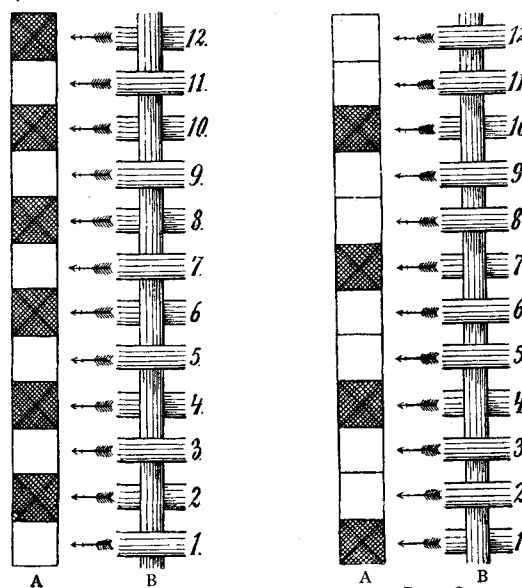
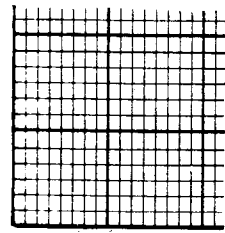


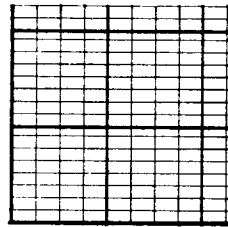
FIG. 7. FIG. 8.

For harness work, the usual kind of point paper used is 8×8 , and which in connection with some papers is ruled in two colors in place of light and heavy lines, as a rule green or blue being used for the light lines, and which are then overruled with red, every 8 squares warp and filling ways, said red lines taking the place of the heavy lines in the point paper, shown herewith, and referred to later on. This 8×8 paper is the only point paper in the market thus ruled in two colors and in connection with which, no painting is to be done, pencil or pen only being used by the designer for indicating the weave.

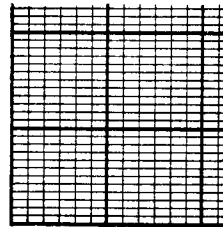
Heavy overruled papers like 10×10 or 12×12 can be similarly used by designers for harness work; however, 8×8 is the one preferred, since 8 is the most convenient multiple or fraction of a multiple of the bulk of our weaves for harness work - 4 - 8 - 10 - 12 - 16 - 20 and 24 being the most often met with repeats of weaves, and when then 4 means half of a heavy square, 8 one heavy square, 10 one heavy square plus two light squares, 12 one and one-half of a heavy square, 16 two heavy squares, etc.



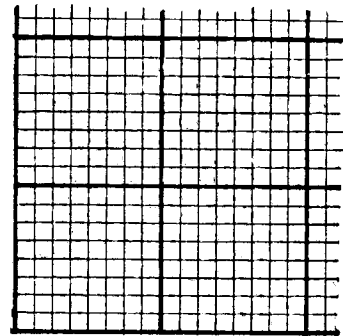
8x6



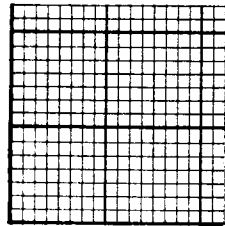
4x8



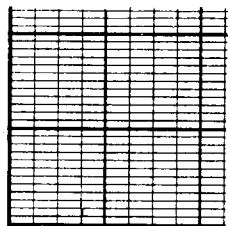
6x12



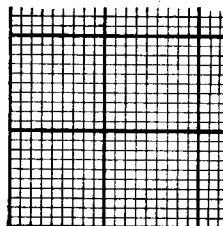
8x8



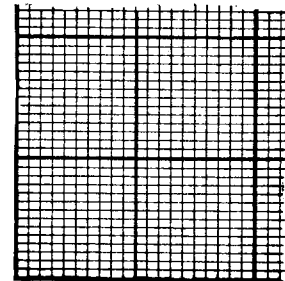
8x7



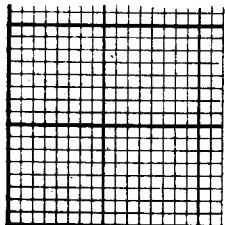
4x12



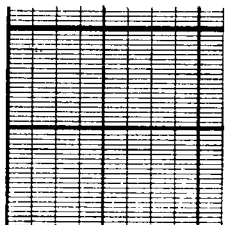
9x10



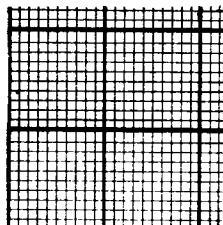
10x14



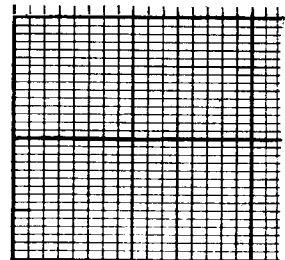
8x8



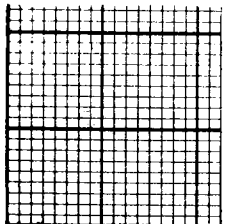
4x20



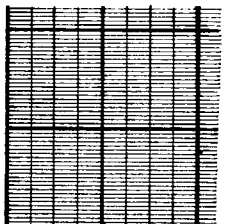
10x10



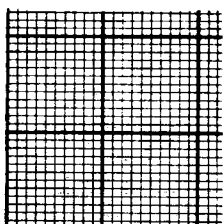
8x15



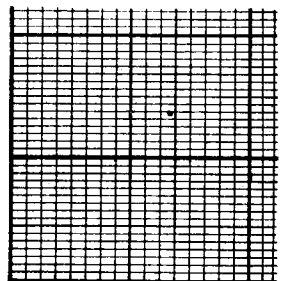
8x9



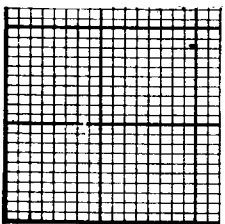
4x24



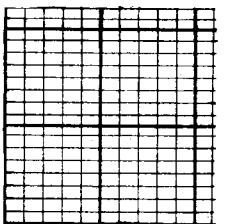
10x12



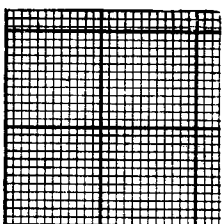
8x16



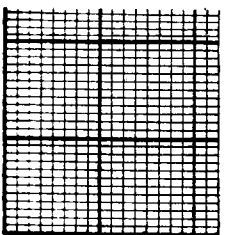
8x10



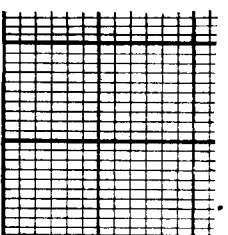
5x8



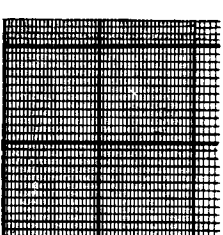
12x12



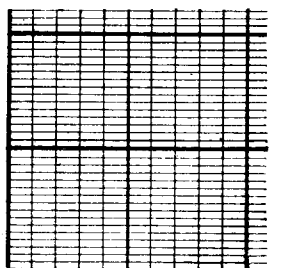
8x12



6x10



24x12



5x16

FIG. 9.

Plate Fig. 9 shows us a collection of some of the different kinds of point paper, the more advanced designer will come in contact with, each different specimen of a paper being correspondingly marked below it.

In mentioning a certain kind of point paper, the warp dimension is indicated first, and a design paper having eight rectangles vertical, with eight horizontal, is variously read and indicated as 8 by 8, 8×8 or $8/8$; a design paper having eight rectangles vertical, with ten horizontal, is read and indicated as 8 by 10, 8×10 or $8/10$. The size of the square may vary in each kind of paper, and must be selected according to the fabric. For example, there are two different styles of 8×8 point paper illustrated: one forming $\frac{1}{2}$ inch heavy squares and one forming $\frac{3}{4}$ inch heavy squares. These sizes may still be varied. The principle of these two kinds of point paper is identical, the size preferred being left to the pleasure of the designer. Certainly it will be understood by any student that in preparing a design or weave with a large number of threads for repeat, it will be advantageous to use a design paper containing the smallest sized rectangles practical to use.

With reference to these kinds of point paper shown, with the exception of the 8×8 , they refer more particularly either to more advanced harness work, or to Jacquard work, and have simply been given to make the subject on point paper complete for future instruction papers. The kind of point paper then to use, in connection with single cloth structures, depends upon the texture of the finished fabric, or upon the texture of the effect in connection with figured cloth other than single.

Selection of proper brush and color. We would advise the student to at once begin to paint his weaves, right from the start, so as to get familiar with it, since later on, in connection with more complicated weaves, as well as in studying lessons and getting up his original weaves from the latter, he has to paint these weaves anyway, in order to make satisfactory progress with his work.

With reference to the brush, select a common artist's imitation camel's hair brush (a number 3 for $\frac{1}{2}$ inch 8×8 point paper) costing about 8 cents, although if the student chooses, he may pay as high as 25 cents for a camel's hair brush, the 8 cent brush, however, with careful use, doing good work for months, in fact will last him up to a year. The brush to be used for painting designs on point paper, has then to be clipped to suit the width of the small squares, which it has to fill, one sweep of the hand of the designer filling one or any number of squares in succession in a vertical direction on the point paper. For trimming the brush, point it with your mouth, place it with your left hand on a smooth piece of wood and trim it with one cut, by means of a very

sharp knife held in your right hand. Never trim too much, *i. e.*, too deep into the brush, rather less, since you then can correct the proper size of cut by a second procedure. A pronounced difference in size of square, calls for a different number, as well as more or less trimming of the brush. A brush trimmed too much, can be used in connection with point paper, having larger squares.

With reference to paint, use Vermillion, water color, and which can be obtained, in most any artists' material store, in two styles, small porcelain cups at 12 cents, or large hexagon glass jars at 25 cents. Although this prepared water color—ready for use—is more convenient all around for use, at the same time provided you can not procure this color in your city or town, you may prepare your own paint by mixing vermilion, in powder form, and which you can buy in any paint store, with sufficient mucilage to have it not rub off after drying, adding at the same time sufficient water to permit it to be properly mixed. Mix it well—a few drops of alcohol will greatly assist the mixing, if added before the water.

Advantages of painting your weaves are: a more satisfactory representation of the weave, mistakes are quicker noticed, and finally, provided a mistake is made, it can be corrected by washing out the error with clear water, using for this a somewhat larger common artist's brush:—about a number 6, costing 10 cents—will be found the most satisfactory for it.

Provided the point paper does not take the paint freely, has become greasy, for one reason or the other, wipe the paper off with a damp sponge. Do not have your hand rest on that portion of the point paper you may have to paint on later, keep a piece of waste, or blotting paper between hand and point paper.

For the beginning, always paint out two or more repeats (warp and filling ways) of a weave under consideration, to be sure that the latter repeats properly.

Questions:

- (1) What is meant by "regular" fabric structures?
- (2) What is the purpose of point paper?
- (3) Explain *what*, letters of reference *r*, *s* and *u* in diagram Fig. 6, represent?
- (4) Why is point paper squared off with heavy lines?
- (5) Which kind of point paper is most commonly used for harness work, and why?

P. S. This lesson will be examined, corrected if necessary, and returned to the student with suitable comment, at a uniform rate of 25 cents per lesson, to partly cover cost of clerical work, time, postage, etc.

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