DESIGNING AND FABRIC STRUCTURE.

COMBINING BROKEN TWILLS AND BASKET WEAVES IN THE FORMATION OF NEW WEAVES.

This methqthod of combining broken twills with its mate basket v. weaves forms a most interesting study for the textile ile designer in constructing new weaves.

Most of th them will prove of practical value, since their foundatiation calls for our standard weaves, the 4 or 6-harnesiess even-sided twills, used in connection with their matiate basket weaves.

Provided w we use only small repeats of each foundation weave, thithe resulting new weaves will present well broken-up effeffects, since then both systems of weaves become well di distributed (mixed-up among each other) giving the eyieye no chance to distinguish where one weave stops ai and the other starts.

Using largirge repeats of each foundation weave will produce promominent figured effects, since then each foundation weweave will become distinctly visible.

To give a a clear understanding how to proceed to construct theseese weaves, diagrams 1 to 6 are given.

Fig. 1 showiows the plan for the new weave: Repeat 32 warp-threaeads and 32 picks.

4 warp-thrchreads and 4 picks are used for each effect; three effects ai are shown *viz.: white, shaded,* and regularly *squared-cd-off.*

The *white ite* effect is shown distributed all over the repeat (32 x 3 32) after the 8-leaf satin setting (4 ends in effect × 8, i8, repeat of satin, = 32).

The *shadeided* effect is shown distributed after the plain weave (+ (checker-board) setting.

The *squarcared-off* effect is shown similarly distributed (its matiate effect) after the plain weave setting. The *white* effeiffect in eight instances, in the repeat of the weave-plan, ta takes the place of said *squared-off* effect.

Fig. 2 showiows the same weave-plan (32 x 32) overruled in sectiortions of 4 threads, both warp and filling ways. Corresfresponding to Fig. 1, see *white* we inserted in its respectiv:tive 8 squares of 4 x 4 each, in Fig. 2, one repeat of the 4e 4-harness basket weave, see *full* type.

Fig. 3 shows a duplicate of Fig. 2, plus inserting the 4-harness even-sided twill, see *dot* type, running direction of the twill from left to right, in every effect (square of 4 x 4) shown *shaded* in Fig. 1. It will be noticed that two different starting points for said 4-harness twill are taken, *viz.:* all uneven rows of effects of 4 x 4, both warp and filling ways considered, show one arrangement of starting said twill, whereas every even row of effects of 4 x 4 shows the other arrangement of starting said twill. These two arrangements of starting the 4-harness twill in two different positions, on its checker-board plan is based upon the principles of designing broken twills, *i. e.,* to produce the clear cut effect between the two directions of twills where they meet. In the present example this would

refer to the construction of the 8 x 8 broken twill, broken warp and filling ways, 4 threads left to right twill effect to alternate with 4 threads right to left twill effect. (See Fig. 14, February, 1908, issue of the Journal.)
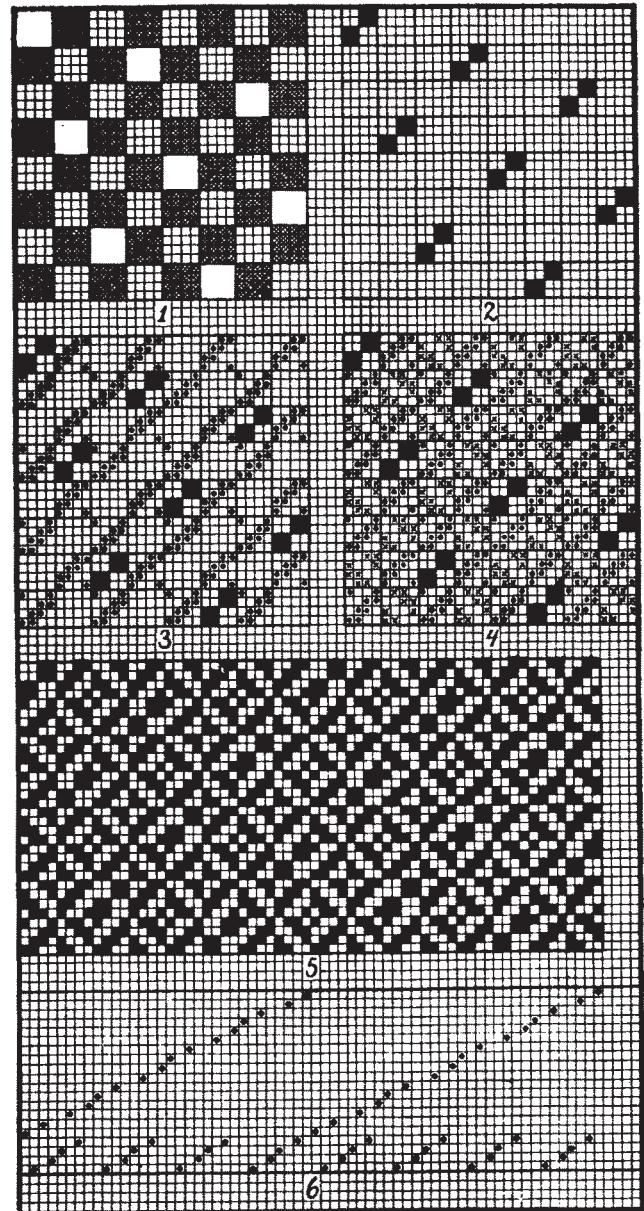

Fig. 4 shows a duplicate of Fig. 3, plus inserting the 4-harness even-sided twill, see *cross* type, running direction of the twill from right to left (or in the reverse direction from that previously done) in every effect (square of 4 x 4) shown *squared-off* in Fig. 1.

As mentioned before, effects filled in with the 4-harness twill whether *dot* type or *cross* type must form the regular broken twill, repeating on 8 x 8, as shown in the left hand lower corner of Fig. 4, by means of the
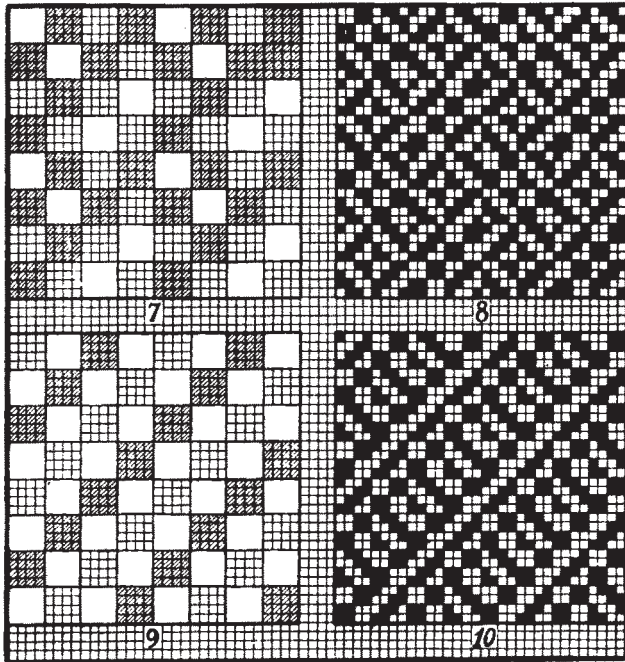
first 8 warp-threads and 8 picks, forming one complete repeat of said broken twill.

Fig. 5 shows us two repeats of weave Fig. 4, executed in one kind of type, in order to more clearly show the effect of the weave in the woven fabric.
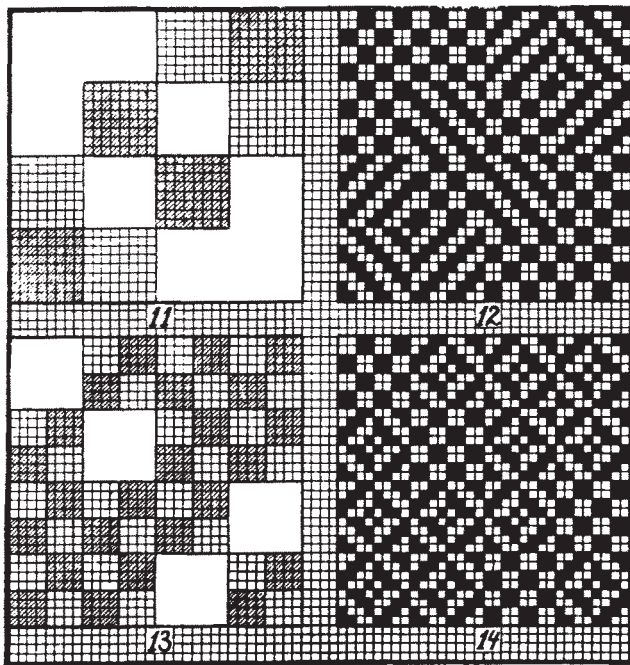

Fig. 6 shows the proper drawing-in draft for weave Fig. 5 as repeating on 32 warp-threads, brought down within compass of the loom, i. e., 20-harness fancy (section) draw. Two repeats of the draft, corresponding to the weave, are given.

Weave Fig. 5 presents a well broken-up effect, on account of the small number of warp-threads and picks (4 x 4) used for each effect. In the same manner we may use 6, 8, 10, 12 or more warp-threads and picks for each effect, increasing correspondingly the repeat of the weave, both warp and filling ways, without increasing the number of harnesses required for the fancy drawing-in draft. In this instance, however, we must remember that the more ends, warp and filling ways, we use for each effect, the less broken-up an effect the new weave will present in the woven fabric—the broken twill and the basket effects will become more prominent in the woven fabric—a feature which however, in many instances, may be desired. Using in this instance 8 x 8 for each effect will result in a weave repeating on 64 x 64; using 12 x 12 equals a weave repeating on 96 x 96 etc.; either repeat calling for 20-harness for their respective drawing-in draft.

Fig. 7 shows the plan and Fig. 8 the complete weave executed under the same conditions as explained in connection with Figs. 1 and 5 respectively. The basket weave in Fig. 8, or *white* effect in Fig. 7 is, in this instance, distributed after the 4-harness broken twill motive. The 4 changes in this motive, with 4 threads for each effect (4 x 4) equals 16 warp threads and 16 picks for repeat of weave Fig. 8. To more clearly show the effect of the weave in the fabric, 2 repeats each way are shown.

Figs. 9 and 10 show respectively another change in the plan of distributing the basket weave, using in this instance the plain weave (checker-board effect) motive for this purpose (see *white* squares in Fig. 9). Repeat of weave Fig. 10 is 16 warp-threads and 16 picks; two repeats each way being given.

Fig. 11 is the plan for weave Fig. 12.

White in plan to be basket in weave.

Shaded in plan to be twill from right to left in weave.

Squared-off in plan to be twill from left to right in weave.

Plan Fig. 11 shows 4 changes in either direction @ 8 threads, or repeat of weave (4 x 8 =) 32 warp-threads and 32 picks. One repeat of the weave is shown in Fig. 12; the same can be drawn on 12 or 16-harness respectively.

Fig. 13 is the plan for weave Fig. 14. The same indication in plan refer to the same weaves as used in the preceding example. Large basket effects, distributed after the 4-harness broken twill motive are shown on small broken twill effects. The broken twill motive calls for 4 changes @ 8 threads basket, both warp and filling ways, hence repeat of weave 4 x 8 = 32 warp-threads and 32 picks. One repeat of the weave is shown in Fig. 14, and which can be drawn on 10-harness if so desired; using 12 or 16-harnesses will result in better weaving.

Fig. 15 is the *motive* for weave Fig. 16. Three repeats each way are shown in the motive, two repeats each way in the weave.

Every square in the motive stands for 4 warp-threads and 4 picks in the weave.

Full type in the motive = basket in the weave.

Empty type in the motive = 4-harness twill, right to left.

Dot type in the motive = 4-harness twill, left to right.

Repeat of weave 32 warp-threads and 32 picks; lowest number of harnesses necessary for weaving is 8.
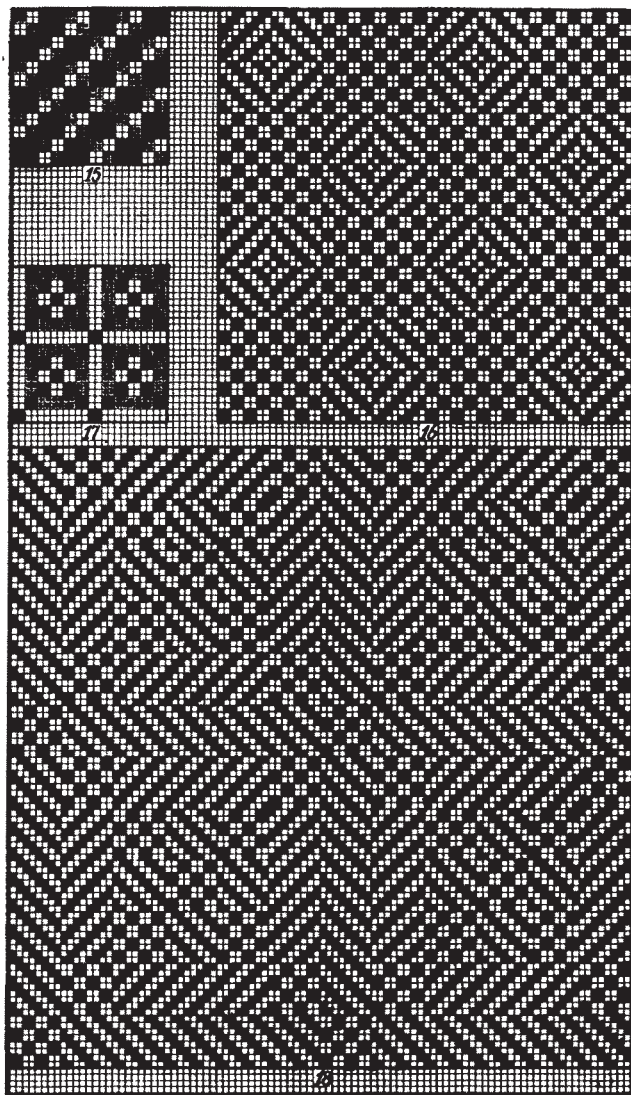

Fig. 17 is the motive for weave Fig. 18. Two repeats in motive as well as in weave are given.

The same as in the previously given example, every square in the motive stands for 4 warp-threads and 4 picks in the weave. Indications of type in motive also indicate weaves correspond to previously given example.

Repeat of weave 48 warp-threads and 48 picks; 12 or 16-harness fancy draw.

In the same manner as we used in our article the 4-harness twill with its mate 4-harness basket, the 6-harness twill and 6-harness basket combination can be used; the 4-harness weaves however will produce superior new combination weaves, with reference to perfect fabric structures.

INTERNATIONAL COUNTS OF YARNS.

The different systems of counts of yarn have evidently been created by the Spinners and Reelers for their own convenience, adapted to the special materials and thickness of yarn with which they are intended to deal. Very few of them are decimal. Little regard has been paid to the convenience of Manufacturers, particularly of those who produce goods where several classes of yarn are used in the same fabric. For facility of export to foreign countries, no consideration has been given at all.

The urgent need of the trade is a system of counts, which will embrace all classes of yarns, be convenient for the Spinner and Reeler, and also for the Manufacturer, and which will be understood in all countries. Count being the relationship of length to weight, it is obvious that such a system could not be attained unless there were one uniform system of weights and measures. The "Metric" system of weights and measures is so perfect, and has been adopted so widely, that it forms the most suitable basis for a uniform system of counts of yarns.

As the old systems of counts have some technical conveniences, they will no doubt in many cases for some time be retained.

Principles of the Various Counts.

INTERNATIONAL METRIC COUNT.

For all classes of yarn, as approved by the Paris Conference of 1900, Number 1 means that a length of 1 meter will weigh 1 gram; No. 100, that 100 meters will weigh 1 gram. etc.

For single yarns the Metric System requires no explanation.

For folded yarns the Congress of Paris decided that the number should indicate the completed thread, no matter of how many minor threads it may be formed, or what may be the counts of these different minor threads.

Local and Sectional Counts for Special Classes of Yarns.

WEIGHT CONSTANT—LENGTH VARIABLE.

American "Run"—Woolen Count.

The hank is 1,600 yards, and the number of such hanks in 1 lb. is the count of the yarn. In addition to using whole numbers, the run is divided into halves, quarters, and eighths, hence; 200 yards equal ⅛ run, etc.

American "Cut"—Woolen Count.

The hank is 300 yards, and the number of such hanks in 1 lb. is the count of the yarn.

American and English Cotton Count.

The hank is 840 yards, and the number of such hanks in 1 lb. is the count of the yarn.

2 ply 40's or 2/40's cotton means that two ends of single 40's are doubled, and equal in count to single 20's.

3 ply 60's or 3/60's cotton means that three ends of single 60's are doubled, and equal in count to single 20's.

American and English Worsted Count.

The hank is 560 yards, and the number of such hanks in 1 lb. is the count of the yarn.