CONSTRUCTION OF SKIP TWILLS.

Skip Twills are a system of weaves we frequently come in contact with; they are extensively used in the manufacture of Worsted Trouserings and Suitings, Cotton, Woolen and Worsted Dress Goods, as well as Silk Fabrics of every description. The combination of smaller units or groups, owing to the characteristic well broken-up effects they produce in the fabric, may be considered as granite effects.

Skip Twills have for their foundation our regular even-sided twills, using groups of the latter (*i. e.,* two or more ends of the foundation twill taken in rotation) and separating said groups either warp ways only, or warp and filling ways, by means of a clear break. Only even-sided twills can be used for the foundation weave since uneven-sided twills will not permit the formation of a clear break line between the groups of twills previously referred to.

Two kinds of even-sided twills are used for foundation weaves, *viz:* (*A*) such as balance and (*B*) such as do not balance. The first require the same number of harnesses (or less) in connection with a fancy (skip) draw as the foundation twill calls for in connection with a straight draw, whereas such skip twills as are obtained from foundation twills that do not balance will require more harnesses than its foundation twill calls for, in many instances calling for double the number of harnesses (the original and its mate) of the foundation twill.

(*A*) Using Balanced Foundation Twills.

The same can be again divided into (*a*) such as produce break lines *i. e.* skip, only warp ways, producing in turn a *stripe* effect in the fabric, and (*b*) such as break or skip, warp and filling ways, producing in turn a *check* effect in the fabric.

(*a*) Stripe Effects.

Rule: After selecting your foundation twill (one of your balanced even-sided twills) use 2, 3 or more warp-threads of said twill in rotation, forming in this way the first group of threads, after which arrange a complete break, and draft again a certain number of warp-threads taken in rotation from your foundation twill and thus produce group number 2, after which arrange again a complete break and draft the required number of warp-threads for group number 3. Continue to break and draft new groups until repeat of weave has been obtained. Remember that in every instance the last warp-thread of one group must interlace exactly the opposite from that of the first warp-thread of the next group, so as to produce the characteristic break effect in the weave and thus in turn on the face of the fabric.

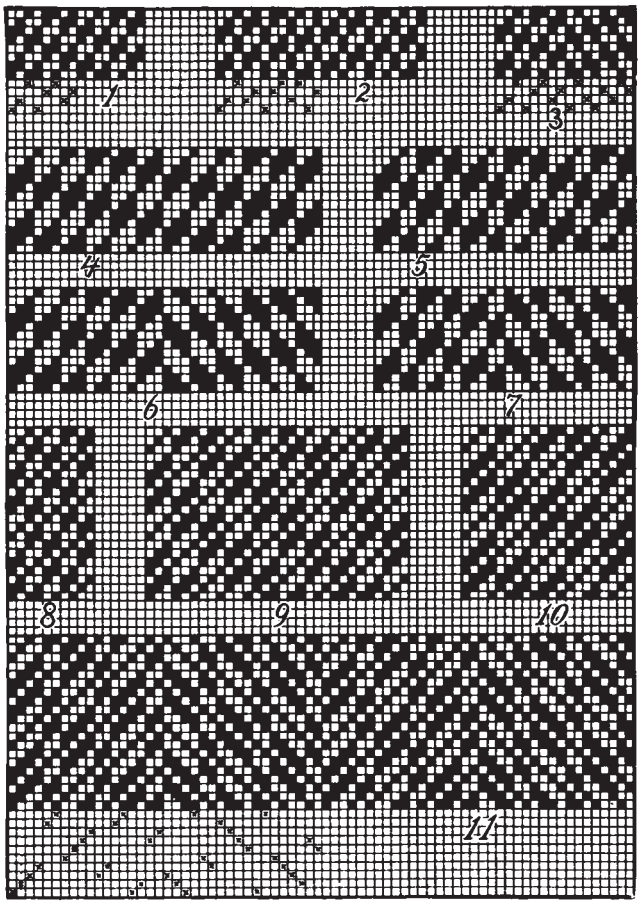
This break actually means: Miss one, two or more warp-threads (*i. e.,* harnesses in your drawing-in draft) considering your foundation twill.

The number of warp-threads or harnesses to miss is ascertained thus: Divide the repeat of your foundation weave into two equal parts, and from which number then subtract 1. This in connection with our common 4-harness twill will give us $4 \div 2 = 2 - 1 = 1$, *i. e.,* one thread or harness has to be missed (skipped) in the drawing-in draft, in order to produce the break. Proceeding in the same way, with a 6-harness twill, it then means skip 2 ends; with an 8-harness twill it means skip 3 ends, etc., skipping always half the number of the repeat of the weave minus 1.

With reference to the number of threads as used in one group, the same may be taken uniformly for each group, or the same may be varied, to suit the effect desired in the fabric.

Weaves Figs. 1 to and inclusive 11 illustrate the subject.

Fig. 1 shows the 4-harness even-sided twill used for foundation, using 2 warp-threads for each group and skipping 1 warp-thread for obtaining the break in the weave. Below the weave one repeat of the skip draft is shown by *cross* type, *i. e.,* harness 1 and 2



are taken, 3 skipped; 4 and 1 taken, 2 skipped; 3 and 4 taken, 1 skipped; 2 and 3 taken, 4 skipped, and when the repeat of the weave is obtained. 8 warp-threads is the repeat of the weave, to be used on 8-harness straight draw for practical work in the loom, but which if so desired, in combination with fancy weaves, can be woven on 4-harness; using then the skip draft given below weaves in *cross* type for the drawing-in draft, in connection with the 4-harness twill for the harness chain.

Fig. 2 shows the combination of two different numbers of warp-threads for a corresponding number of groups, *viz:* 2 ends in one group to alternate with 1 end in the other group. Repeat of weave: 12 warp-threads. This drafting of the 4-harness twill for obtaining the skip twill is shown below the weave by means of *cross* type.

Fig. 3 shows us a broken skip twill, drafting 8 warp-threads twilling from left to right to exchange with 8 warp-threads twilling from right to left. Repeat: 16 warp-threads. The drafting is shown below the weave by means of *cross* type.

Weaves Figs. 4, 5, 6 and 7 have for their foundation the 6-harness even-sided twill, showing four different principles of drafting, *viz:*

Fig. 4: Take 3 and skip—uniformly; repeat 18 warp-threads.

Fig. 5: Take 3 and skip, to alternate regularly with take 2 and skip; repeat 10 warp-threads.

Fig. 6: Use plan referred to with Fig. 4, drafting one repeat of the skip twill with its twill running in one direction to alternate with one repeat of the skip twill having its twill running in the opposite direction; repeat 36 warp-threads.

Fig. 7: Use plan referred to with Fig. 5, drafting one and one-half repeat of the skip twill, *i. e.,* 15 warp-threads with twill running from left to right, to exchange with the same combination but using reverse direction of the foundation twill; repeat 30 warp-threads.

Weaves Figs. 8, 9, 10 and 11 show four different patterns, having the ${}^{2}{}_{1}{}^{2}{}_{2}{}^{1}{}_{2}$ 10-harness twill for its foundation.

Fig. 8 shows the weave produced by using uniformly 2 warp-threads and then skipping; repeat 10 warp-threads.

Fig. 9 shows the weave produced by using uniformly 3 warp-threads and then skipping; repeat 30 warp-threads.

Fig. 10 shows the weave produced by using uniformly 4 warp-threads and then skipping; repeat 20 warp-threads.

Fig. 11 shows what we may term a broken fancy skip twill, using alternately 4 and 2 warp-threads for a group; using alternately for 18 warp-threads of this combination twill from left to right, and for the other 18 warp-threads of the combination twill from right to left; repeat 36 warp-threads.

(To be continued.)

POINTS ON JACQUARD DESIGNING.
Planning Point-paper Design for Single Cloth Fabrics.

This subject is readily explained by means of the sketch of an actual fabric structure and its point paper design.

For sake of an example let us consider a worsted dress goods, a class of fabric calling in most every instance for a straight through tie-up; a 400 Jacquard machine is the machine most often met with in connection with these fabrics.

Fig. 1 is a diagram illustrating this straight through tie-up in connection with a 400 machine, explaining at the same time any similar tie-up for any other size of Jacquard machine we may come in contact with.

On top of diagram the bottom board of the Jacquard machine is shown in its perspective, viewed from below, standing in front of the loom.

The first and last row of holes in said bottom board are only shown to simplify diagram to the reader. Numerals 1, 2, 3, 4, 5, 6, 7 and 8 refer to the first row, and numerals 393-400 to the last row.

Three neck cords (see heavy lines) are shown extending down through the bottom board, *viz.:* neck cords connected to hooks 1, 8 and 400, explaining by it the threading of the complete set of neck cords in the machine.

A 400 Jacquard machine is an 8-row deep machine, with 52 rows in its length = 416 hooks and needles in the machine. In our diagram we only used 50 of these rows *i. e.,* 50 × 8 = 400 needles and hooks. The remaining 2 rows (not shown) are what we technically call *reserve* rows, and which are used in some instances in part for the fabric, other times some are used for selvage; again some may be left idle, and when in the latter case, if no prospect for them to be used soon, the respective hooks are then temporarily taken out of the machine until such time as they are needed again, so as to prevent breakage.

To the neck cords, the leashes of the Jacquard harness are attached. By leash we understand the number of individual harness cords attached in unison to one neck cord. The number of these harness cords thus attached to one neck cord depends upon the number of divisions used in the comberboard, and what depends, in every instance, upon the texture and width of fabric under consideration.

In our example we used two harness cords to each leash, showing for this reason two lines diverging from each neck cord. This will simplify explanation of the principle of the tie-up to the reader, since additional divisions only mean additional harness cords to each leash and would mix up diagram. For this

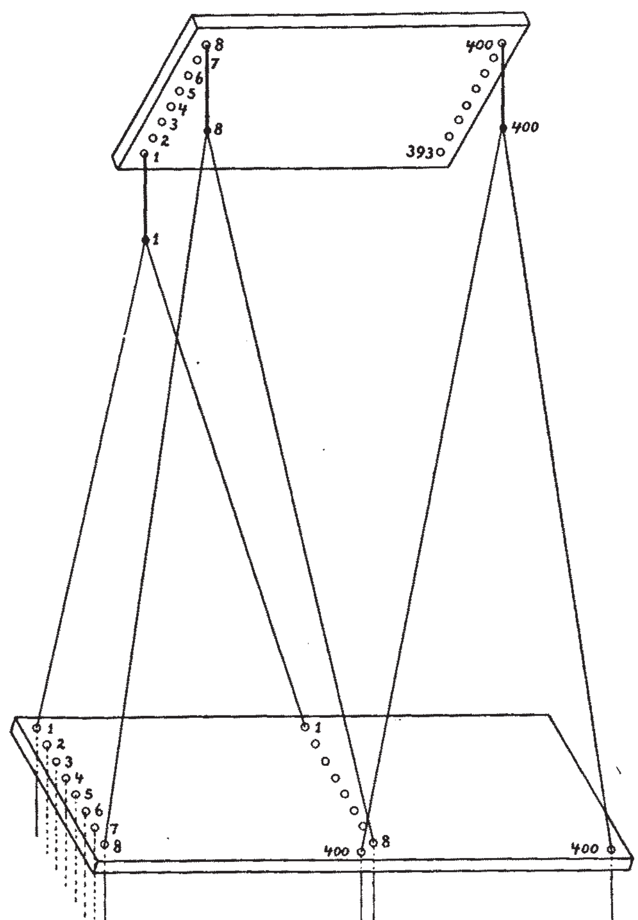


Fig. 1

reason, if 4800 ends are used in the warp, it will mean 4800 ÷ 400 = 12 divisions in comberboard = 12 harness cords to each leash, in place of the 2 now used.

The comberboard, as shown at the bottom of our diagram, shows the 2 divisions last referred to, *each* division being nothing else but a counterpart of the bottom board of the Jacquard machine, both being