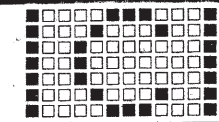


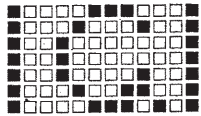
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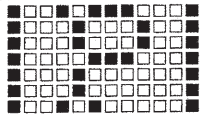
# Construction of Weaves



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Textile  
Schools



and for  
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By  
Charles G. Petzold



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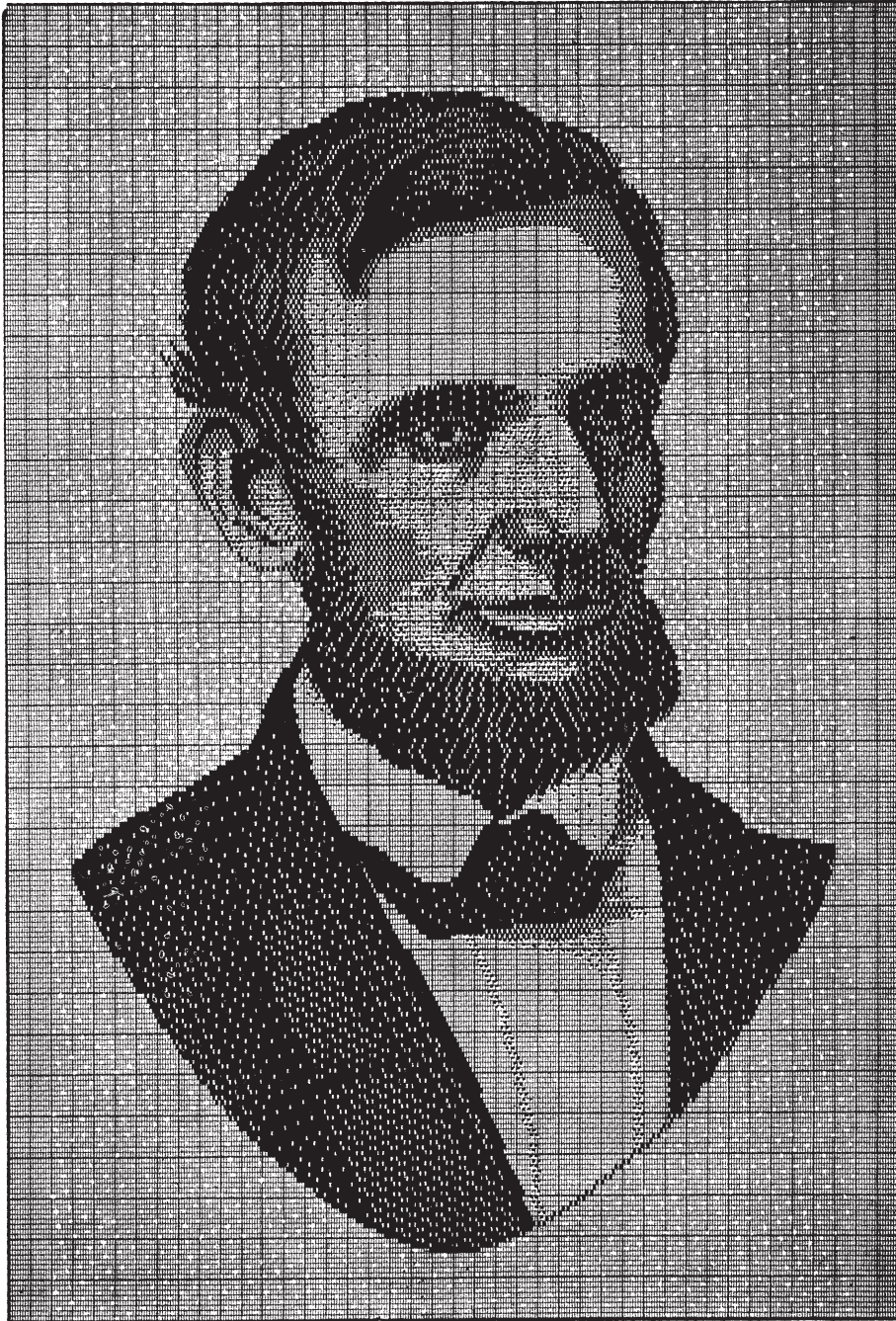
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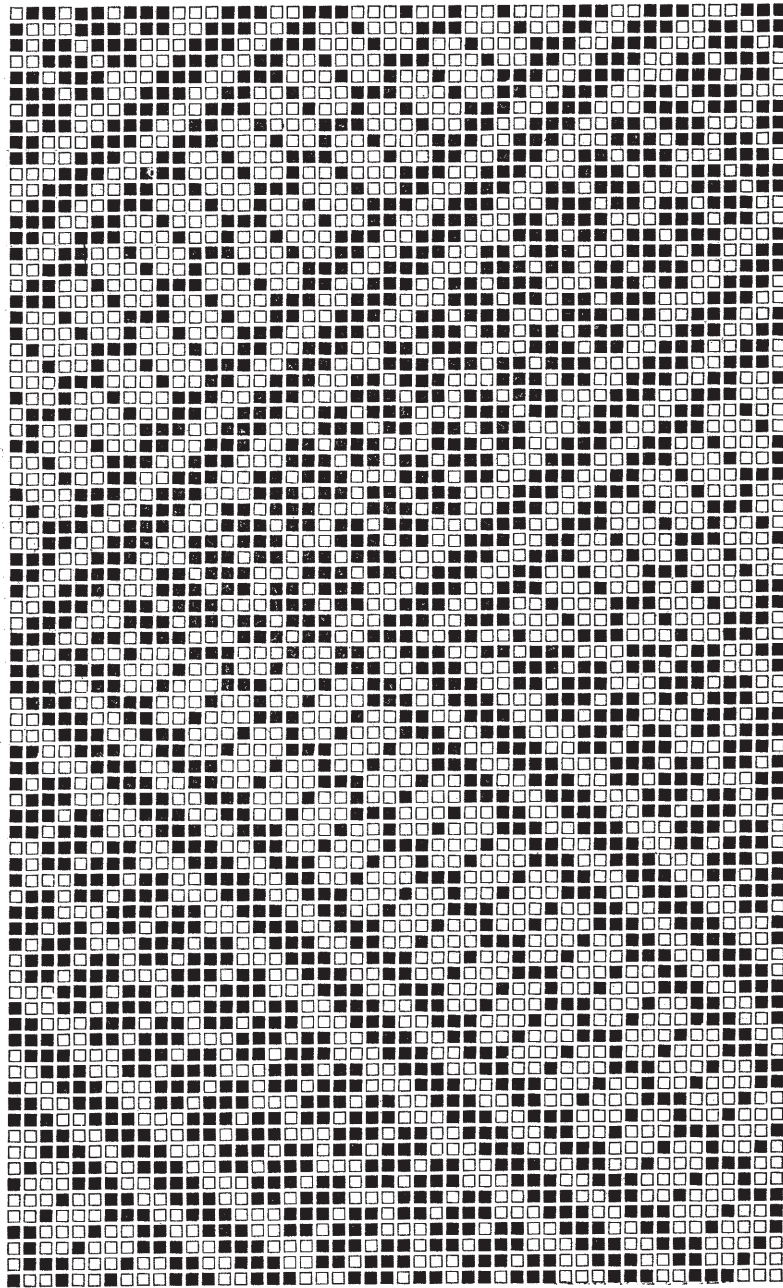
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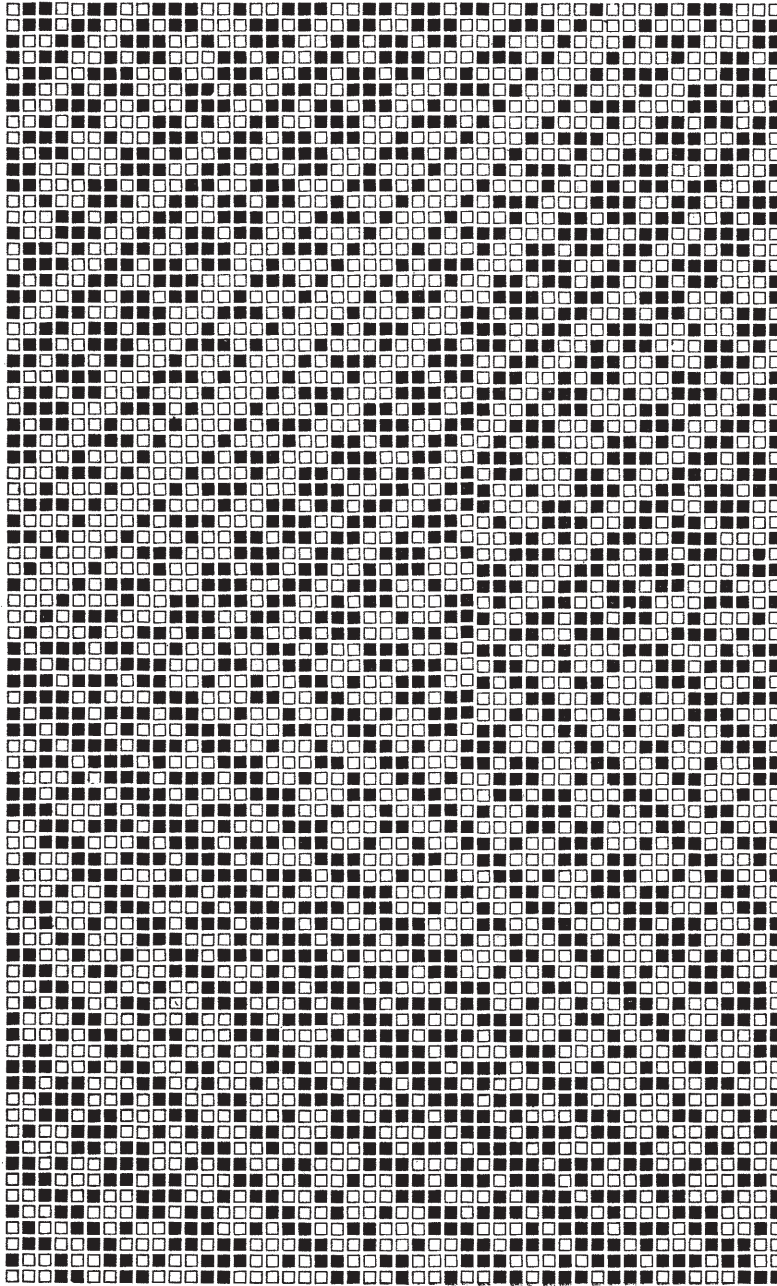


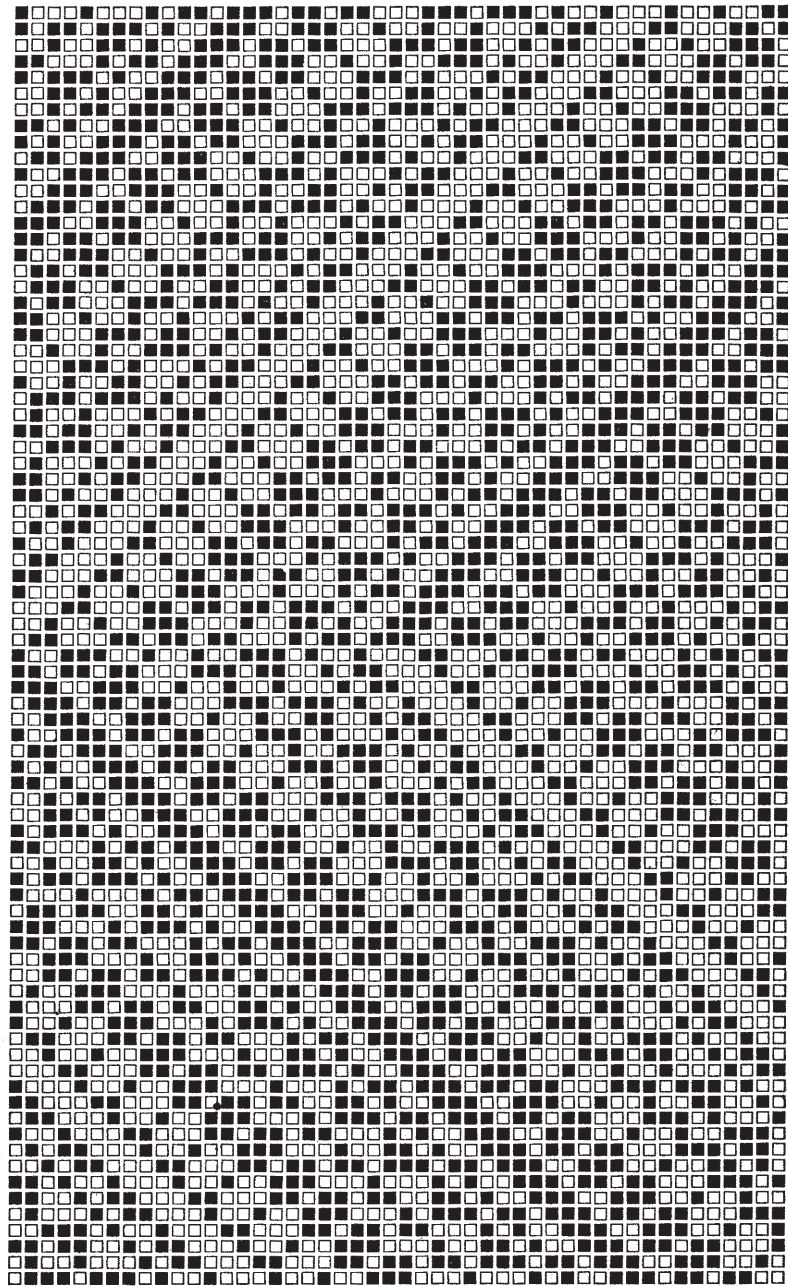
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237





Another series of cross twills are known as serpentine twills. In this class the twill lines are placed in a zigzag position, and the simplest form may be illustrated in figure 260, which is constructed from  $\frac{1}{13}$  twill. To give a clear idea of this weave, the design is carried out twice in width and height.

Figure 261 is another example of this class of weaves. The serpentine lines are worked out on a  $\frac{8}{13}$  twill, with a single serpentine running through every other diagonal. The single serpentine line is indicated with  $\times$ , and to give a better idea of the general appearance, the design is carried out twice in width and height.

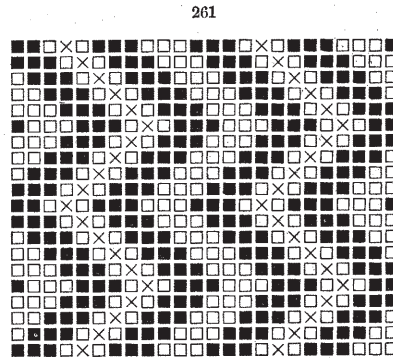
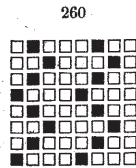
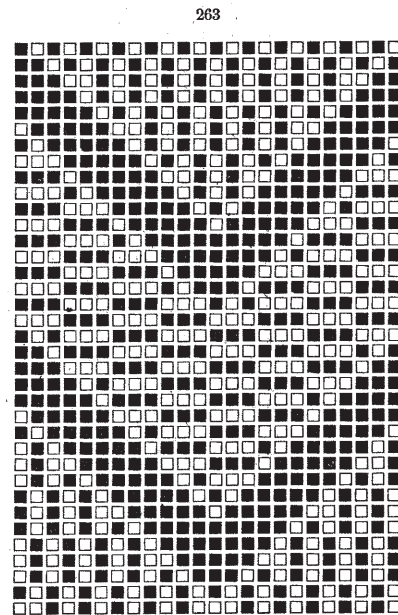
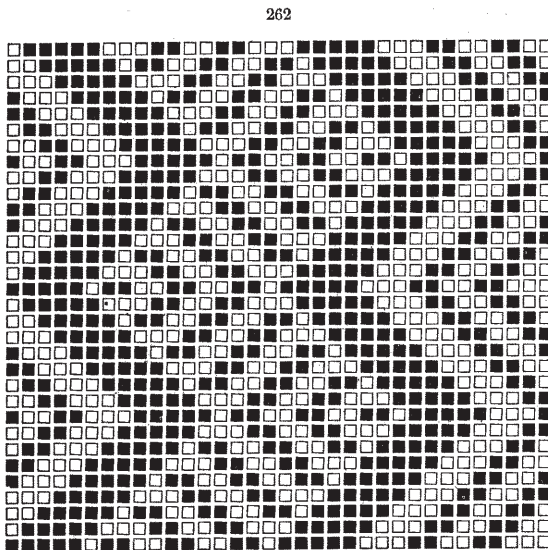


Figure 262 is constructed on 34 harnesses. The original serpentine twill is based on 17 harnesses. The first part is filled in with broken twill and the second part with small serpentine lines from a  $\frac{2}{12}$  twill.

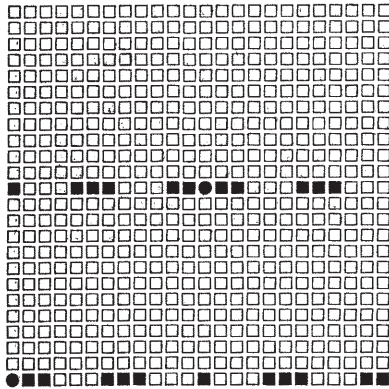
Figure 263 may illustrate another example. For foundation we use 24-harness diagonal, of which one part is filled in with warp rep and the other with filling rep.



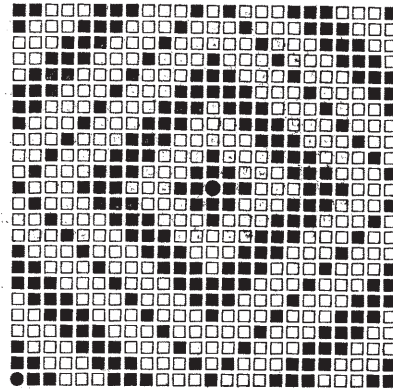
### Construction of Cross Twills in Four Directions.

For example we take figures 264 and 265. The construction of this weave and all of these forms is very simple. In figure 264, the largest width of the twill part extends over 12 fields, and running the twill parts in four directions, it will require twice 12 in width and height. Therefore 24 fields are necessary to complete figure 265. We now indicate the two centres of our 24 fields (see round black characters); on these two centres we add two points on each side, then we leave three points blank and mark three points, leave three blanks again and mark one. See Fig. 264. We now go in four diagonal directions from the indicated points to the end line on each side, and form figure 265. It is at our will to construct this class of designs either plain or fancy. Two more examples are illustrated with figures 266 and 267; both designs differ somewhat from 265, but being constructed on the same principle, they will require no further explanation.

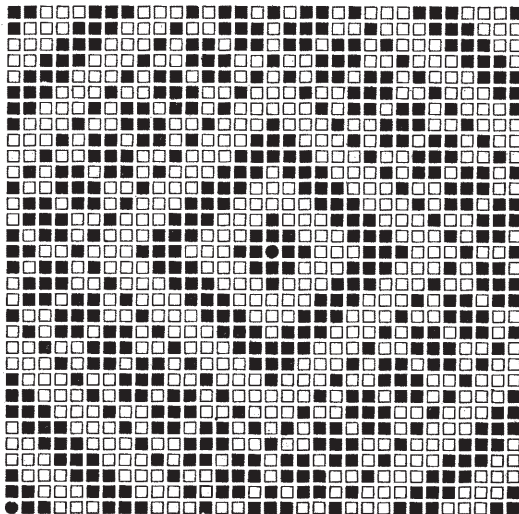
264



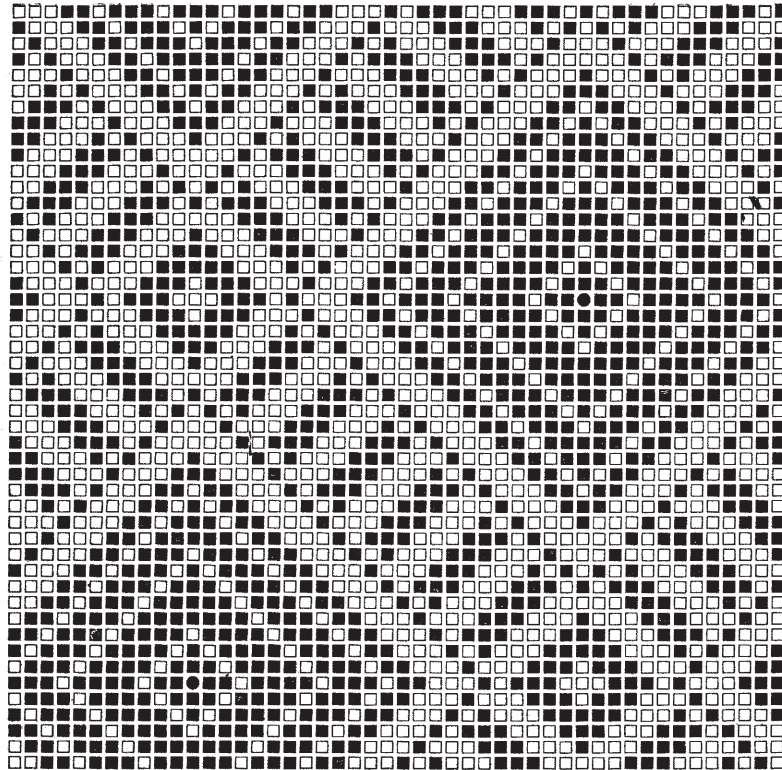
265



266



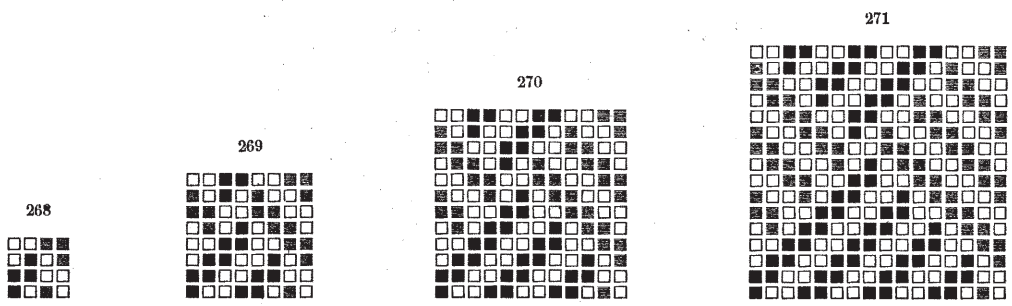




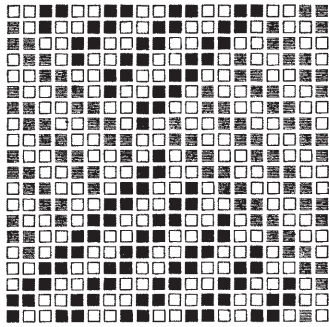
**Braided or Interlaced Cross Twills.**

These cross twills are constructed from a number of parallel twill parts running in opposite directions. For example, we take figures 268, 269, 270, 271, 272, 273 and 274. All of these have for a basis the regular four-harness  $\frac{2}{1}$  twill. We now want to ascertain the number of twill parts we can place adjacent to each other with a given harness number.

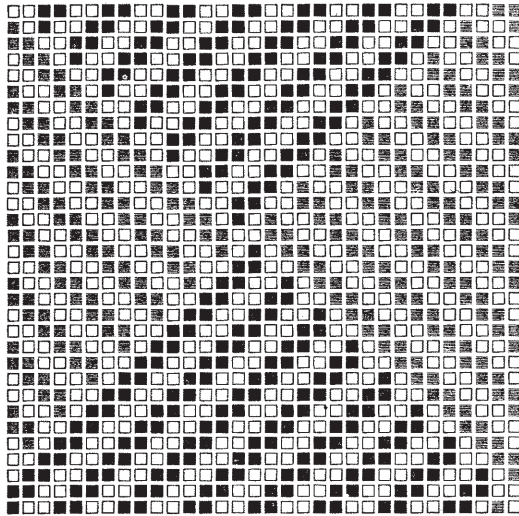
It may be well to state here that in the above examples the twill parts equal one-fourth of the harness number: Figure 268, harness number four, twill parts one. Figure 269, harness number eight, twill parts two. Figure 270, harness number twelve, twill parts three. Figure 271, harness number sixteen, twill parts four. Figure 272, harness number twenty, twill parts five. Figure 274, harness number thirty-two, twill parts eight. For the *above* designs only such harness numbers can be taken which are divisible by four.



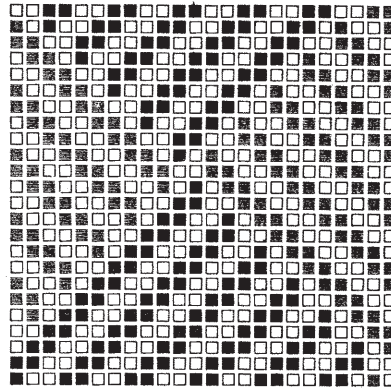
272



274



273



Tables for figures 268 to 274 inclusive.

Harness number.	Ends in original twill parts for each direction.	Number of twill parts.
4	2	1
8	4	2
12	6	3
16	8	4
20	10	5
24	12	6
32	16	8

The foregoing method can be applied to all double twills with even harness numbers. Twills of odd harness numbers are excluded. Our next examples are illustrated by figures 275, 276, 277, 278, 279; for these designs we use regular  $\frac{3}{13}$  twill. Figure 275, harness number six, twill parts one. Figure 276, harness number twelve, twill parts two. Figure 277, harness number eighteen, twill parts three. Figure 278, harness number twenty-four, twill parts four.

In figures 275, 276, 277 and 278 the twill parts are one-sixth of the harness numbers, and only such harness numbers can be selected which are divisible by six. Two more examples are shown in figures 279 and 280. We have used for these two designs eight harness regular  $\frac{4}{14}$  twill. The number of harnesses which can be used must be divisible by eight. Figure 279, harness number sixteen, twill parts two. Figure 280, harness number twenty-four, twill parts three.

It may be well to state here that the original twill parts in the foregoing designs from figures 268 to 280 inclusive extend over one-half of the harness number.

For explanation we take from figure 271 the original twill part, which is illustrated with figure 281. The design is based on sixteen harnesses and you will readily see that each part extends over eight harnesses in each direction. We can also reverse our method for working out these cross twills. For example, we take the number of twill parts we wish to use in the design; to find the necessary number of harnesses, we simply multiply the twill parts by the weave. For instance:

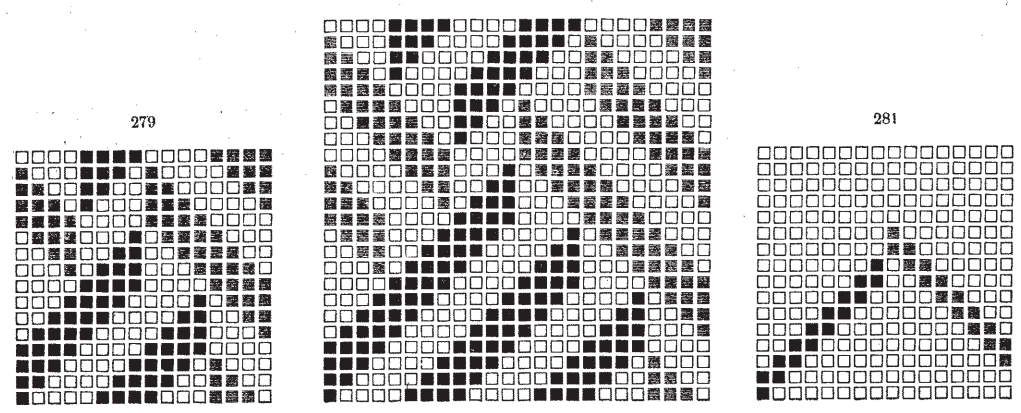
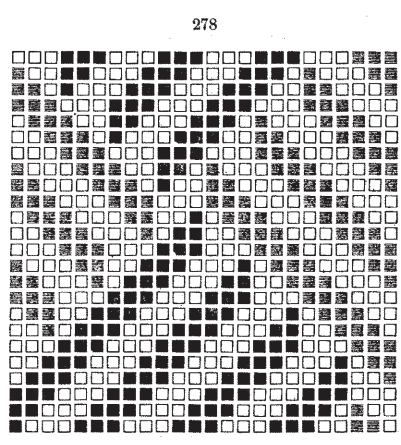
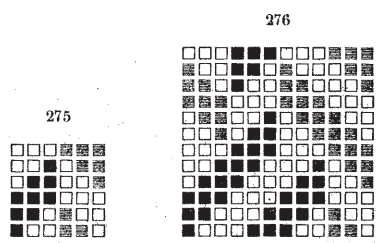
- Twill parts times four for four-harness  $\frac{2}{2}$  twill.
- Twill parts times six for six-harness  $\frac{3}{3}$  twill.
- Twill parts times eight for eight-harness  $\frac{4}{4}$  twill, and so on.

Table for figures 275 to 278 inclusive.

Harness number.	Ends in original twill parts for each direction.	Number of twill parts.
6	3	1
12	6	2
18	9	3
24	12	4

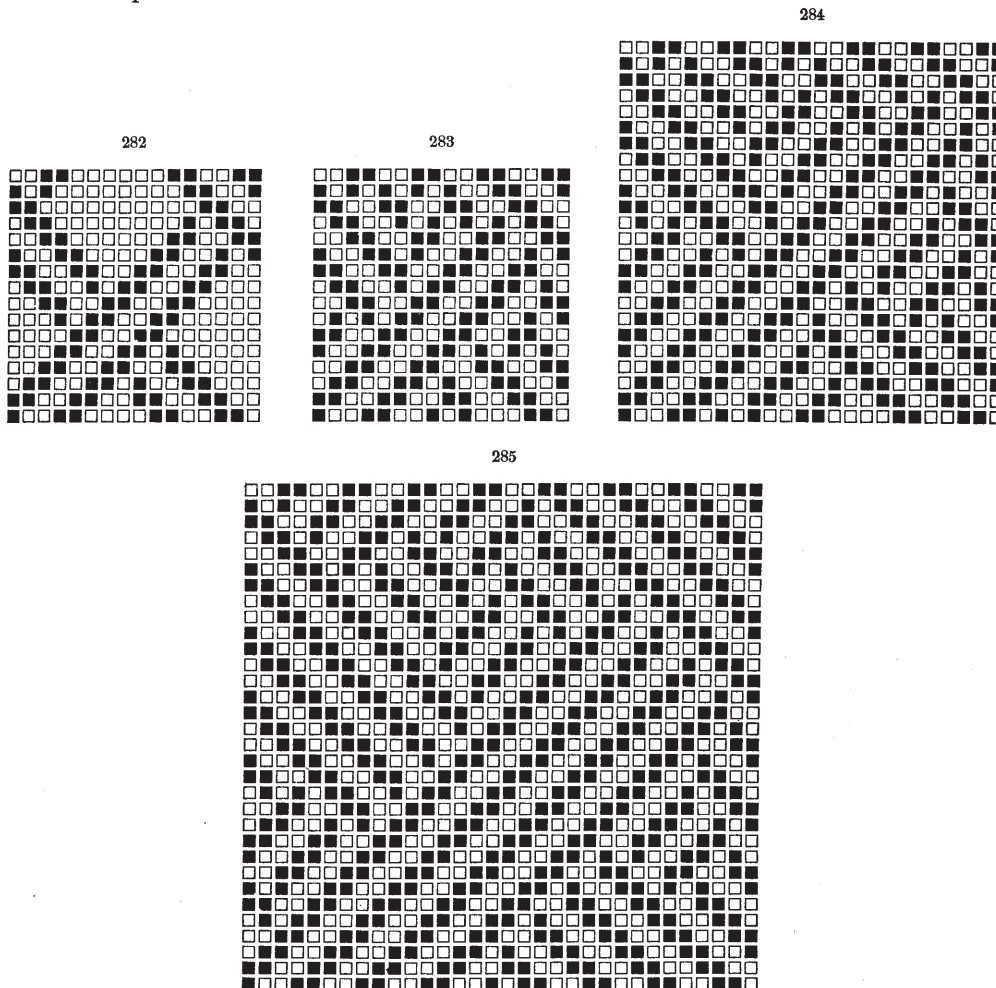
Table for figures 279 and 280.

Harness number.	Ends in original twill parts for each direction.	Number of twill parts.
16	8	2
24	12	3



Figures 282, 283, 284 and 285 illustrate another method of constructing cross twills. For example we use a regular  $\frac{2}{1}$ / $\frac{2}{2}$  twill; harness number sixteen, twill parts four. From the four twill parts we remove two and lengthen out the remaining two parts by four fields each; this will leave two empty squares. See Fig. 282. These two empty squares we now fill out with smaller broken twill parts and obtain with this procedure fig. 283.

Figures 284 and 285 are worked out on the same principle and need no further explanation.



#### Cross Twills which Commence at Different Heights.

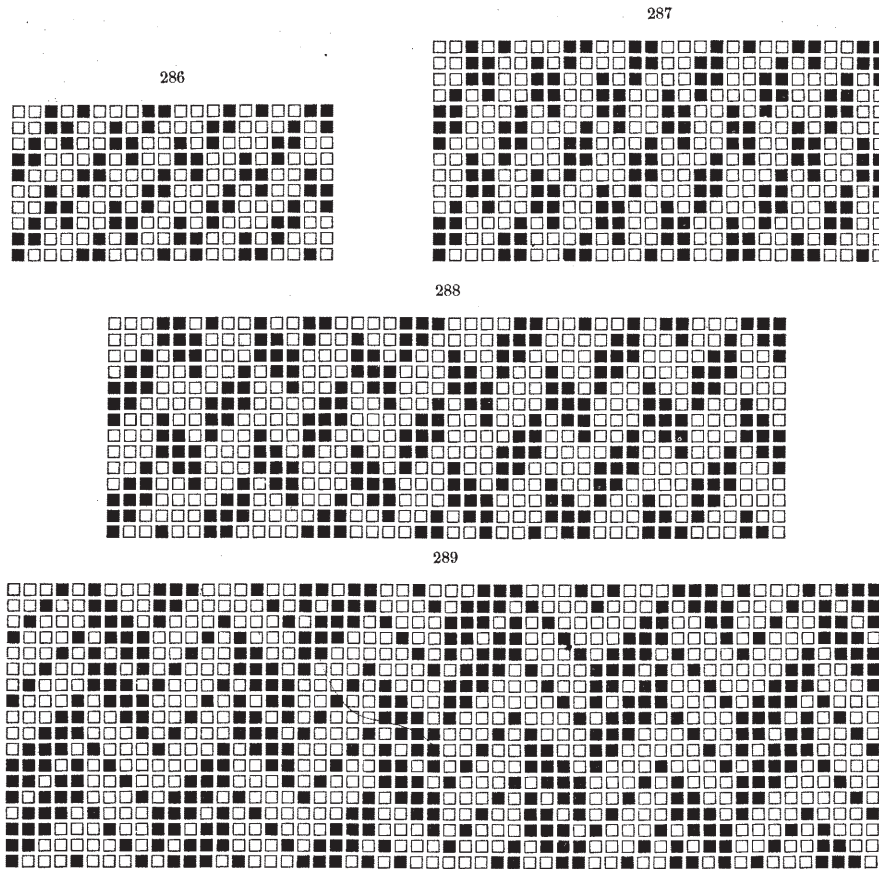
All the previous cross twills have consisted of regular and reversed twills beginning on relatively the same height. This restriction can be dropped, and by doing so another large number of new forms can be obtained. For example we use figures 286, 287, 288 and 289.

In figure 286 we have a twill part of two ends, running from left to right. Adjacent is a twill part of two ends running from right to left. Again we have a twill part of two ends going to the right and so on alternatingly until the design is complete.

The height of figure 286 is five picks; one twill of two ends to the right and one twill of two ends to the left requires four ends in width. We have selected five picks in height and a twill group of four ends, therefore it will require  $5 \times 4 = 20$  ends before the original twill group begins again on the same height. Figure 287 is another example. We use seven picks in height, twill group of four ends, two ends each to right and left, therefore  $7 \times 4 = 28$  ends will be required before the original twill group begins on the same height. Figure 288; height seven picks, twill group six ends, three ends to right and three to left, therefore  $7 \times 6 = 42$  ends will be required for the repeat of the design.

Figure 289 may illustrate another example. Height eighteen picks, twill group nine ends, five ends from left to right and four from right to left. The original twill group, however, will return to the same height after six groups, for the reason that there is a difference of three picks in the beginning of each twill group, and as this difference in picks for each twill group is contained six times in the total number of picks (18), the original twill part will return to the same height after six groups ( $18 \div 3 = 6$ ) or on the seventh group;  $6 \times 9$  (the total number of ends for each twill group) = 54 ends to complete the design.

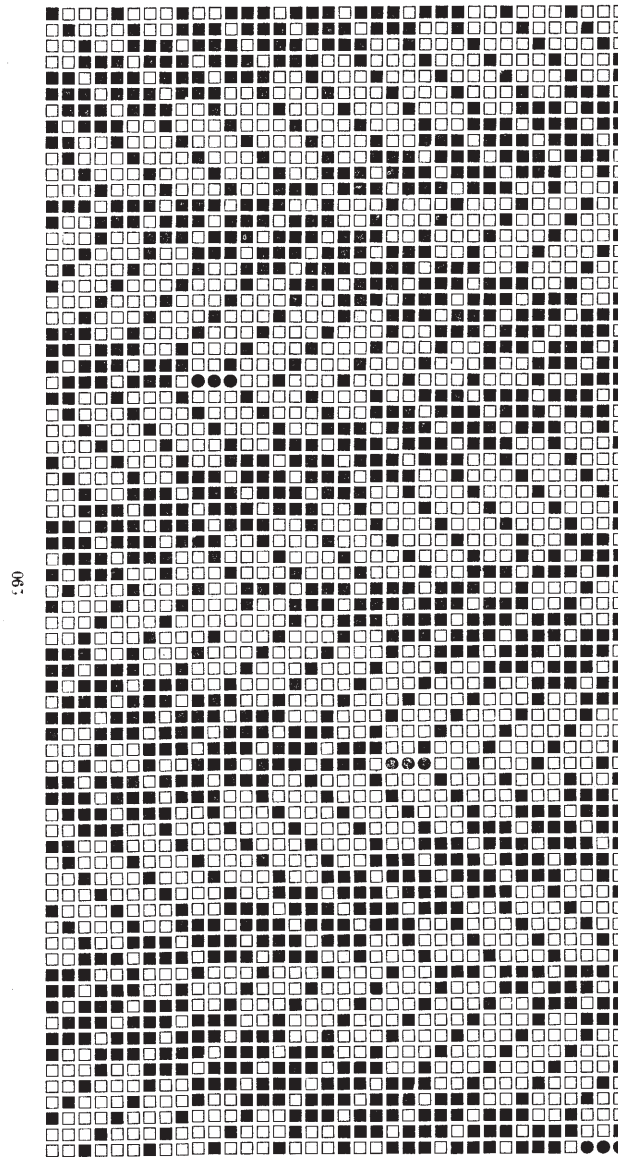
Figures 286 and 287 are carried out twice in height.



We have it in our power to begin twill parts on any height or difference of picks for each twill group. For example see Figure 290.

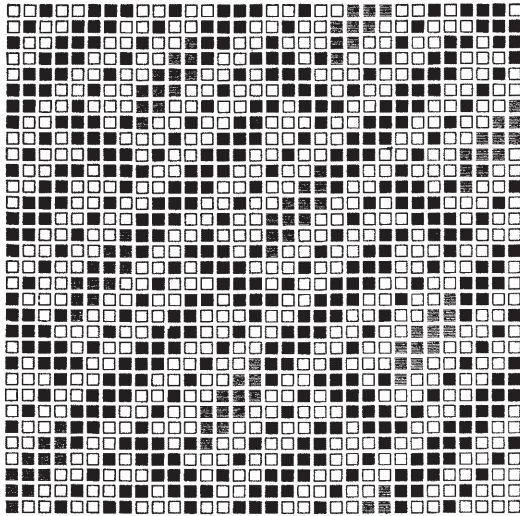
Height thirty-six picks, twill group twenty-four ends, twelve ends to right

and twelve ends to left, the first twill group beginning on the first pick and end. The second twill group begins on the thirteenth pick and twenty-fifth end; the third group begins at the twenty-fifth pick and forty-ninth end. The reversed twill parts may be begun at any convenient height, but once begun, the same relative distance as above must separate the successive parts of the reversed twill.

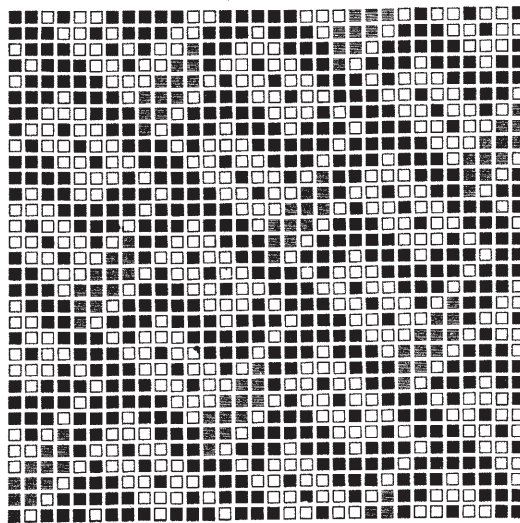


**Cross Twills Formed with Twills in Sateen Position.**

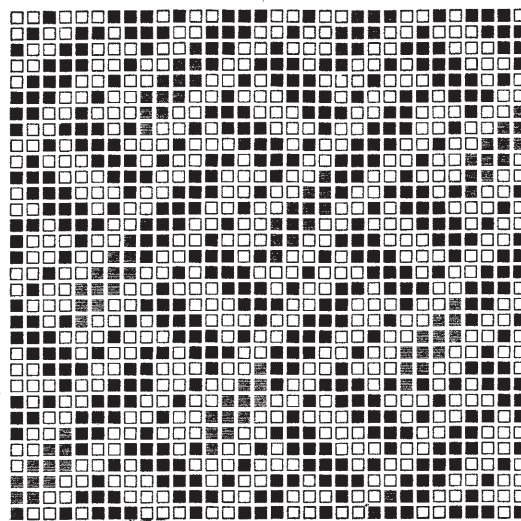
For example see figures 291, 292 and 293. In working out these designs we have selected the eight-harness sateen position placed on 32 ends and picks, divided into eight equal parts, and each original twill part is indicated with shaded characters. These twill parts are then lengthened out and filled in with twill parts to suit our fancy or fashion.



291



292



293

**Discontinued or Broken Twills.**

Discontinued or broken twills are all such twills in which twill parts of two or more sizes form the design; the simplest forms of these twills are illustrated by figures 294 to 299 inclusive.

To ascertain the number of ends for the complete design we multiply the twill by the number of ends in a twill part, and the product equals the number of ends necessary for the repeat. Figure 294 is constructed from four harness  $\frac{2}{1} \frac{1}{2}$  twill, with twill parts of two ends each;  $4 \times 2 = 8$ . That is to say: if the first twill part ends on the third pick, the second twill part begins on the fourth pick.

294

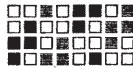


Figure 295 is constructed from five harness  $\frac{2}{1} \frac{1}{3}$  twill. Twill parts of two ends each which also begin on the point of the preceding one. This will require  $5 \times 2 = 10$  ends to complete the repeat of the design.

295

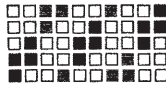
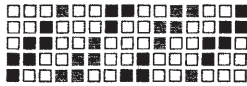


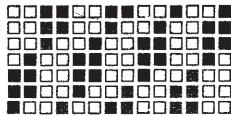
Figure 296 is constructed from five harness  $\frac{3}{1} \frac{1}{3}$  twill. Twill parts of three ends each are used; therefore  $5 \times 3 = 15$  ends are required for the design.

296



In figure 297 we use a seven harness  $\frac{3}{1} \frac{1}{4}$  twill. Twill parts of two ends each,  $7 \times 2 = 14$  ends are required for the complete design.

297



In figure 298 we use the regular six harness  $\frac{3}{1} \frac{1}{3}$  twill. Twill parts of three ends each. This will require  $6 \times 3 = 18$  ends for the design.

298

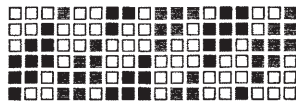
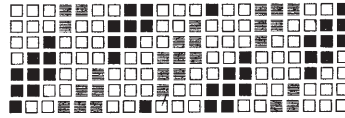


Figure 299 is constructed from seven harness  $\frac{3}{1} \frac{1}{4}$  twill. Twill parts of three ends each;  $7 \times 3 = 21$  ends required for the complete design.





In figure 300 we use fourteen harness  $\frac{3}{1} | \frac{3}{1} | \frac{1}{3}$  twill. Twill parts of three ends each;  $14 \times 3 = 42$  ends are necessary for the complete design.

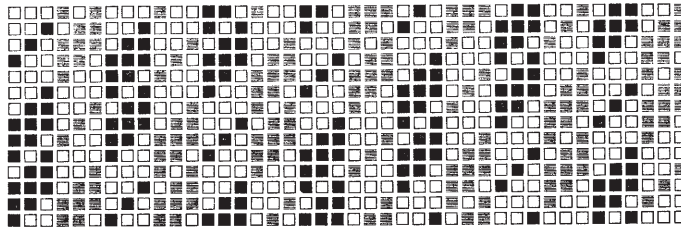
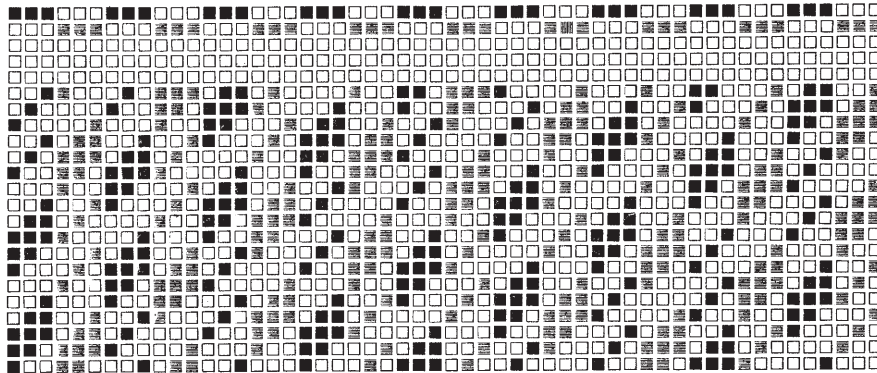


Figure 301 is constructed from eighteen harness  $\frac{3}{3} | \frac{3}{3} | \frac{1}{2} | \frac{1}{2}$  twill. Twill parts of three ends each. This will require  $18 \times 3 = 54$  ends for the complete design.



**Discontinued or Broken Twills Constructed from Irregular Twill Parts.**

In working out this class of designs the following method has to be applied: Multiply the twill by the total number of ends belonging to the twill parts; then ascertain the number of picks ensuing between the beginning of the first and second twill parts. From these figures we find the total number of ends required for the design. For example we take figure 302. The twill is a regular four harness  $\frac{2}{1} | \frac{1}{2}$  twill with twill parts of three and one, equal four ends, the number of picks between the beginning of the first and second twill parts being two. The rule is then to divide the difference in picks into the weave or harness-number as in this  $4 \div 2 = 2$ . The result will be the number of twill parts required to complete the design.

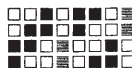


Figure 303 is constructed from five harness  $\frac{21}{13}$  twill. Twill parts of three and one ends, the difference in picks is one.  $5 \div 1 = 5$ , therefore five twill parts are required to complete the design.

303

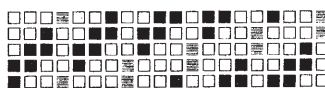


Figure 304 is constructed from six harness  $\frac{31}{13}$  twill. Twill parts of three and one ends are used; the difference in picks is two.  $6 \div 2 = 3$ . Three twill parts are required for the design.

304

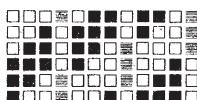


Figure 305 is also constructed from  $\frac{31}{13}$  twill, with twill parts of four and two ends; the difference in picks again being two,  $6 \div 2 = 3$ . Therefore, as in the preceding example, three twill parts are required to complete the design.

305

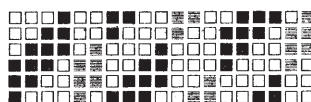
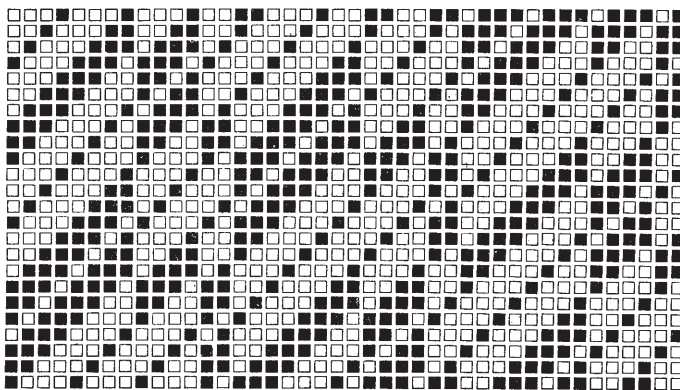


Figure 306 is constructed from twenty-four harness  $\frac{31}{13} \frac{31}{13} \frac{11}{13} \frac{31}{13} \frac{11}{13}$  twill, with twill parts of eight, four and two ends. The difference in picks between two successive twill parts of the same kind is eight; therefore  $24 \div 8 = 3$ . Thus it will take three sets of twill parts of fourteen ends each = 42 ends to complete the design; each twill part again beginning on the point of the preceding.

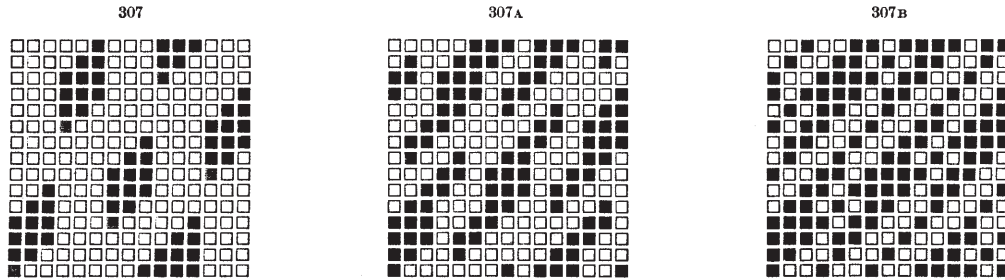
306



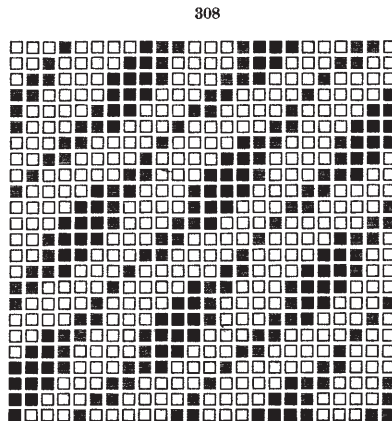
### Broken Twills Formed from Sateen Positions.

Figures 307B, 308 and 309 may illustrate some of these designs. Figure 307B is formed from figures 307 and 307A in the following manner: We take fifteen fields in width and height and divide these into five equal parts of three ends and three picks each. In these parts we denote the five harness sateen position with step-number three which serve for an indication mark for the twill pieces extending over four picks and three ends. See Figure 307.

We now add twill pieces of two ends and two picks onto each twill part both sides and form figure 307A. We now fill out the remaining space with floats of one end and one pick. For the complete design see Figure 307b.



In figure 308 we use twenty-four fields each way and divide these into eight equal parts. For foundation we take the eight harness sateen position with step-number three, each twill part extending over four picks and three ends. Onto these parts we now add one 3-float and two 2-floats, and fill out the remaining space with floats over one.



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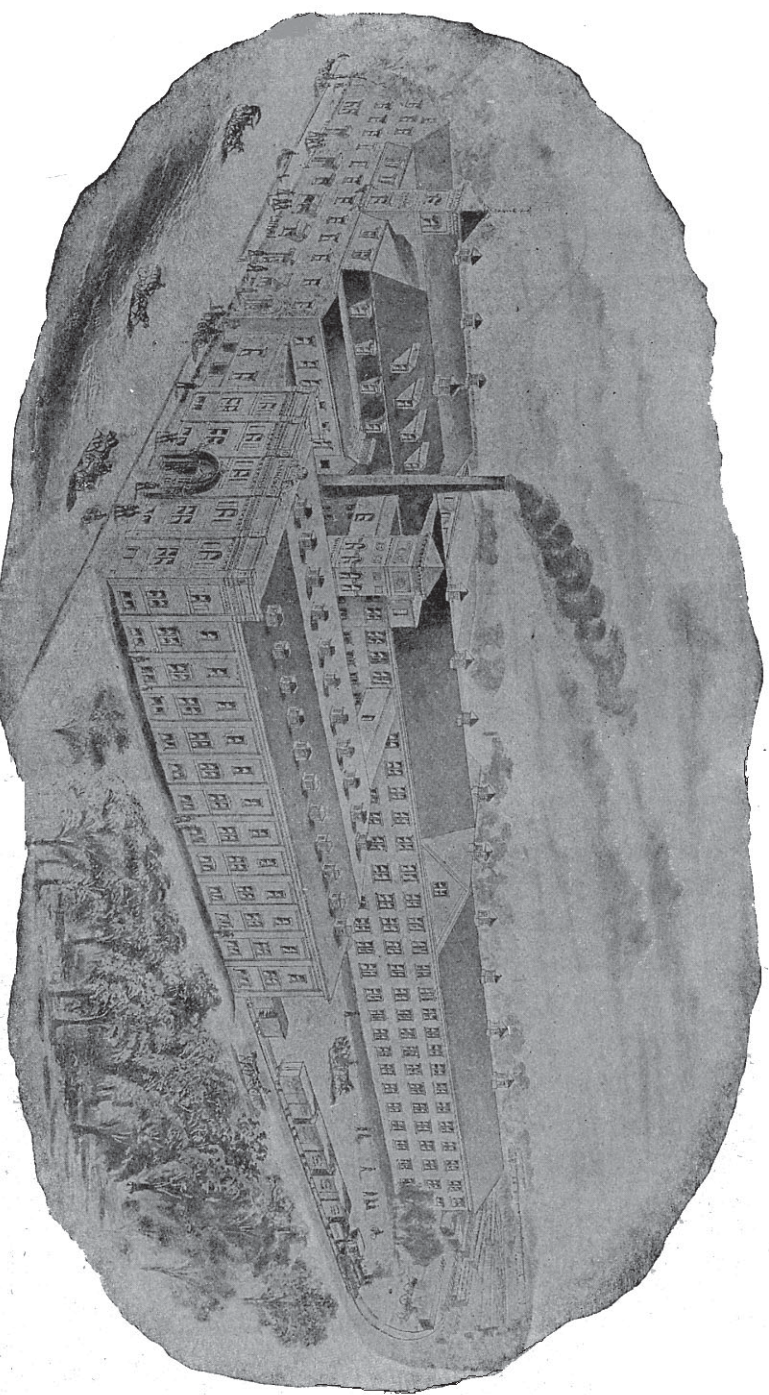
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