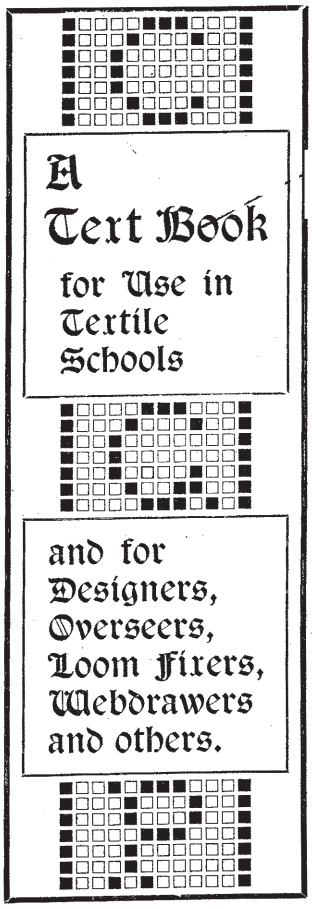
No. 2 JUNE 1900

Construction of Weaves



By
Charles G. Petzold

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FRIEDRICH v. SCHILLER.

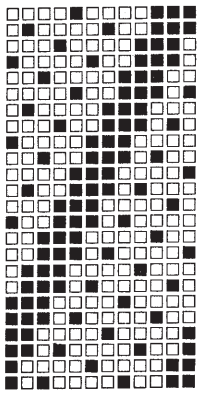
DESIGNED AND WOVEN BY CHARLES G. PETZOLD, LAWRENCE, MASS.

RICHARD KISSLING'S MODEL OF WILLIAM TELL.

DESIGNED BY FRITZ KOESER.

WOVEN AT THE SILK WEAVING SCHOOL, ZURICH, SWITZERLAND.

96



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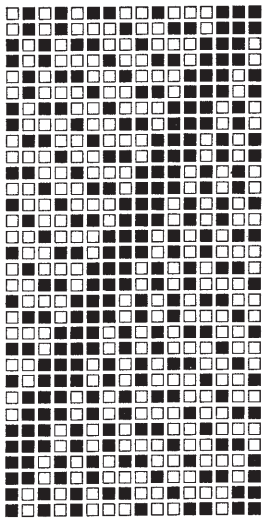

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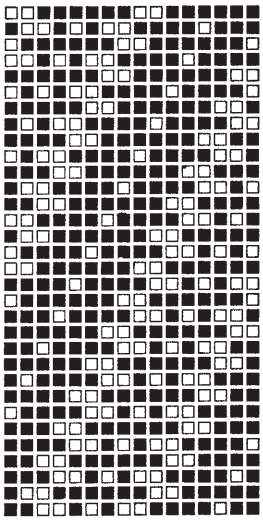

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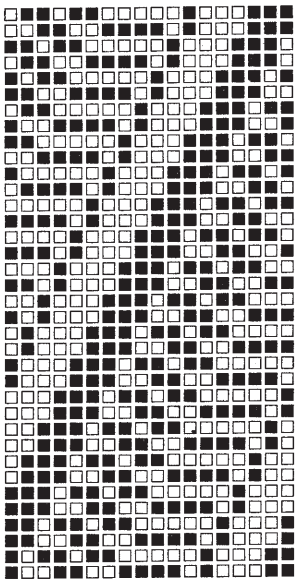

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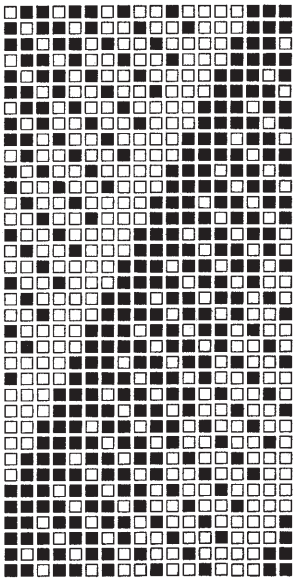
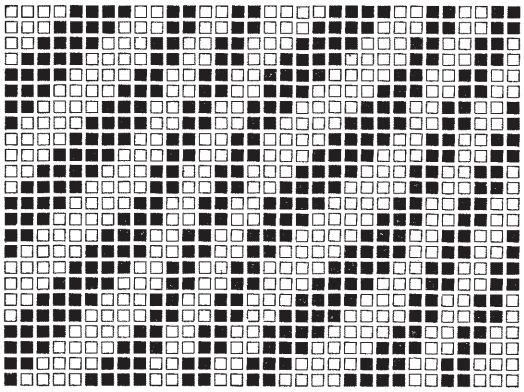


Curved Twills.

This class of twills are mostly constructed from regular and steep twills, and diagonals. In figure 101, 9 ends are regular twill and 7 ends steep twill. The design is carried out three times in height and twice in width to give a better idea of the effect. Figure 102 represents another curved twill. We take 9 ends regular 8 harness double twill and 7 ends steep twill; then return with 7 ends steep twill and 9 ends regular twill, in opposite direction.

101



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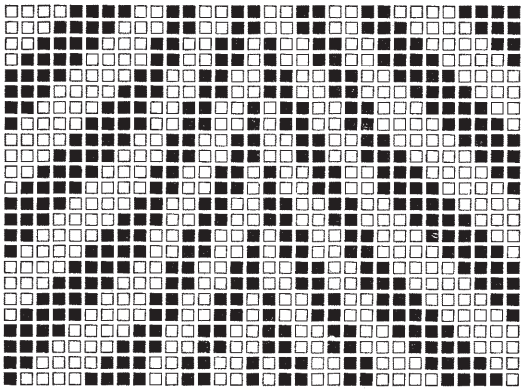
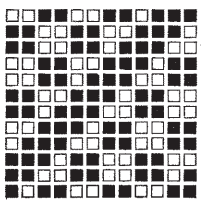


Fancy Twills and Diagonals.

By adding to a regular twill Panama and broken twill parts, a large number of these fancy twills can be worked out.

Figures 103, 104 and 105 are based on 12 harness diagonal with Panama and Basket effects. Figures 106, 107, 107 B, 108, 109, 110, 111, 112, 113, 114 and 115 are all based on regular twills, Panama and broken twill effects.

103



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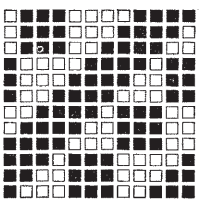

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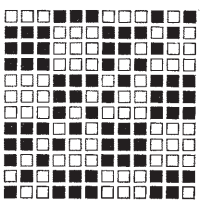

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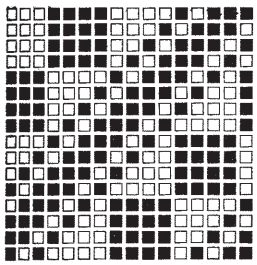

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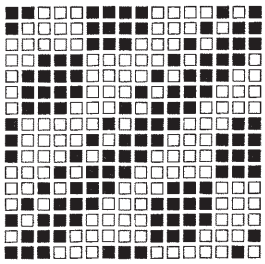
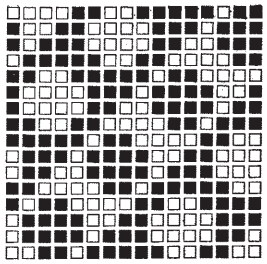


107B



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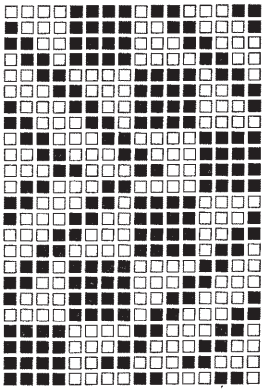

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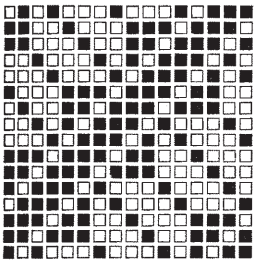

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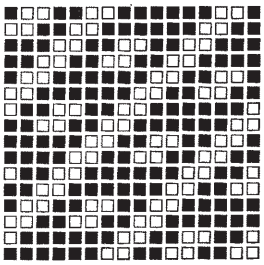

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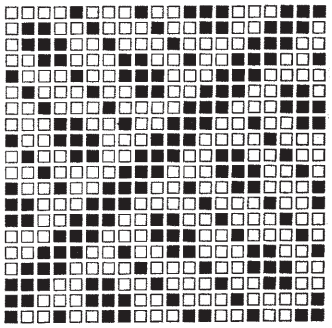

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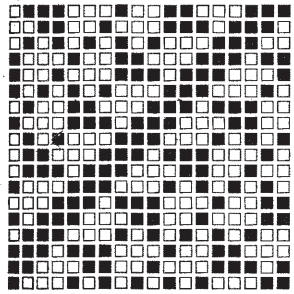

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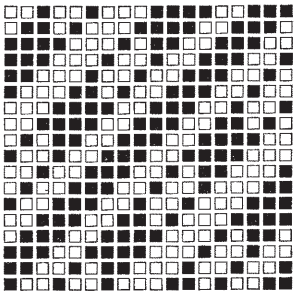

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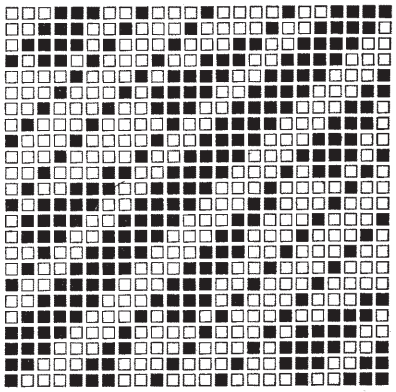

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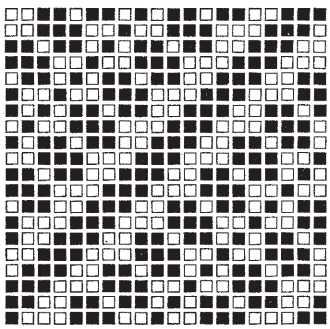
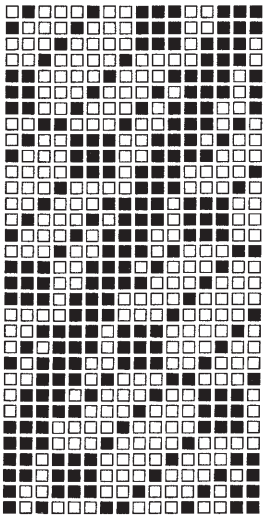


Another method of forming steep twills may be illustrated by figures 116, 117 and 118. For foundation we use the main diagonal from any steep twill, and fill out the blank spaces with either fancy, curved, or broken twill effects. But this is to be left entirely to either fancy or fashion.

116



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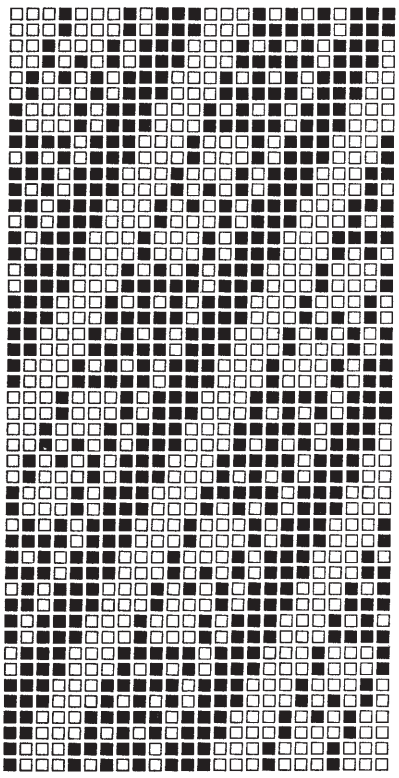

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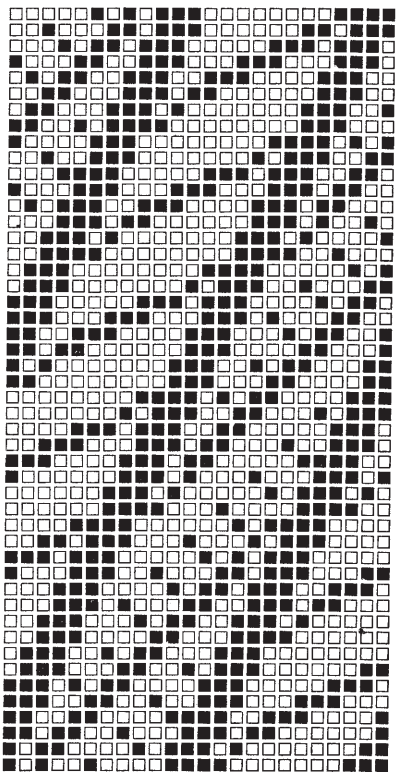


Sateens

And the Rules Governing Their Construction, with Methods for Finding the Necessary Arrangement for the Weave.

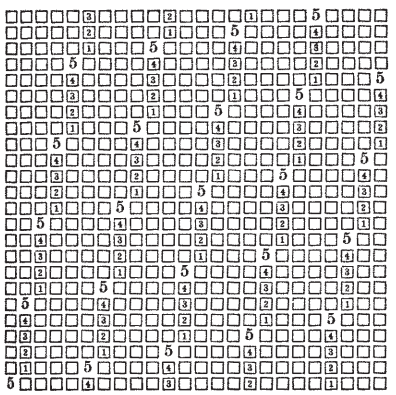
The construction of sateens is based on a simple mathematical formula, and any number from five up (six excluded) can be used in working out the weave of sateen. The mathematical formula is found by dividing the number of harnesses of the desired sateen into two parts. The numbers thus found should not be equal, neither should they be a multiple of each other. These numbers are technically known as the step-numbers by which we find the weave. The smaller number of the two is the more preferable. To illustrate the method, we now aim to work out a twenty-four harness sateen. Therefore we divide 24 into 5 and 19, 7 and 17, and 11 and 13, and then use the lower numbers 5, 7 and 11. These will make three 24-harness sateens.

Make three 24 cross section plans as shown in figures 119, 120 and 121. Start in figure 119 with the step-number 5 in the lower left hand field; then go over to the second line and step up by 1, 2, 3, 4, 5; from here go to the third line and step up again 1, 2, 3, 4, 5; from the third line go over to the fourth line and step up 1, 2, 3, 4, 5; from the fourth line go over to the fifth line and step up 5, and so on. Any incomplete stepping up by 5 must be continued on the lowest field on the same line, as will be readily observed on the sixth, eleventh and sixteenth line. The number 5 indicated in figure 119 denotes the harness up and is replaced in figure 119B by a black square, thus representing the weave proper.

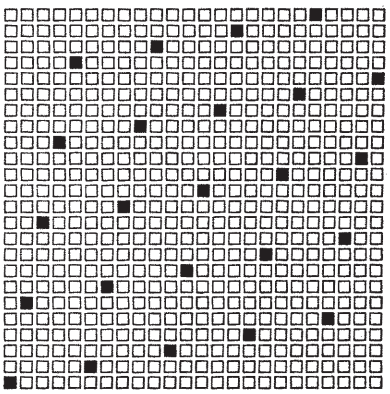
Figures 120 and 120B are worked out by the same principle on a twenty-four cross section plan, except that we use step-number seven.

Figures 121 and 121B are obtained in the same way with step-number eleven, and need no further explanation.

119



119B



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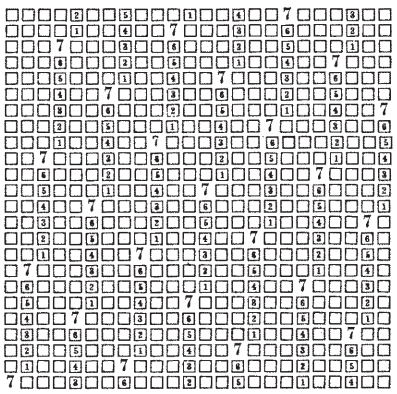


120B

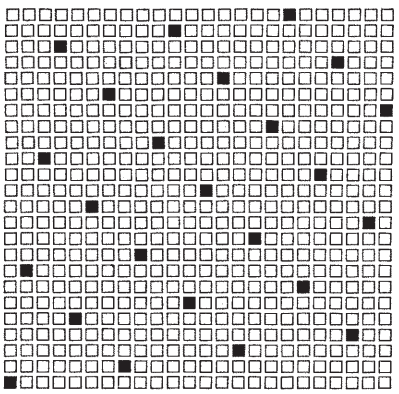
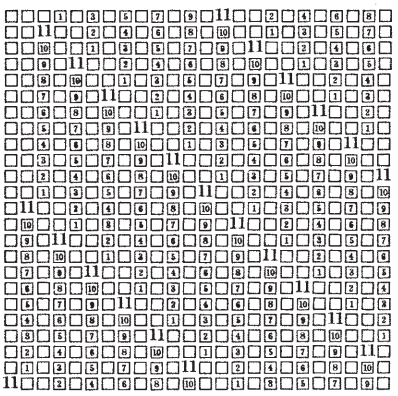


Figure 120 is the 24-harness sateen stepped up by 7. Fig. 120B is the weave.

121



121B

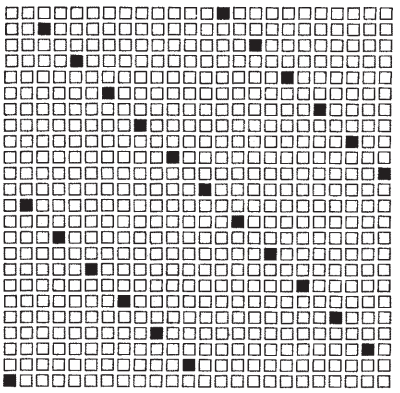


Figure 121 is the 24-harness sateen stepped up by 11. Fig. 121B is the weave.

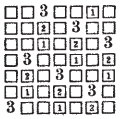
Following is a series of sateens worked out by the above method which are shown in figures 122 to 148 and 122B to 148B.

122

Harness number 5.
Divided by 2 and 3.
Use step-number 2.

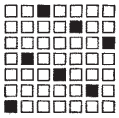
122B

123

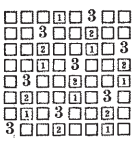


Harness number 7.
Divided by 3 and 4.
Use step-number 3.

123B

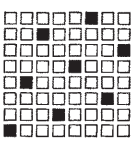


124

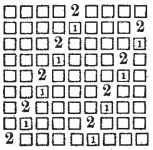


Harness number 8.
Divided by 3 and 5.
Use step-number 3.

124B

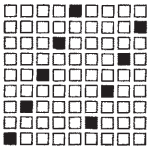


125

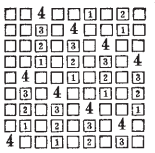


Harness number 9.
Divided by 2 and 7.
Use step-number 2.

125B

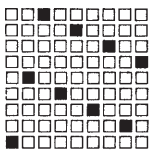


126



Harness number 9.
Divided by 4 and 5.
Use step-number 4.

126B



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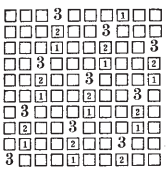
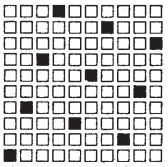


Harness number 10.
Divided by 3 and 7.
Use step-number 3.

127B



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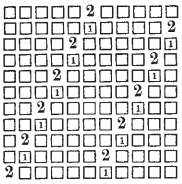
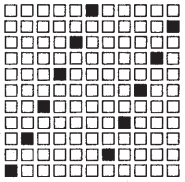
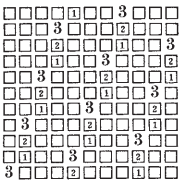


Harness number 11.
Divided by 2 and 9.
Use step-number 2.

128B

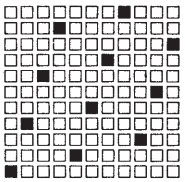


129



Harness number 11.
Divided by 3 and 8.
Use step-number 7.

129B



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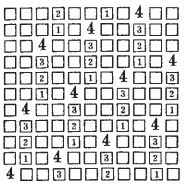
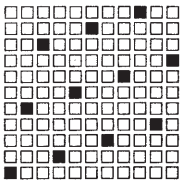


Harness number 11.
Divided by 4 and 7.
Use step-number 4.

130B



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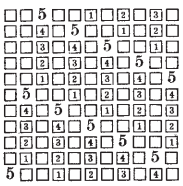
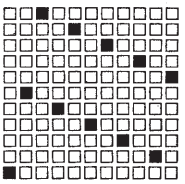


Harness number 11.
Divided by 5 and 6.
Use step-number 5.

131B



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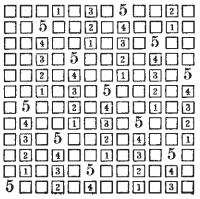
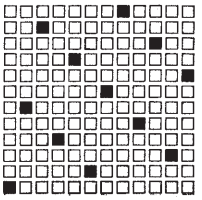


Harness nnmber 12.
Divided by 5 and 7.
Use step-number 5.

132B



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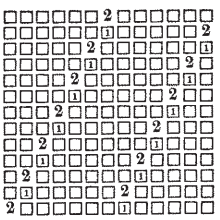
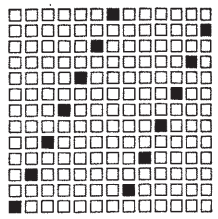
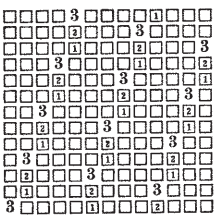


Harness number 13.
Divided by 2 and 11.
Use step-number 2.

133B

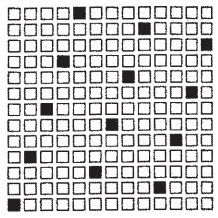


134

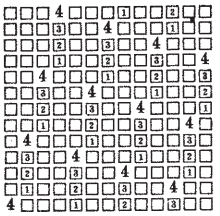


Harness number 13.
Divided by 3 and 10.
Use step-number 3.

134B

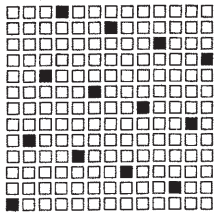


135

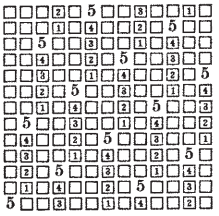


Harness number 13.
Divided by 4 and 9.
Use step-number 4.

135B

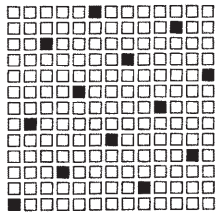


136

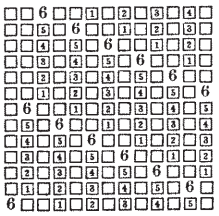


Harness number 13.
Divided by 5 and 8.
Use step-number 5.

136B

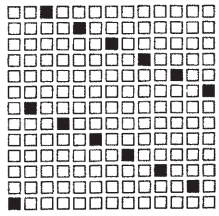


137

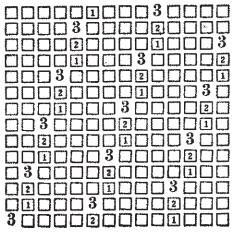


Harness number 13.
Divided by 6 and 7.
Use step-number 6.

137B

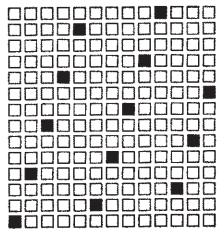


138

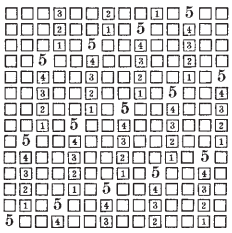


Harness number 14.
Divided by 3 and 11.
Use step-number 3.

138B

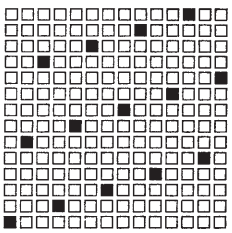


139

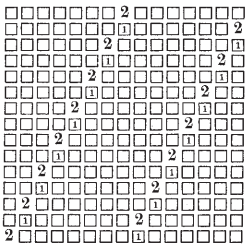


Harness number 14.
Step-number 5.

139B

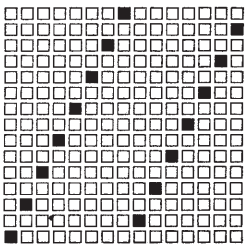


140

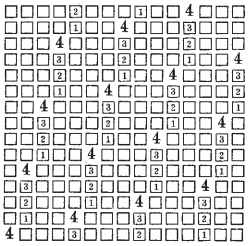


Harness number 16.
Step-number 2.

140B

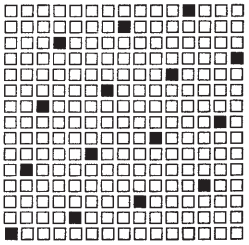


141

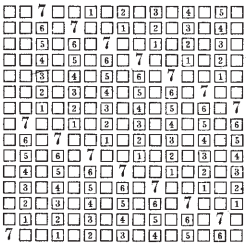


Harness number 16.
Step-number 4.

141B

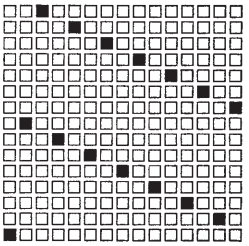


142

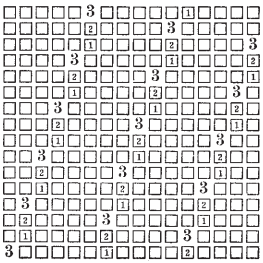


Harness number 16.
Step-number 7.

142B

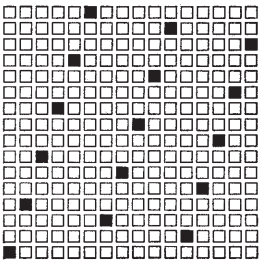


143

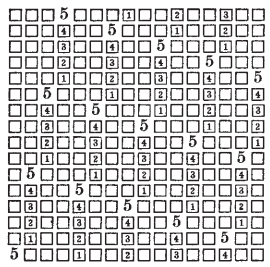


Harness number 17.
Step-number 3.

143B

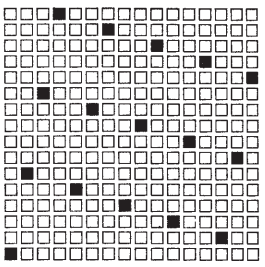


144

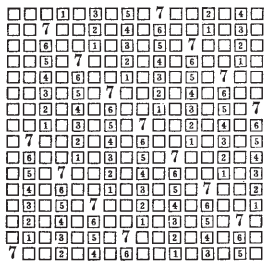


Harness number 17.
Step-number 5.

144B

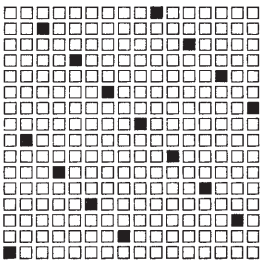


145

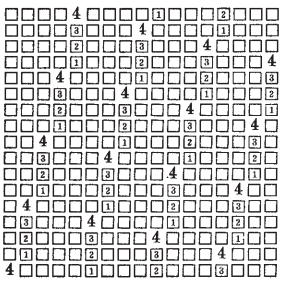


Harness number 17.
Step-number 7.

145B

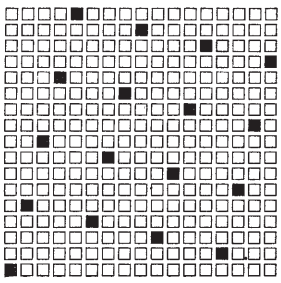


146

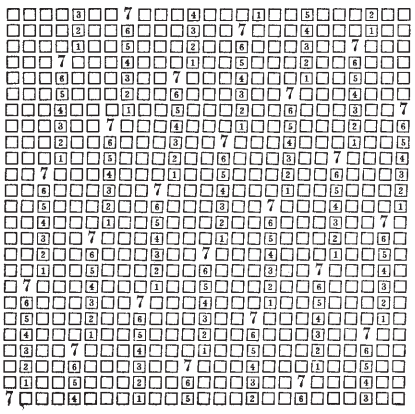


Harness number 17.
Step-number 7.

146B

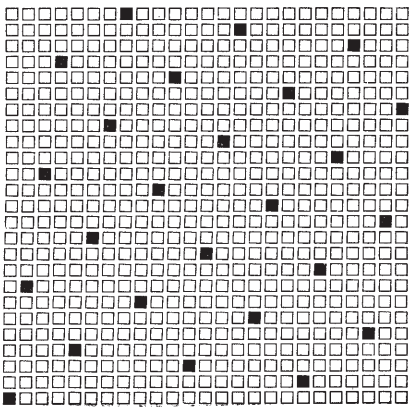


147

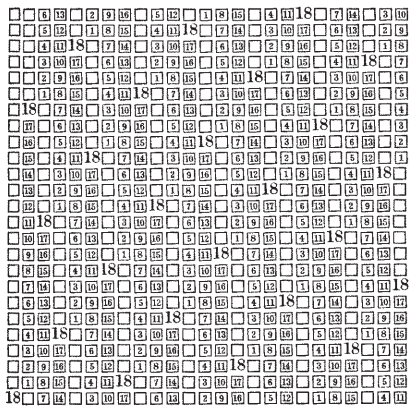


Harness
number 25.
Step-number 7.

147B

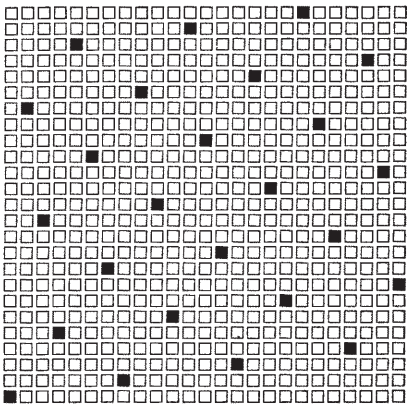


148



Harness number 25. Step-number 18.

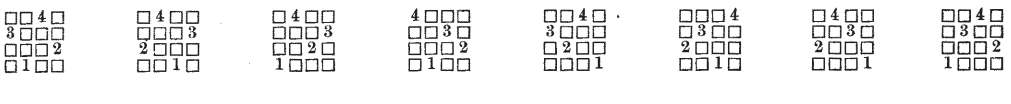
148B



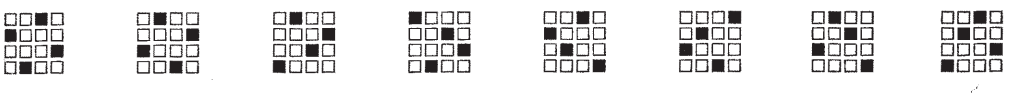
In practice very often we use the terms 4-harness and 6-harness sateens, although both weaves are cross twills and should be classed as such; but as the terms "4 and 6-harness sateens" are legitimate, we will take them up as sateens. In a true, or regular, sateen no two bindings or stitchings should be adjacent to each other, since this interferes with the rule of the sateen. There are sixteen possible positions in which the bindings or stitchings of a 4-harness sateen could be placed, but in all cases two bindings will be adjacent to each other. The appearance of the cloth will remain the same, the only difference being that the beginning of the binders has taken place in another field.

For purpose of illustration we have carried out the sixteen possible positions in Figs. 149 to 164 inclusive, and Figs. 149B to 164B inclusive.

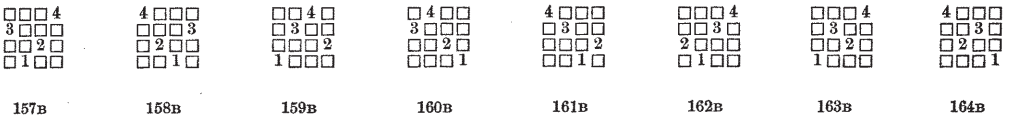
149 150 151 152 153 154 155 156



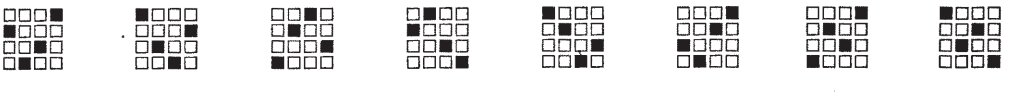
149B 150B 151B 152B 153B 154B 155B 156B



157 158 159 160 161 162 163 164



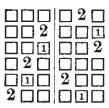
157B 158B 159B 160B 161B 162B 163B 164B



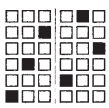
In laying out a 6-harness sateen, we can place the bindings so that no two will be adjacent to each other; but we cannot separate six into any two numbers that are in accordance with the rules given on a previous page regarding step-numbers. Nevertheless there is a rule by means of which this sateen can be constructed. Divide the six lines of fields into two parts of three each, and step

up by 2 on the first half, in the regular manner. Then start on the second line of the second half and step down 2 until the sixth line is reached. *See Figs. 165 and 165b.*

165



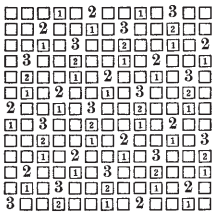
165B



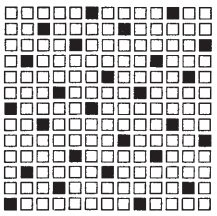
Sateens with Divided Step-numbers.

For example, we will take a 13-harness sateen. Divide 13 into 5 and 8, and use step-number 5 for working out the sateen; but this time we again divide the step-number 5 into 3 and 2, and step regularly by 3 and 2 until the 13th harness is reached. Then we start again on the first line, and stepping up by 2 and 3, until the 13th harness is reached for the second time. You will now readily see that each warp and filling thread has two bindings, where before, in all our regular sateens, there has been only one. The above sateen is illustrated by figures 166 and 167. Many good effects can be obtained by this method, by using different sateens.

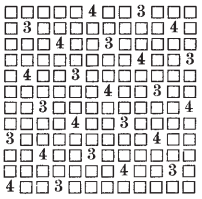
166



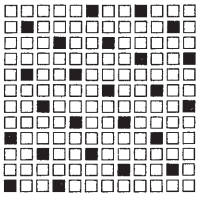
167



168



169



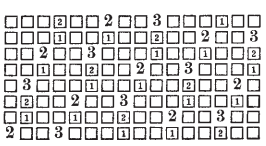
Another example is illustrated with figures 168 and 169. We use a 12-harness sateen with step-number 7, divide into 4 and 3, and step regularly with 4 and 3; but this time we continue on the same line with 4 and 3 before we step over to the second line, and so on until the 12th line is reached.

Another example is shown in figures 170 and 170B. We take the 8-harness sateen with step number 5, and again divide this number into 2 and 3 and step alternatingly with 2 and 3. The result is that in this case the design will require 16 ends, since a complete step-number of 5 takes two lines. Therefore 16 ends are required.

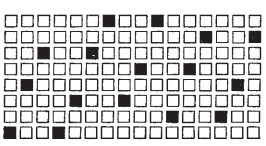
Figures 171 and 171B are a 10-harness sateen worked on the same principle; step-number 7 divided into 2 and 5. Twenty lines in this instance are required to complete the weave.

Figures 172 and 172B, harness number 15, step-number 11, divided into 4 and 7. 30 lines are required.

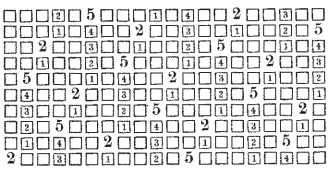
170



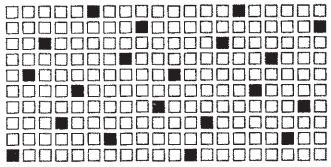
170B



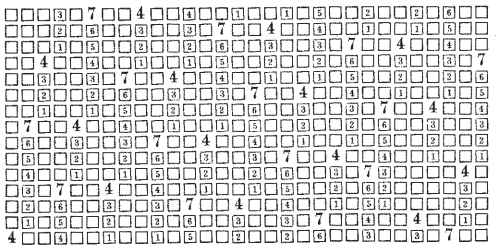
171



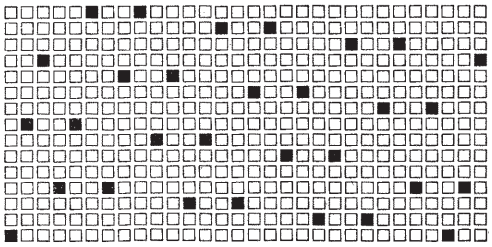
171B



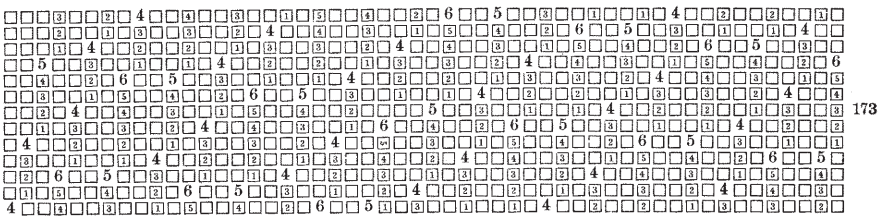
172



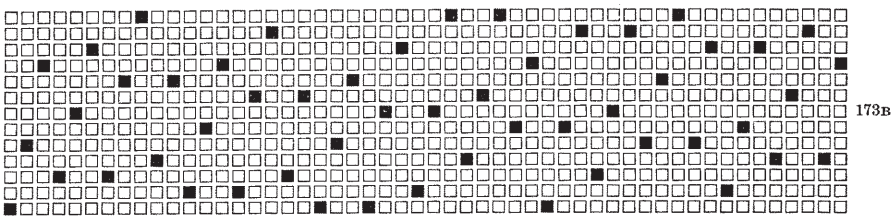
172B



Dividing of the step-numbers can be still further extended. For example, we use a 13-harness sateen with step-numbers 4+4+5+6=19. A complete step-number of 19 for a harness number 13 seems not possible; but we will readily see that it can be done. Step-number 19 divided into four parts, 4, 4, 5 and 6. Therefore multiply the four step-numbers by the harness number; the product equals the total number of lines to complete the design. 4×13=52. *See Figures 173 and 173b.*

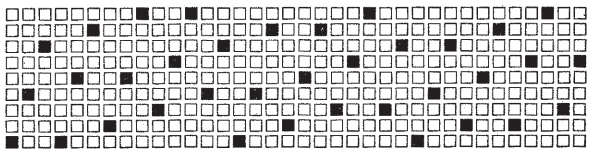


173



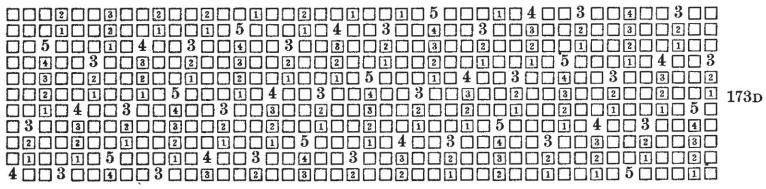
173B

We now construct a design on a 9-harness sateen, step-number 13, which we wish to divide into four parts, 4, 3, 3 and 3. Therefore 4×9=36 lines will be the repeat of this design. *See Fig. 173c.*



173C

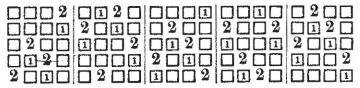
Another example may be herewith explained. Harness number 11, step-number 15 divided into four parts, 4, 3, 5 and 3. 4 times the harness number 11, equals 44. Therefore the number of lines required to complete the design will be 44. *See Fig. 173d.*


173D

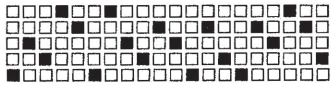
Interchanged *Sateen.*

For example, we take a 5-harness sateen with step-number 2. We divide our plan into five groups of four lines each. Harness number 5 and group number 4 will require 20 lines to complete the weave. The step-number, however, will not be used in the same way as before. We wish to interchange the third and fourth line of each group of four, the original group being stepped up by two in the ordinary method. This will be equivalent to stepping as follows: first to second, second to fourth, fourth to third; then to first of second group, first to second, second to fourth, fourth to the third and so on. Figures 174 and 174B illustrate this method. If this plan were to be continued for several groupings in height, a much better idea of the arrangement of the weave and the appearance of the design would be obtained.

174

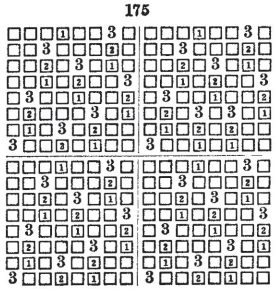


174B

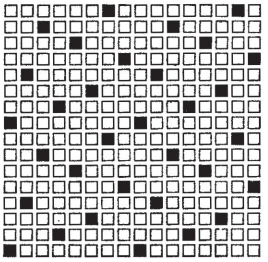


Figures 175 and 175B show an 8-harness sateen with step-number 3. We divide our field into groups of four, and since four is a factor of eight, then only eight lines will be required to complete the design. (The general rule may here be stated: When the group number is a factor of the harness number, then the number of lines required to complete the design will be the same as the harness number. When the group number is not a factor of the harness number, then the number of lines required will be the product of the group numbers and the harness number.) We now step regularly on the first, second, third and fourth lines; then from the fourth we step to the eighth, then regularly back to the seventh, sixth and fifth. The design is carried out twice each way.

175

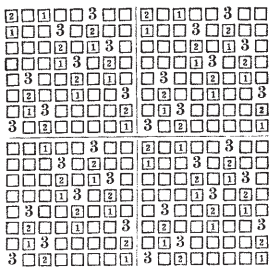


175B

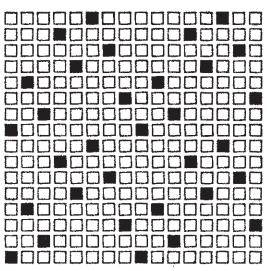


Figures 176 and 176B show the same 8-harness sateen, but this time the field is divided into groups of two. According to the general rule stated above, the number of lines required to complete the design will be 8. We now step regularly on the first and second, from the second to the fourth, and back to the third; from the third to the fifth and sixth, to the eighth and back to the seventh. This design is also carried out double size each way.

176



176B



Figures 177 and 177B show a 10-harness sateen with step-number 3. The field is divided into groups of 5, and we step regularly on the first, second, third, fourth and fifth, then to the tenth, ninth, eighth, seventh and sixth. This design is similarly plotted to figures 175 and 175B save that we now have 10 harnesses instead of 8. In order to simplify the plan, we will now show the step-numbers in part of the field only, the remaining portion giving the weave itself. It will be noted that the step-numbers indicate the bindings, and in several instances are used to denote the weave.

177

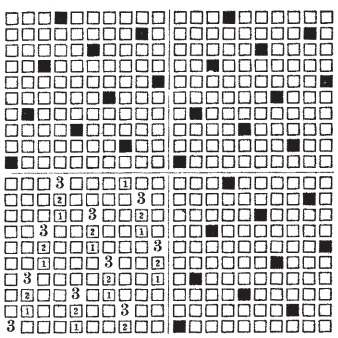


Figure 178 is designed from a 5-harness sateen with step-number 3, the field being divided into groups of 6 ends each. Harness number 5 times group number 6 equals 30 ends, which are required to complete the design. We now step regularly on the first, second and third lines, from the third line we step to the sixth and back to the fourth, from the fourth we step to the seventh, eighth and ninth, from the ninth to the twelfth and back to the tenth, from the tenth we step to the thirteenth, fourteenth and fifteenth, from the fifteenth to the eighteenth and back to the sixteenth, and so on until the design is completed.

178

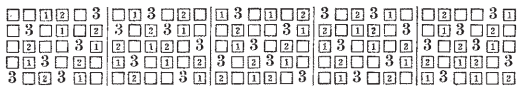
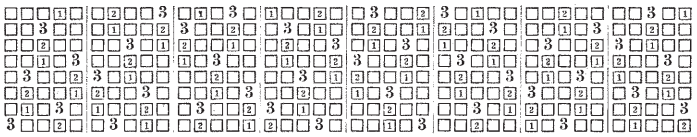
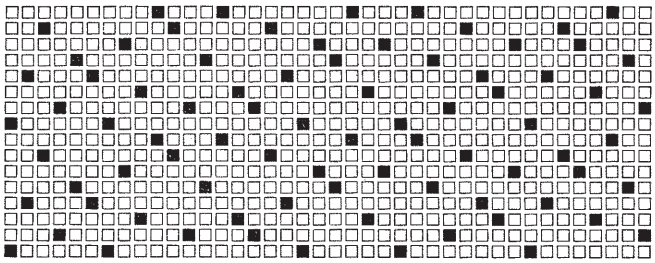


Figure 179 is an 8-harness sateen with step-number 3. The field being divided into groups of five lines, forty lines will be required to complete this design. Step regularly five lines in the first group, from there to the last end in the second group and step regularly back to the first end in the second group; from there step to the first end in the third group, and so on until the design of forty ends has been completed. Figure 179B shows the design twice the repeat in height.

179

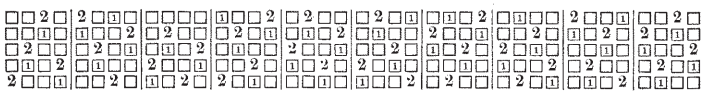


179B

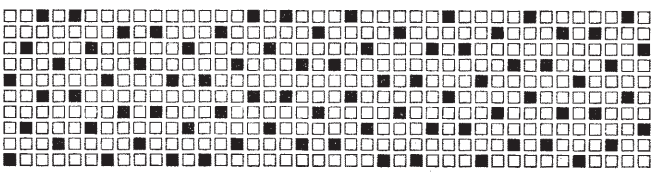


Figures 180 and 180B are constructed of 5-harness sateen, step-number 2, group number 8. 5×8=40. Forty ends required for the design. We step regularly with 2 on the first, second, third and fourth, from the fourth to the eighth and back to the fifth; from the fifth we step over to the ninth, tenth, eleventh and twelfth, regularly from the twelfth to the sixteenth and back to the thirteenth, and so on.

180



180B



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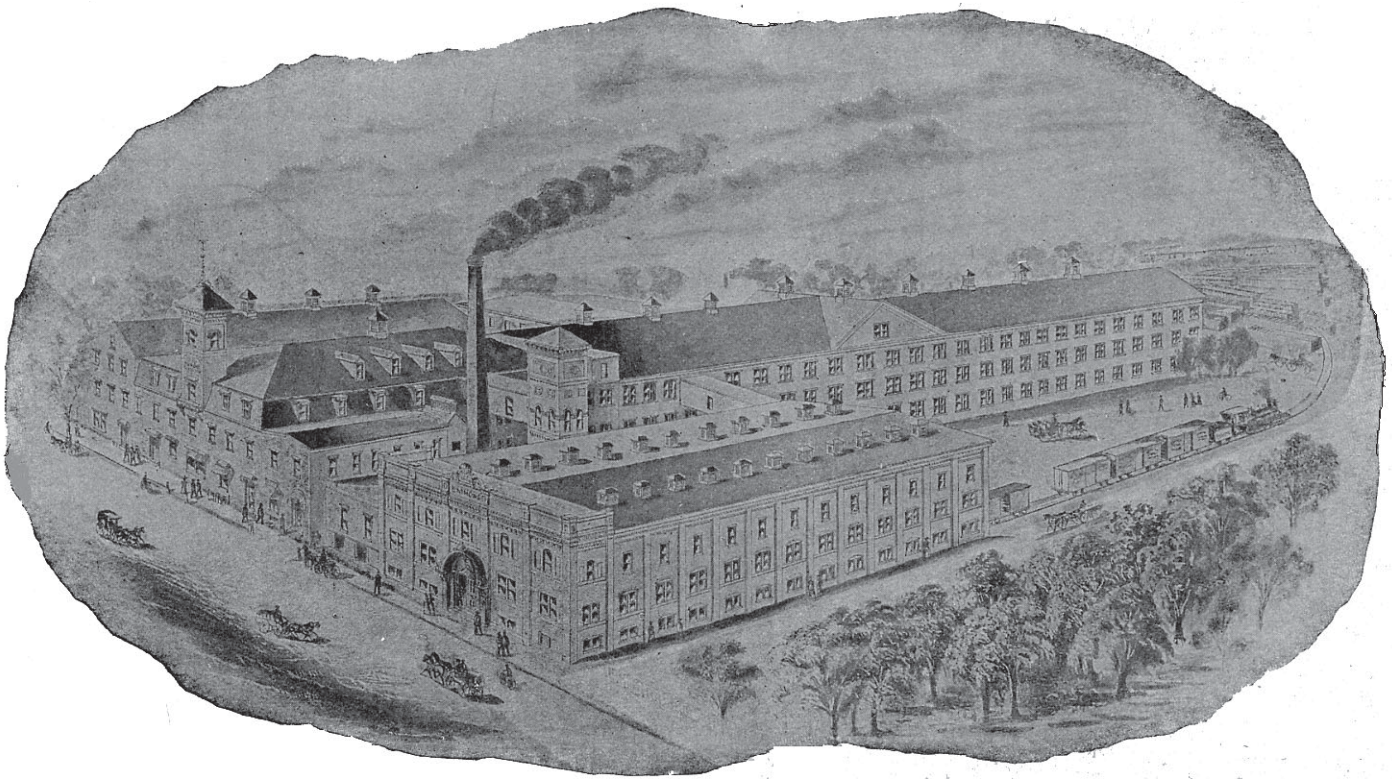

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