

HAND BOOKS OF THE TEXTILE INDUSTRY, VOL. I.

Dictionary of Weaves

PART I.

**A COLLECTION OF ALL WEAVES FROM
FOUR TO NINE HARNESS**

By E. A. POSSELT

Editor of Posselt's Textile Journal

**Two Thousand Weaves Conveniently Arranged
for Handy Use**

Lexicon der Gewebemuster

Band I.

*Eine Sammlung von allen Gewebemustern von vier bis neun-
schäftig. Zwei Tausend Gewebemuster für den
praktischen Gebrauch geordnet.*

Manuel des Dessins du Tissage

Première Partie

*Une collection de Tous Genres des Dessins du Tissage
de Quatre à Neuf Lisses.
Deux Mille Dessins Classés à Convenance.*

TEXTILE PUBLISHING COMPANY

2154 North 21st Street, Philadelphia

London, Eng.: Sampson Low, Marston & Co., Ltd.

PREFACE

The purpose of these Hand Books is to bring the Various Branches of the Textile Industry conveniently arranged before the reader so that he may consult whatever subject of the Industry he is more particularly interested in.

The present Volume of this Series of Hand Books, the

Dictionary of Weaves, Part 1,

covers a collection of all the Weaves for Four, Five, Six, Seven, Eight and Nine Harness, and which will be followed by successively issued parts, covering all the weaves possible to be made up to Twenty-four Harness. One of these parts will be issued regularly every year, the next part to deal with Ten, Eleven and Twelve Harness Weaves, etc.

In designing these weaves, stress has been laid on selecting such weaves as will be of practical value.

The various repeats of this collection of weaves have been kept separate as much as possible; the repeat of the warp-threads, *i. e.*, number of harnesses necessary for each weave is indicated on top of each page, whereas the numerals on the bottom of each page indicate a summary of the repeats of all weaves given, both warp and filling ways. The numeral in front of the multiplication sign indicates the repeat for the warp-threads, the numeral after the multiplication sign that for the filling.

The grouping of the various repeats of weaves on each plate are such that the eye can readily grasp the repeat filling ways of any one of the collection of weaves given, by consulting the sets of numerals at the bottom of the page, and which, provided more than one set of numerals are used, are indicated corresponding side by side to that of the arrangement of the weaves in the collection above it.

Wherever possible to do so four repeats of the weave are given in order to convey a good idea of its general effect in the fabric. To simplify subject to the designer, in most all instances complete repeats of a weave are given, whereas with such weaves where more than one repeat is shown in order to bring such weaves within compass of the plate (referring to large pronounced effects) by consulting the proper set of numerals on the bottom line the eye will readily grasp the repeat of the pattern.

With reference to other Branches of the Textile Industry and which will be taken up in successively issued volumes of these Hand Books, besides the serial continuation of the Dictionary referred to, Books on the following subjects are now in course of preparation: Designing and Weaving of Narrow Ware Fabrics; The Finishing of Ribbons and Trimmings; The Analysis of Textile Fabrics; Silk from Cocoon to Loom, etc.

VORWORT

Der Zweck dieses Werkchens

Lexicon der Gewebemuster, Band 1,

ist, jedem Webereibeflissenen zu ermöglichen mit einer Vorrichtung von Vier bis Neun Schäften massenhafte Musterungen auszuführen. Nur Bindungen von praktischem Werth sind gegeben.

Jedes Jahr wird ein neuer Band erscheinen; der nächste wird die Gewebemuster für Zehn, Elf und Zwölf Schäfte bringen.

INTRODUCTION

Le present volume d'une serie de manuels couvre une

Collection d'Armures, Première partie

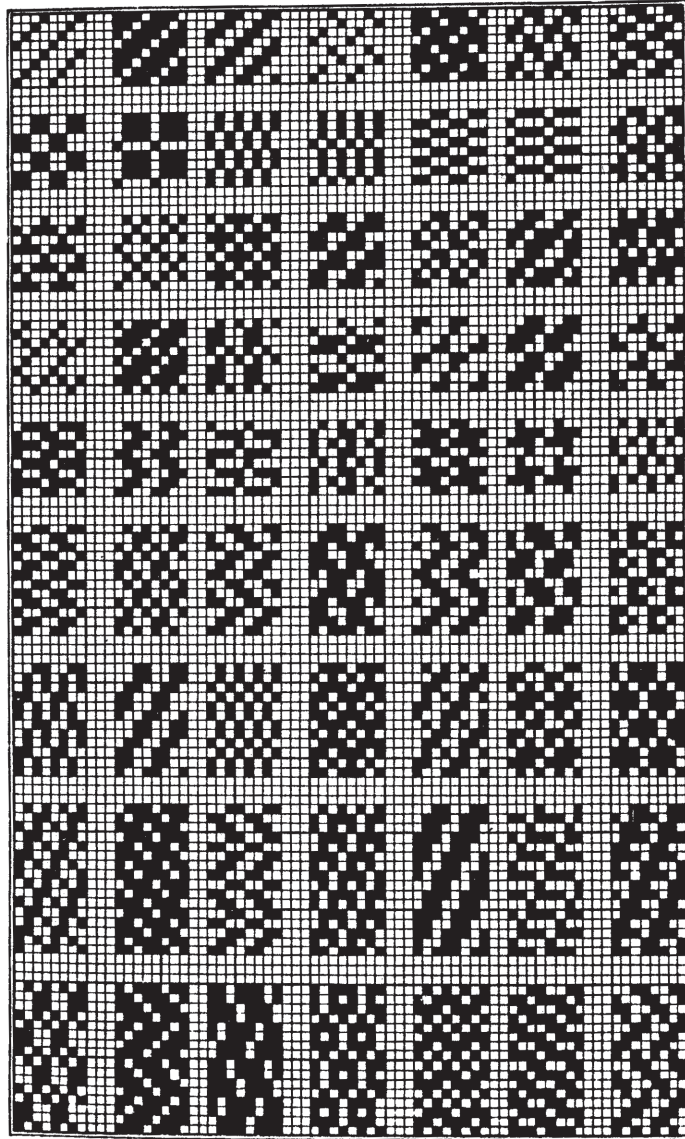
toutes les armures pour quatre, cinq, six, sept, huit et neuf lisses.

D'autres volumes vont suivre, couvrant toutes les armures possibles jusqu'à vingt-quatre lisses.

Un volume va paraitre chaque année, le prochain contiendra les armures à dix, onze et douze lisses.

FOUR HARNESS

1

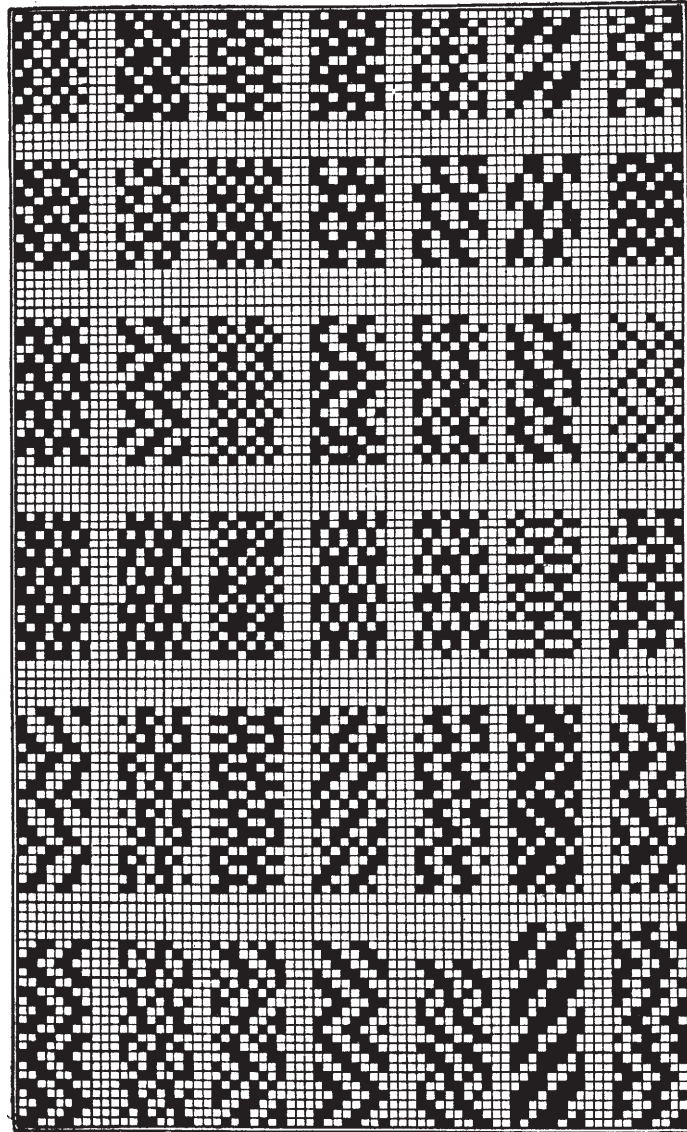


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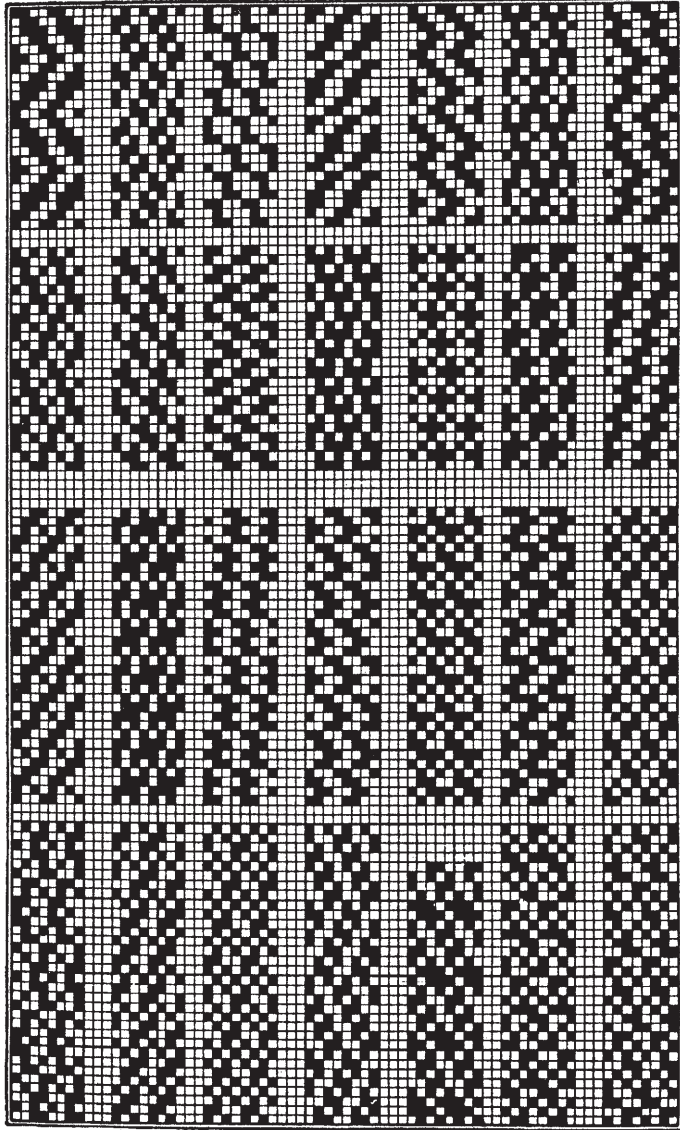
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FOUR HARNESS



4×3 4×6 4×4 4×8 4×10 4×9 4×11

FOUR HARNESS



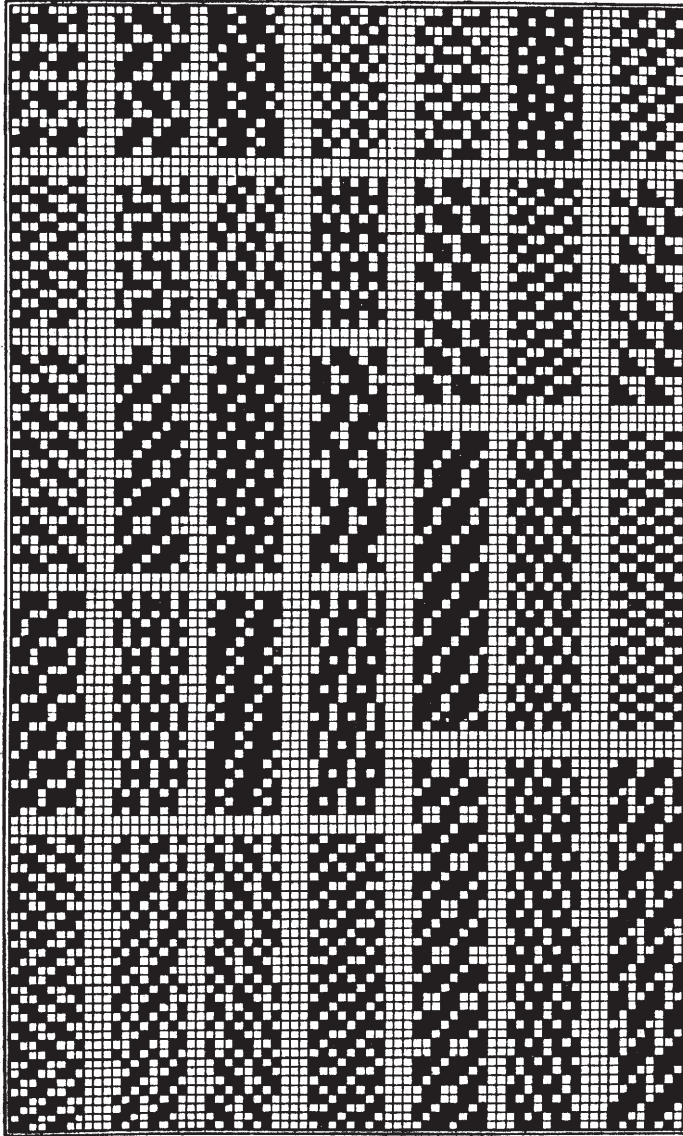
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4 × 16

4 × 28

4 × 32

FOUR HARNESS

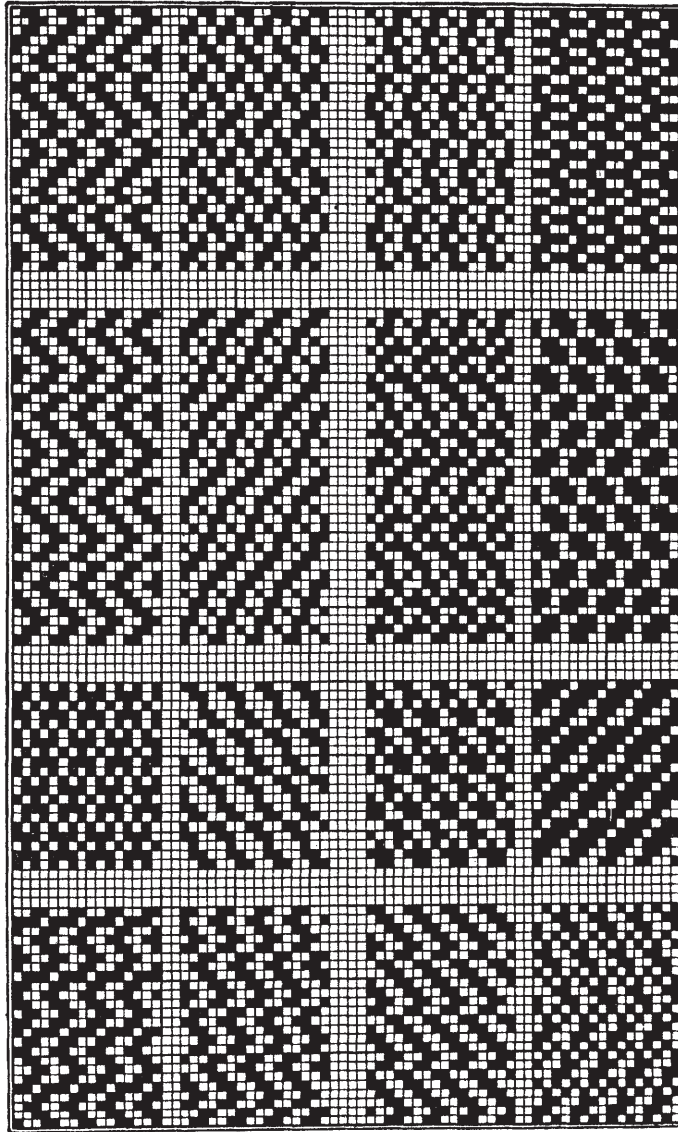


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FOUR HARNESS

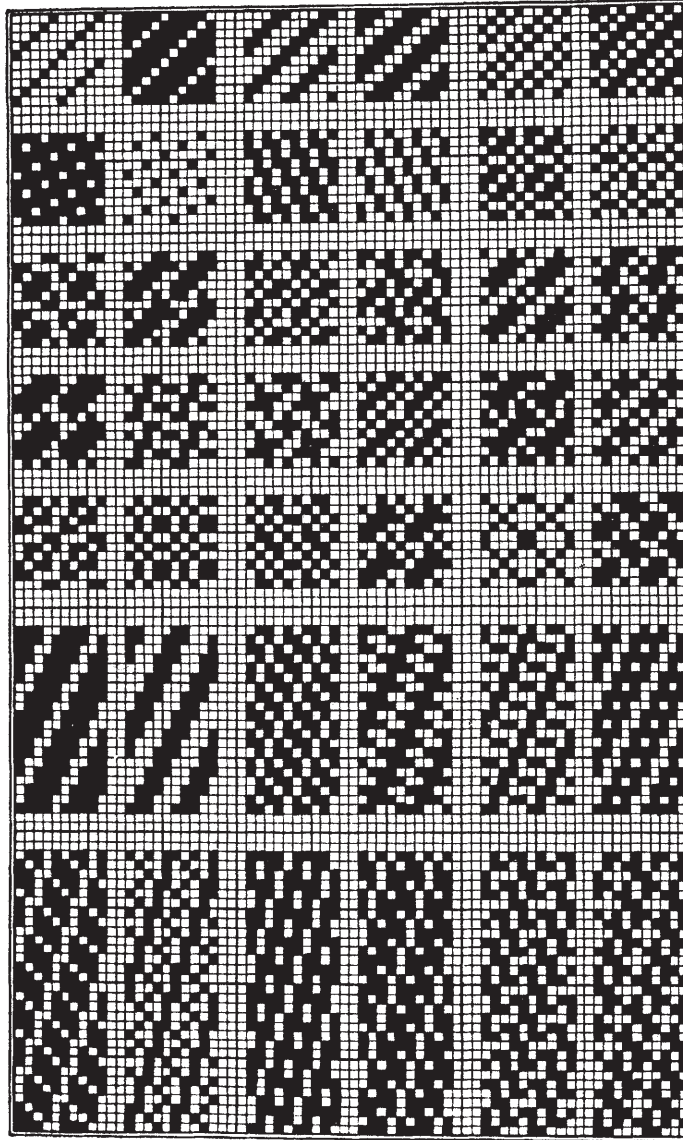


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4 × 18

4 × 20

4 × 24



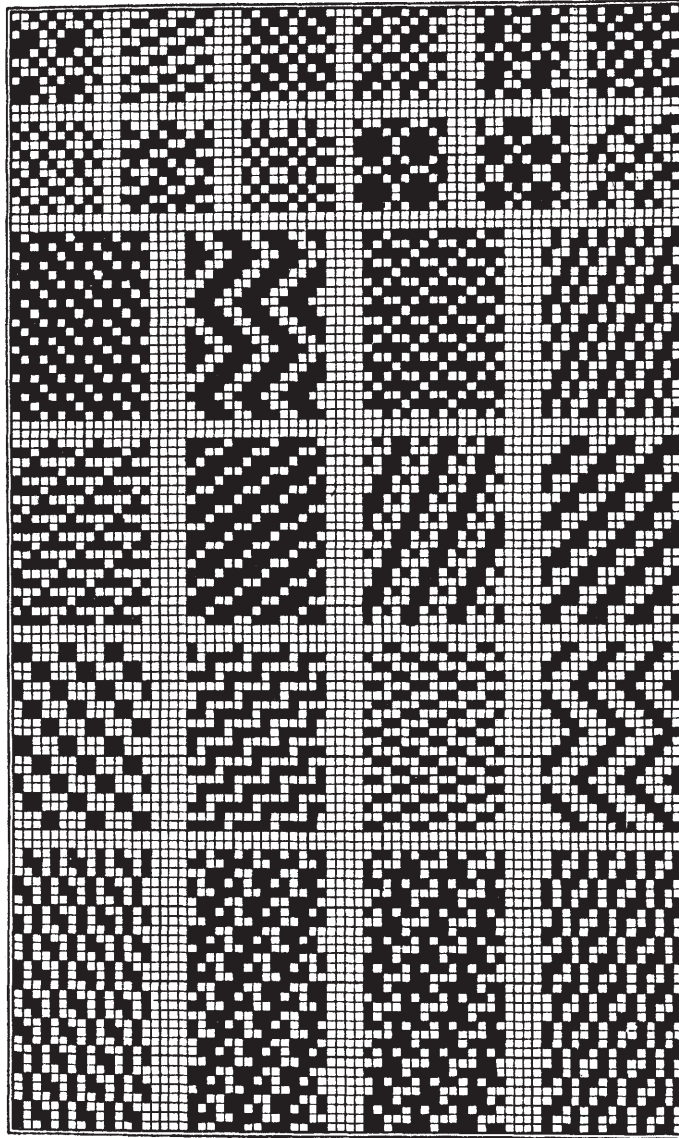
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5 × 15

FIVE HARNESS

7

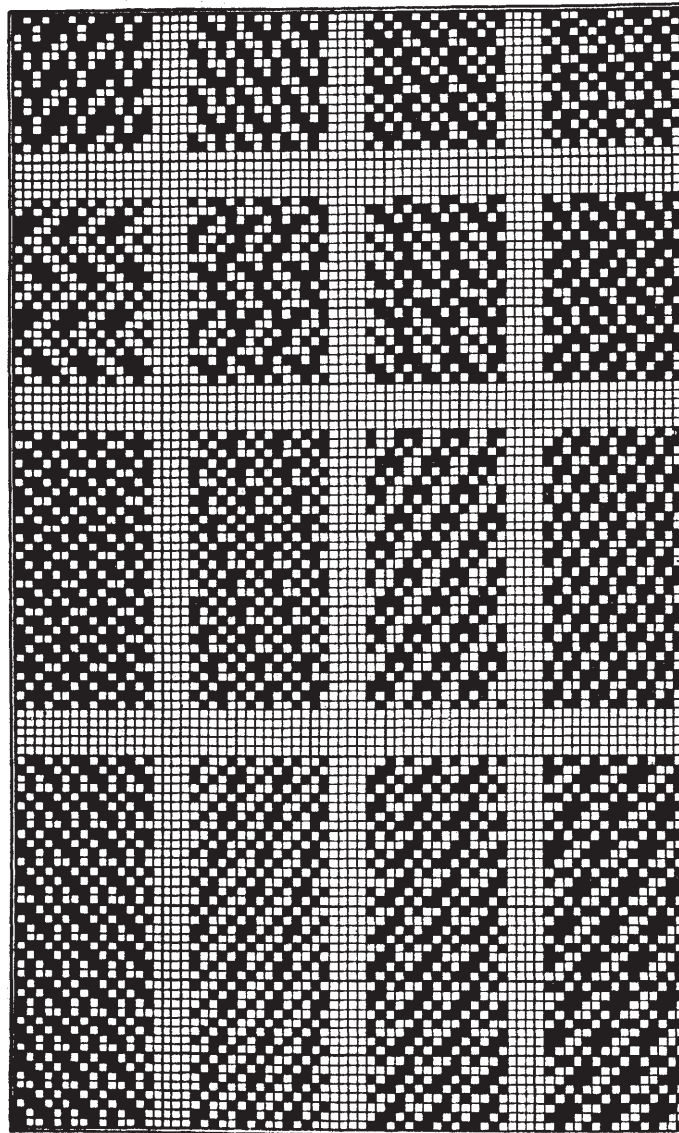


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FIVE HARNESS



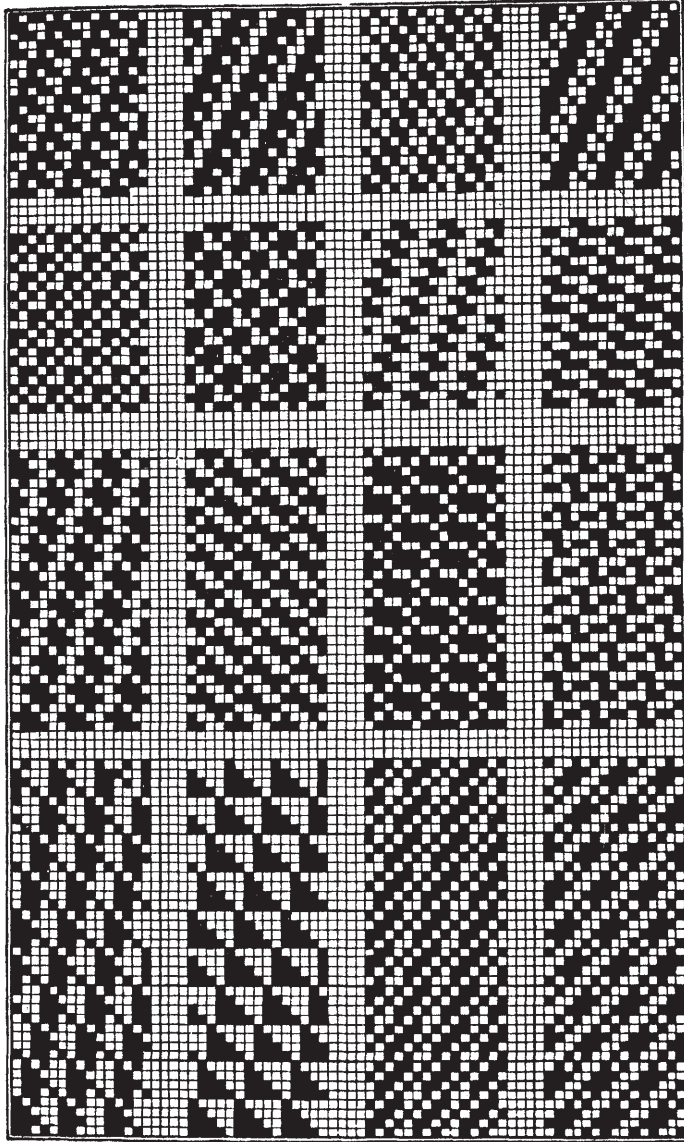
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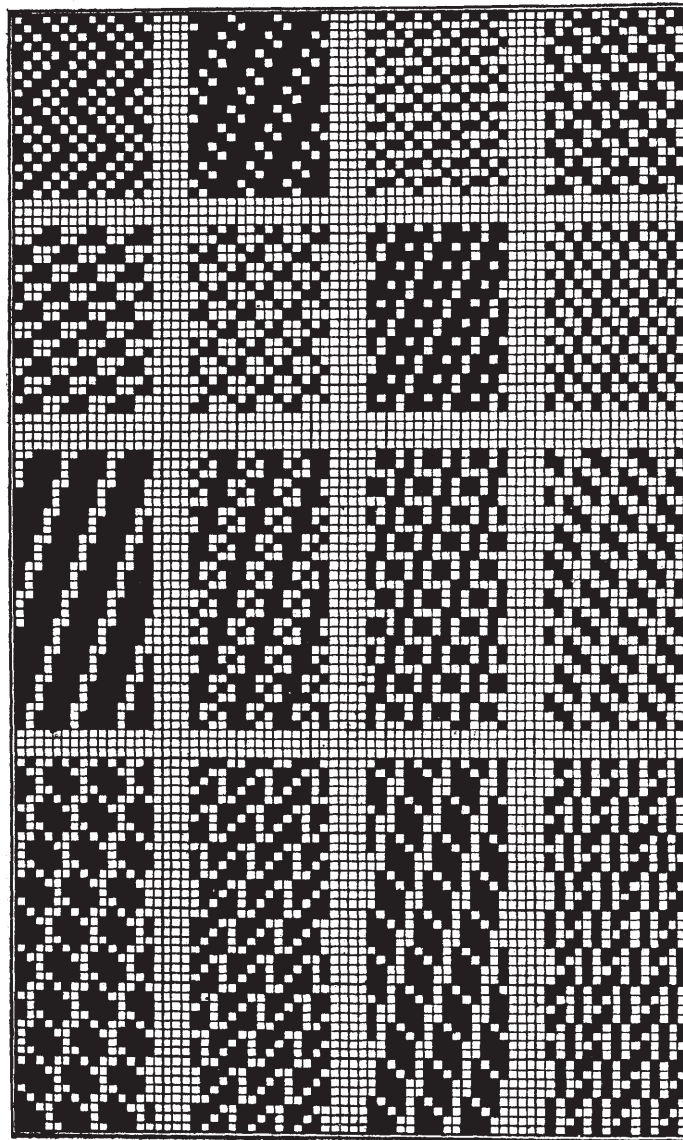
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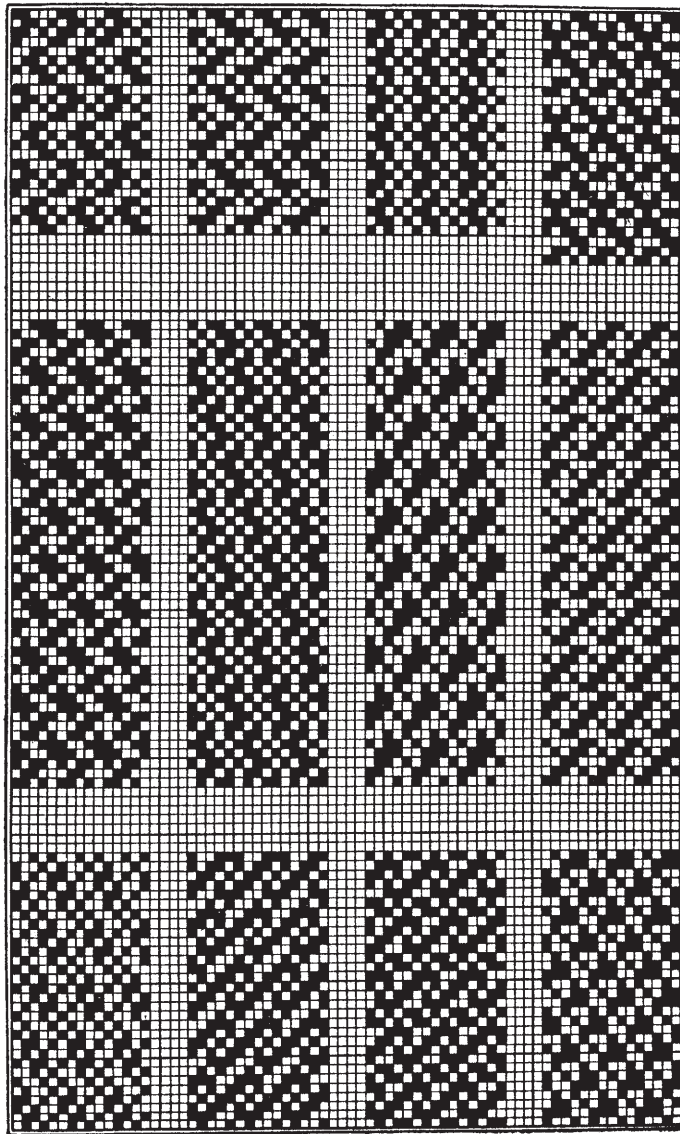


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FIVE HARNESS



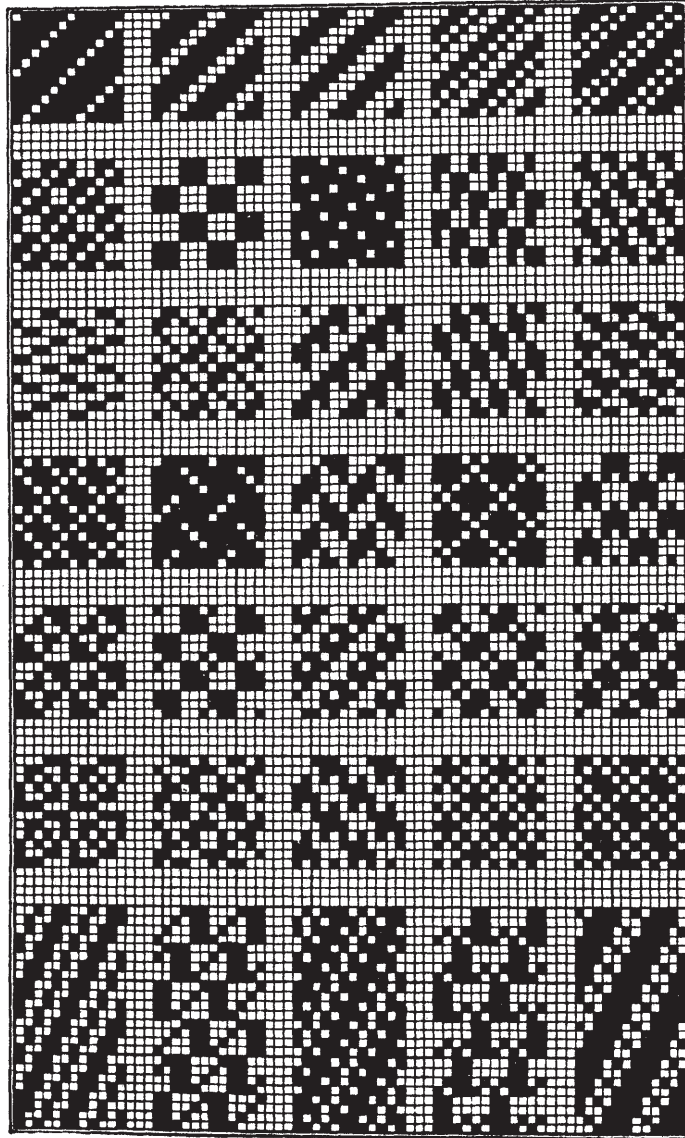
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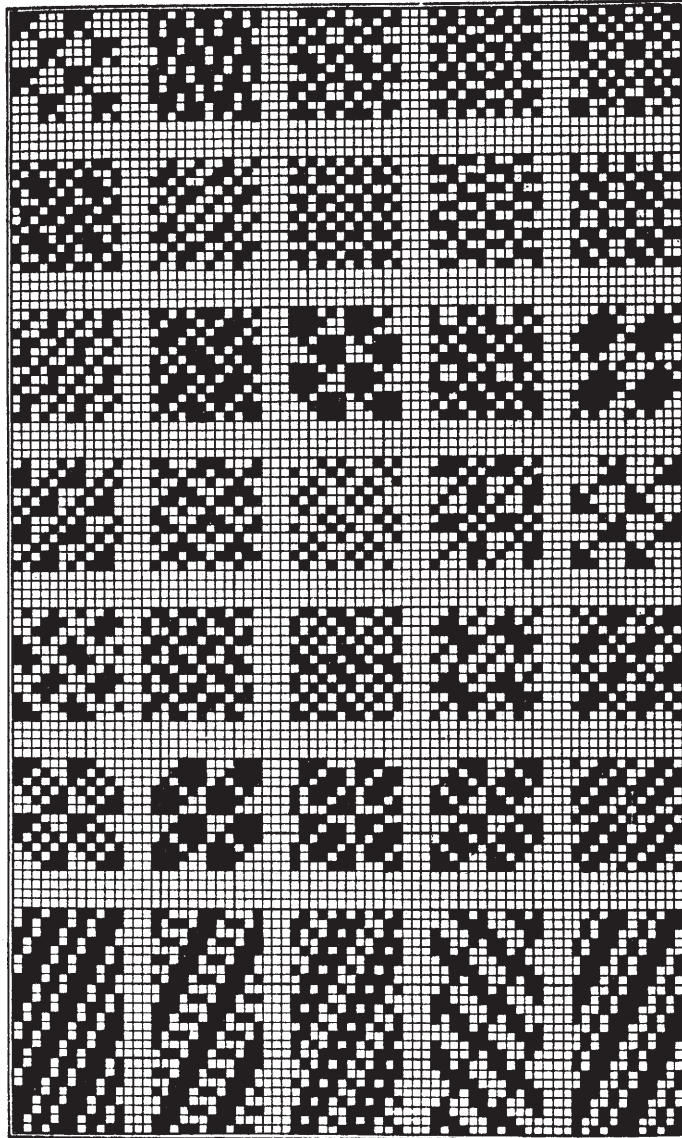
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SIX HARNESS



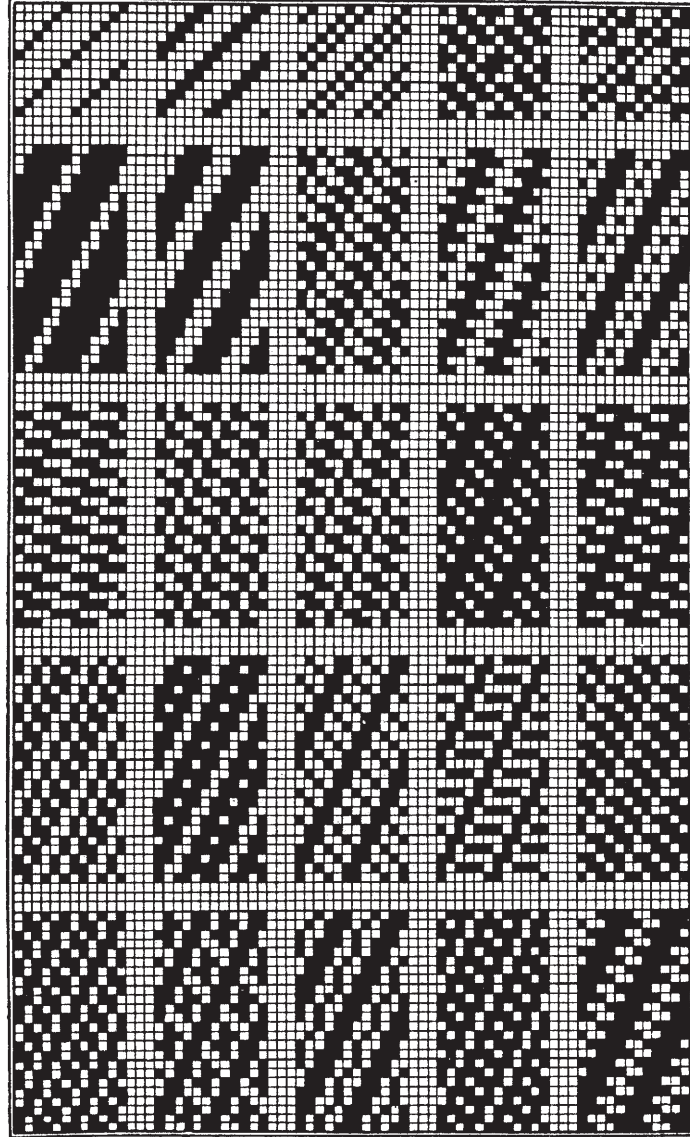
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6 × 6

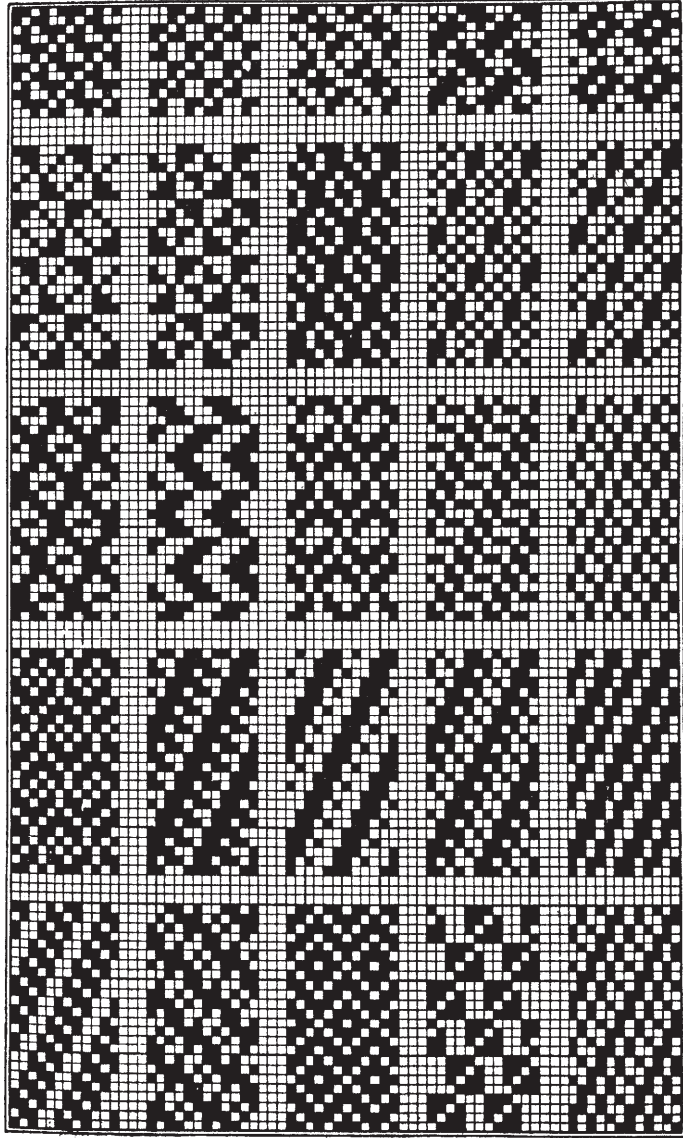
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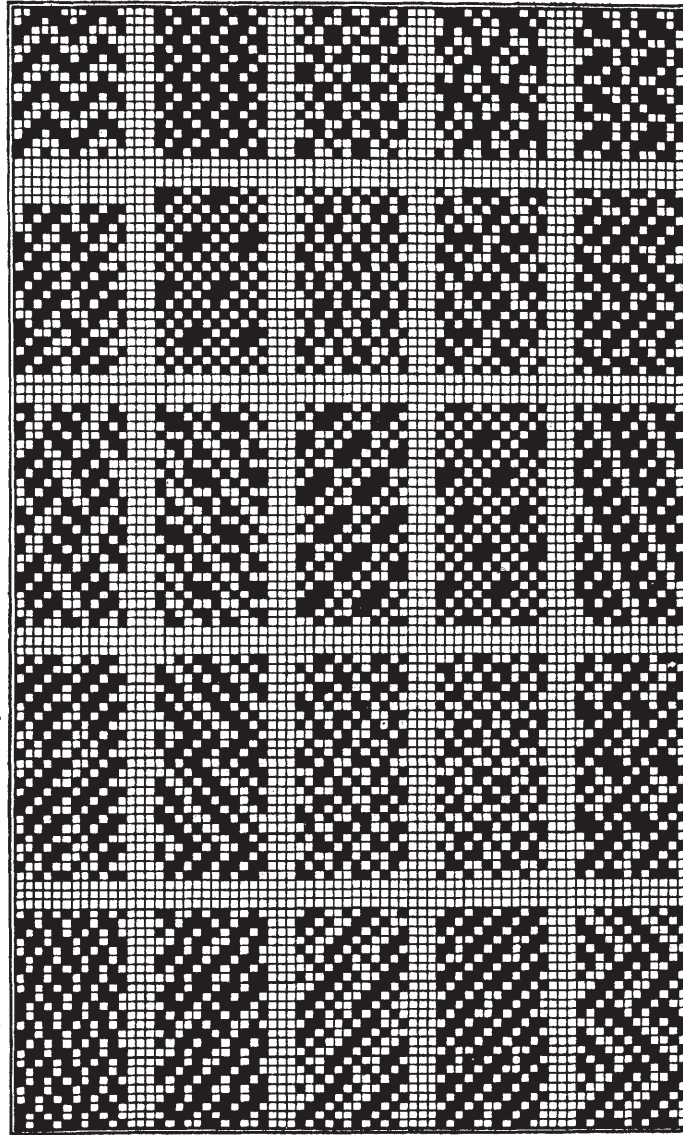
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SIX HARNESS



6 × 6

6 × 12



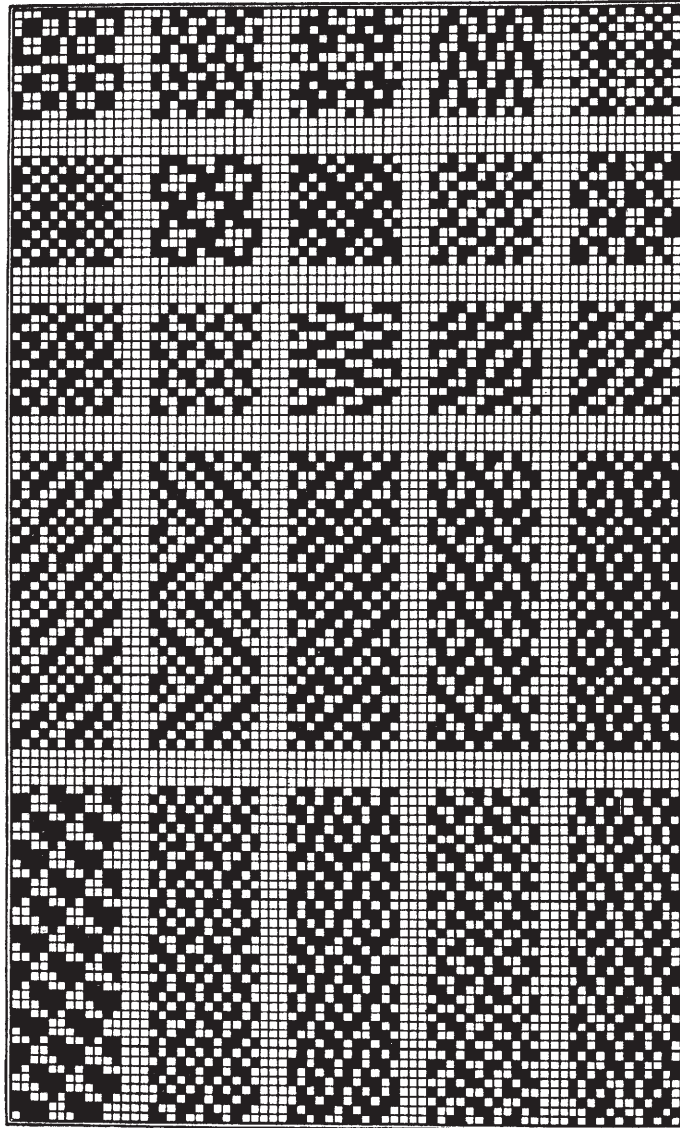
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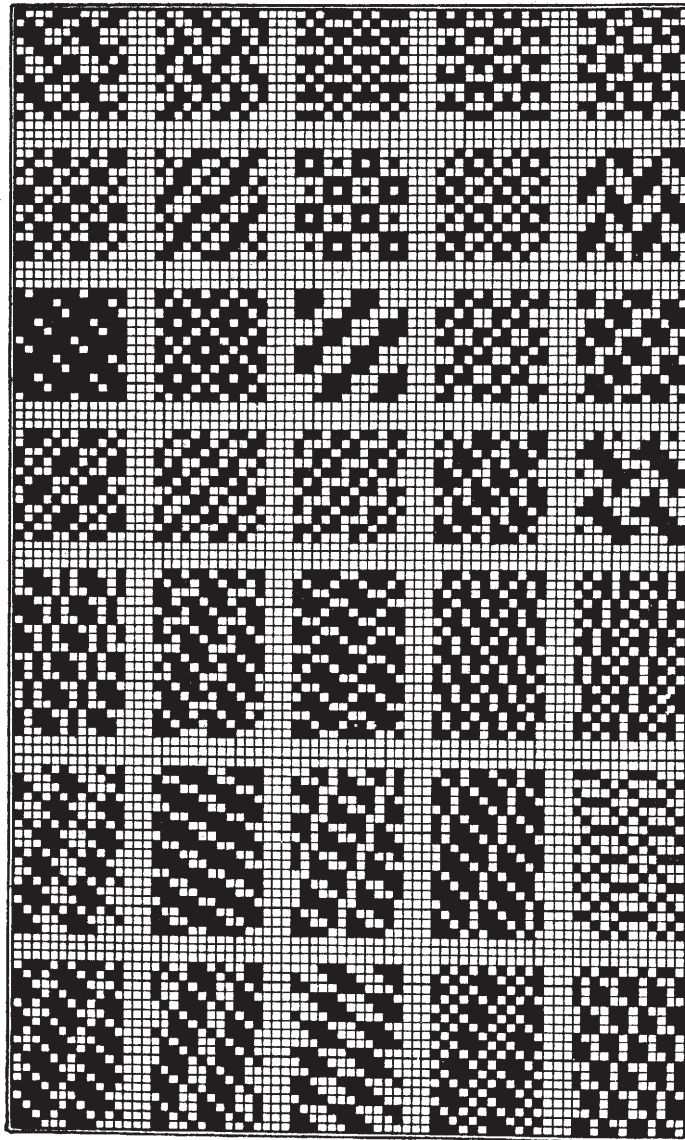
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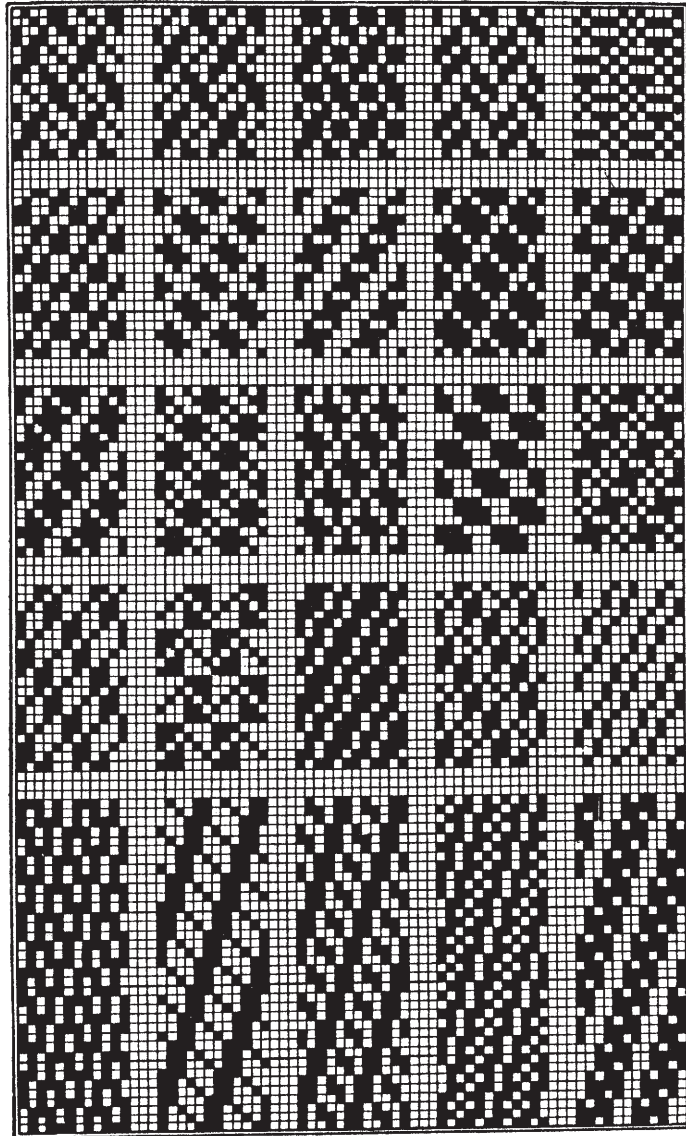
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6 × 18



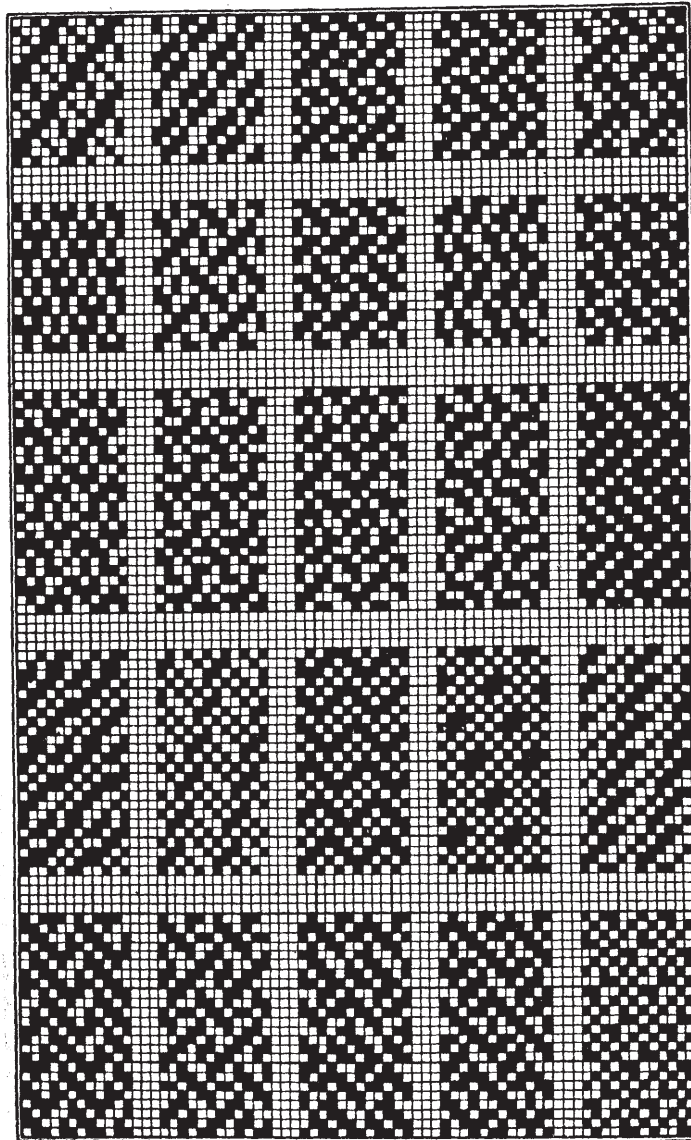
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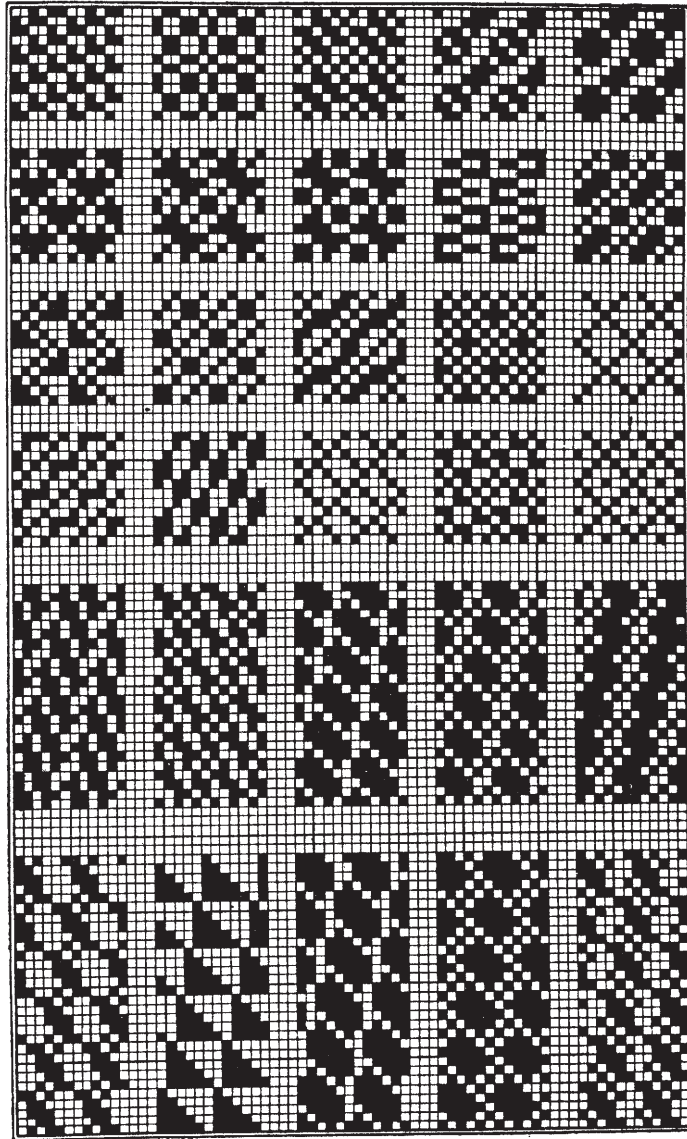
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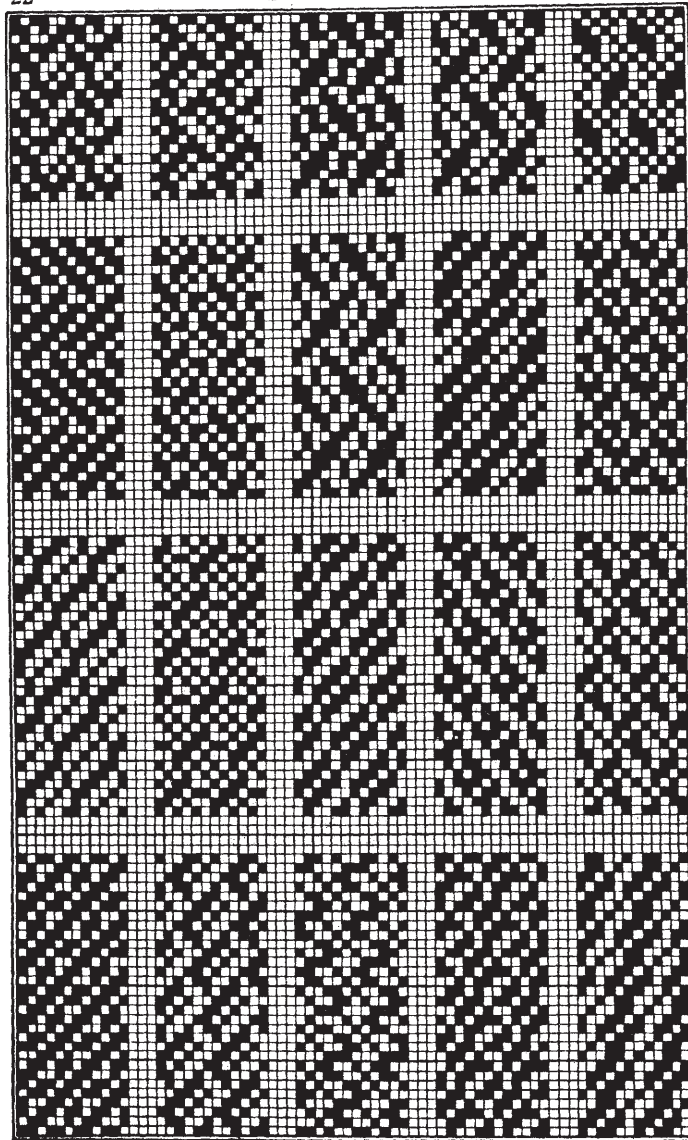


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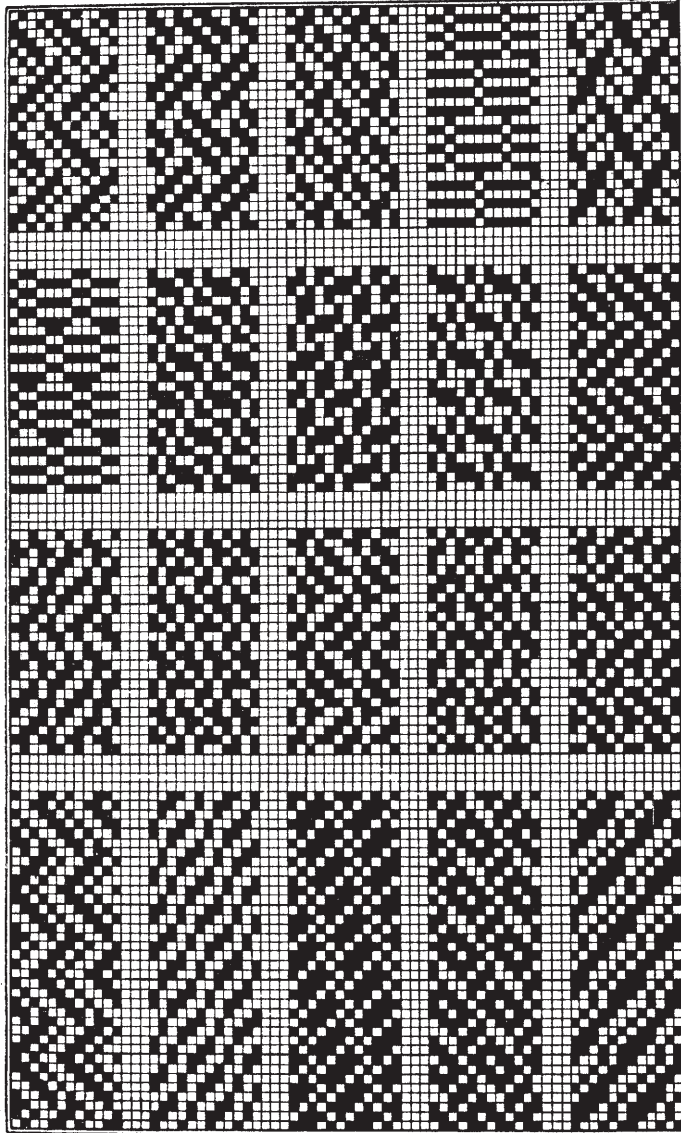


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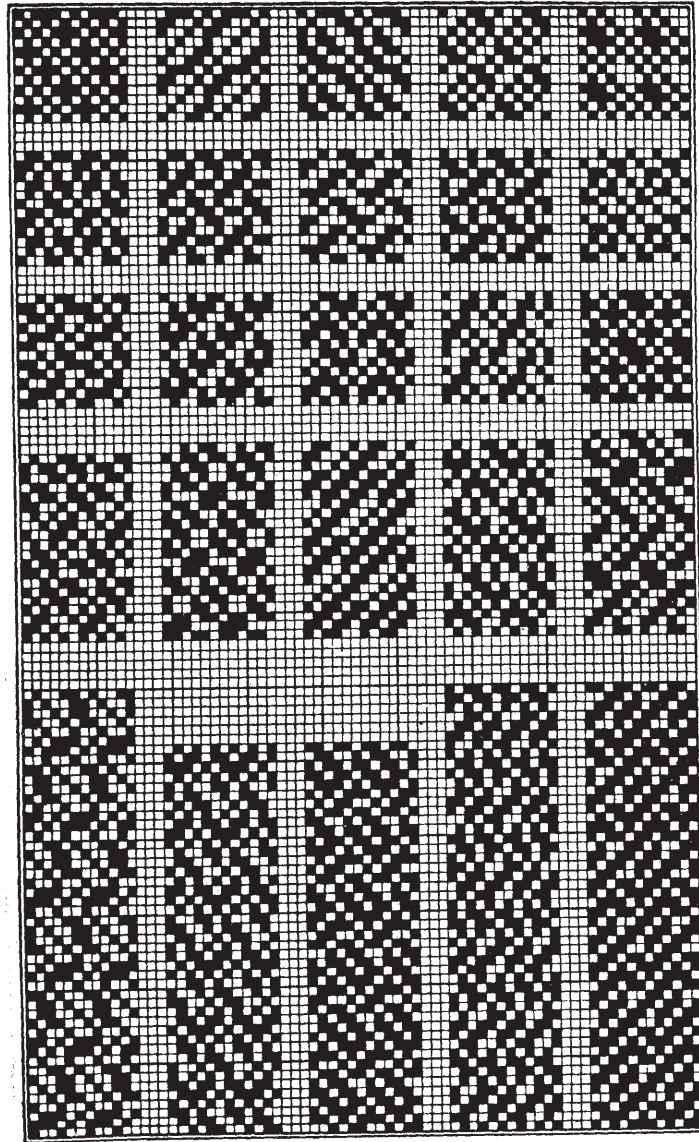


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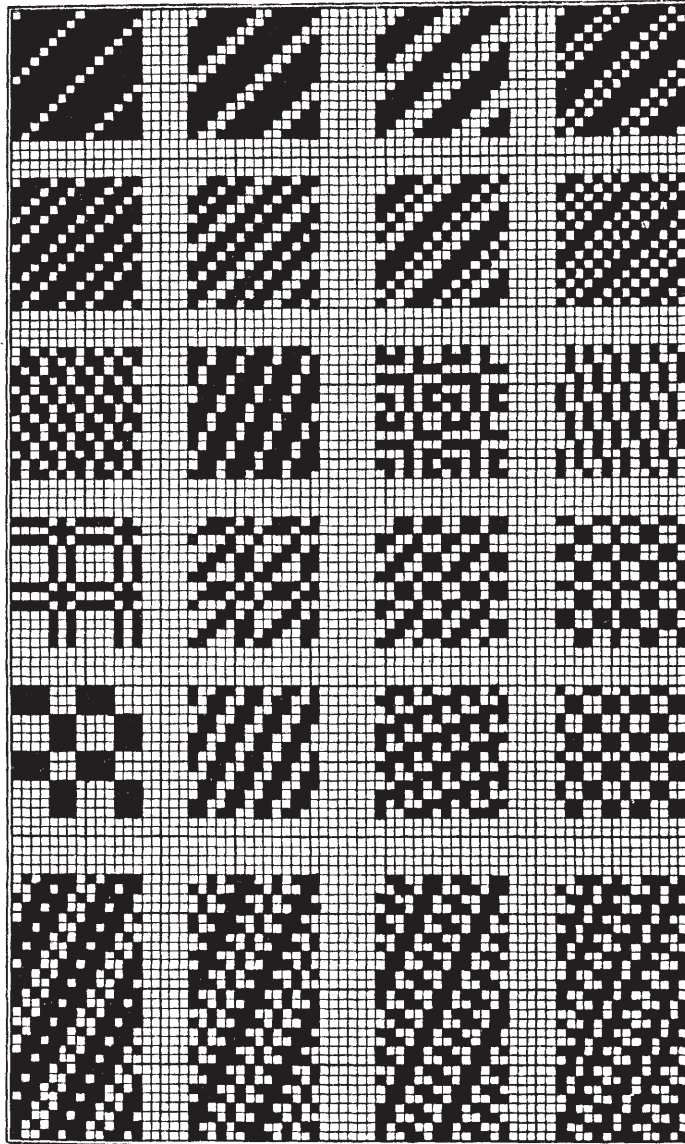
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SIX HARNESS



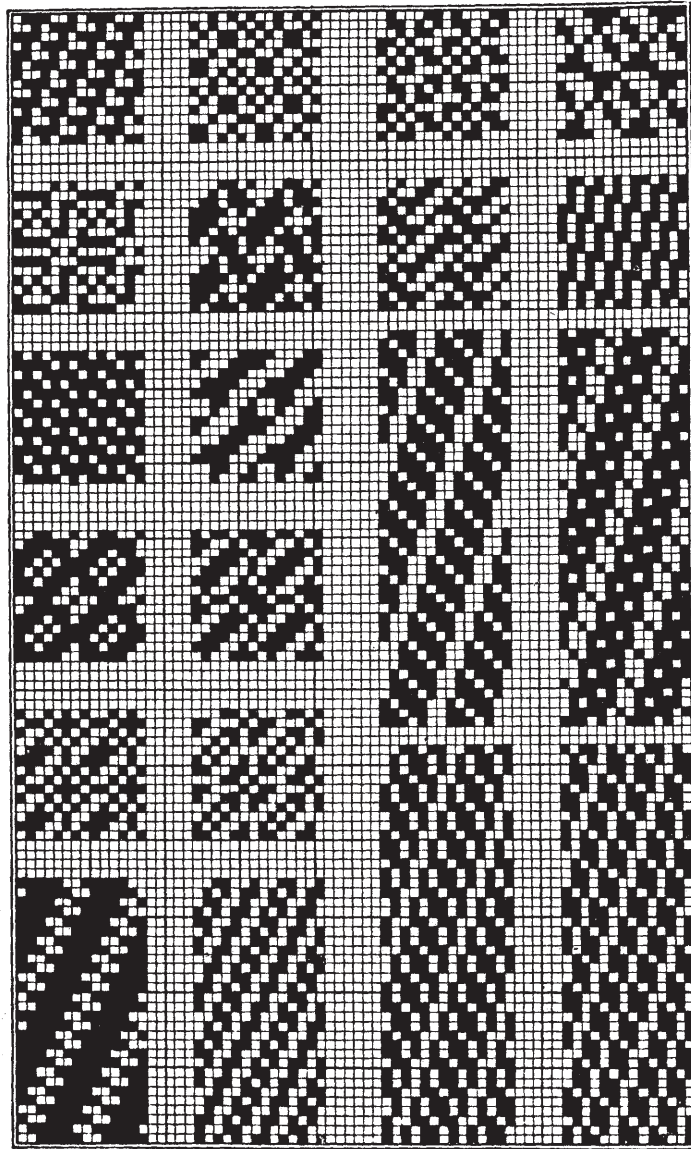
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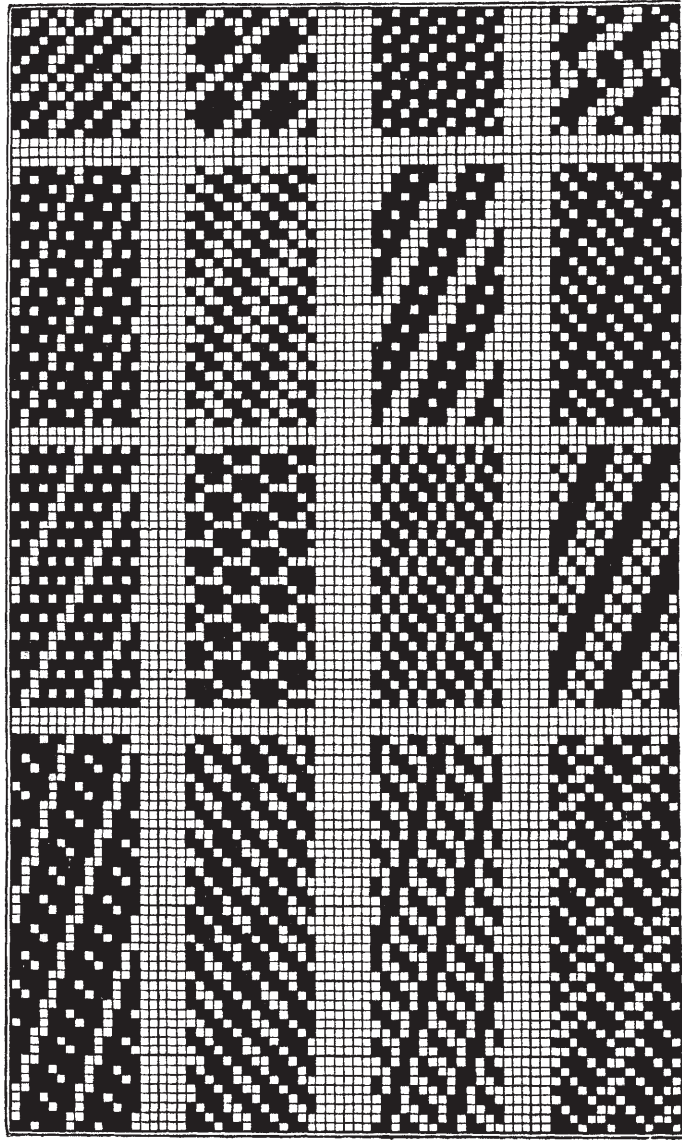


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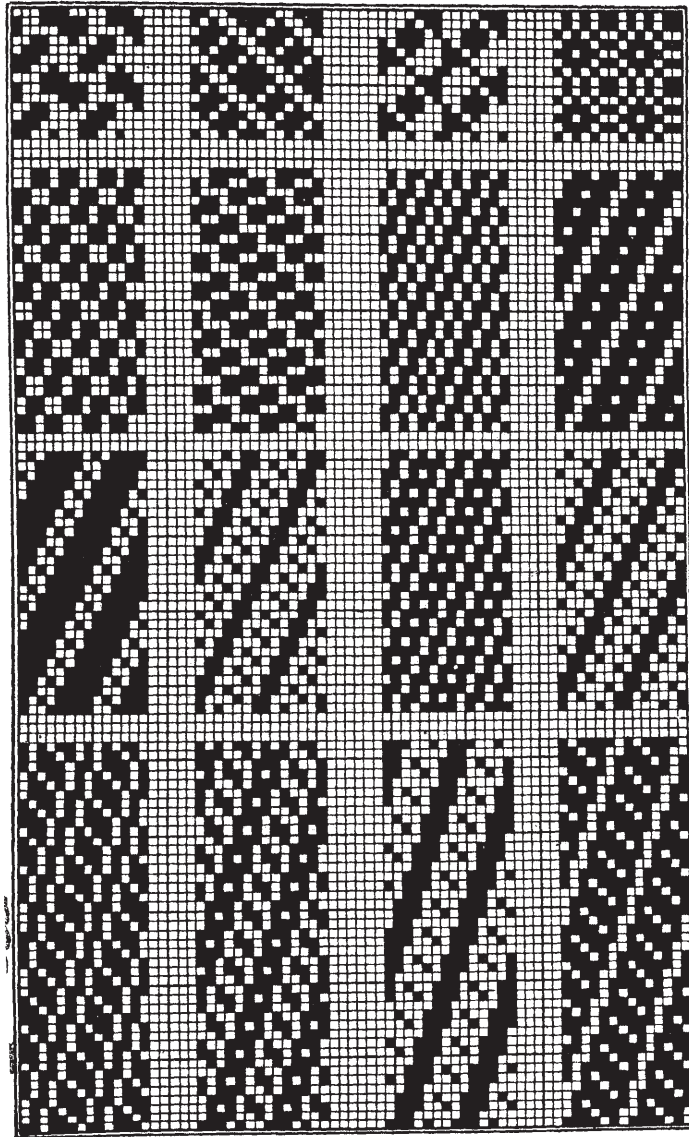


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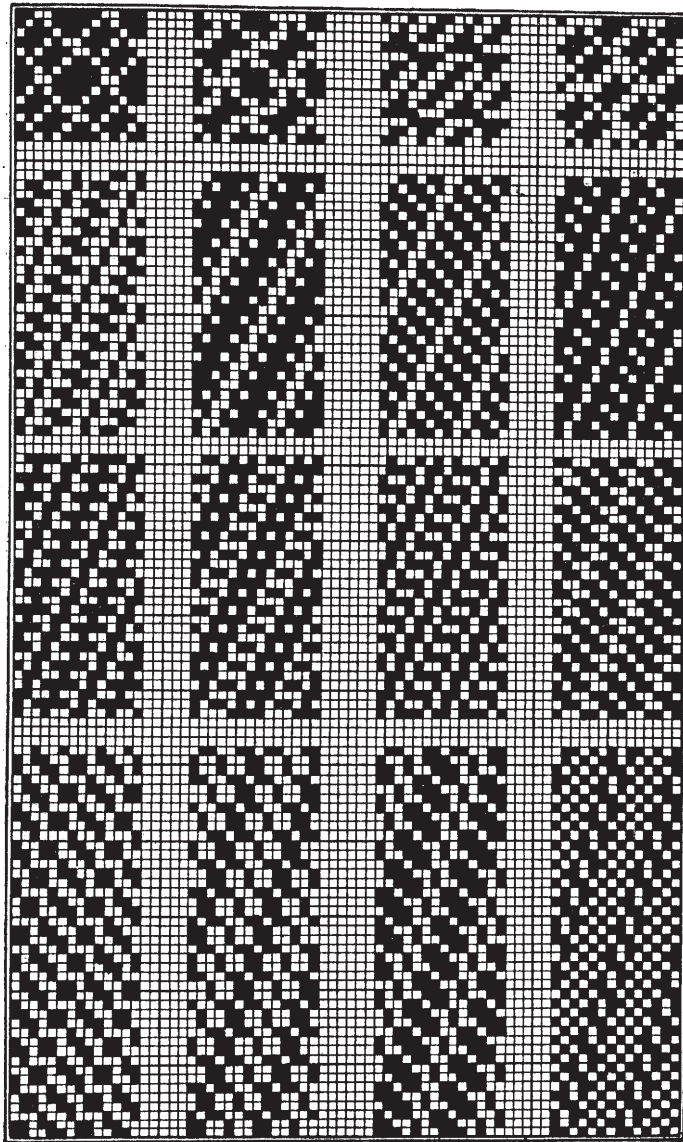


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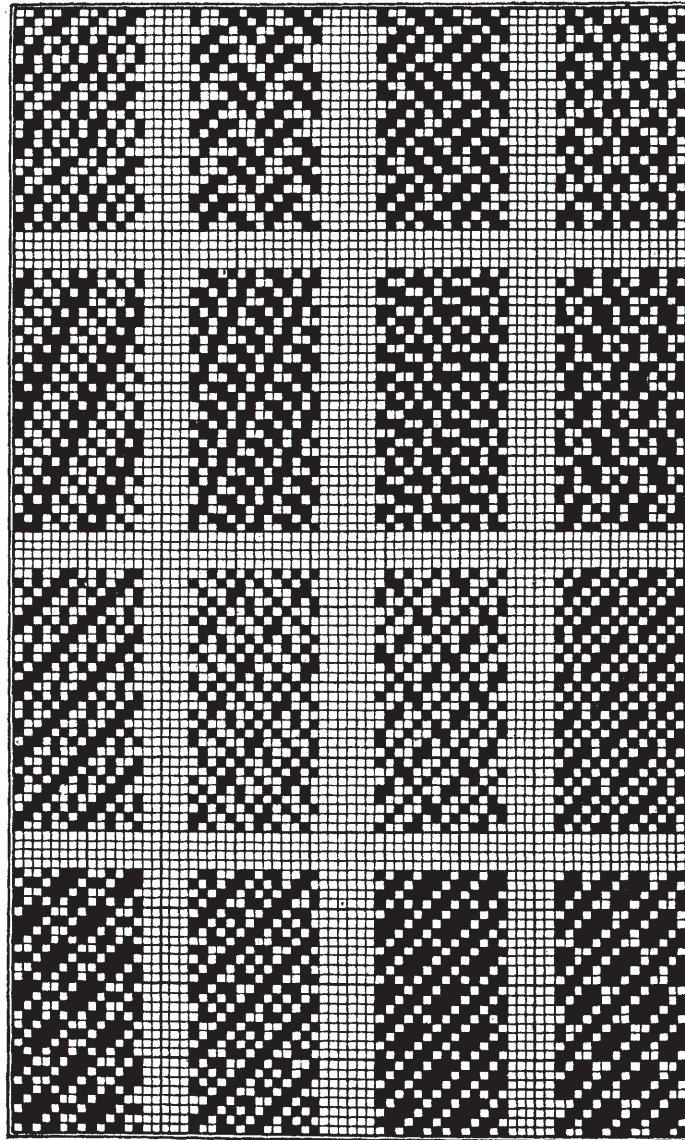
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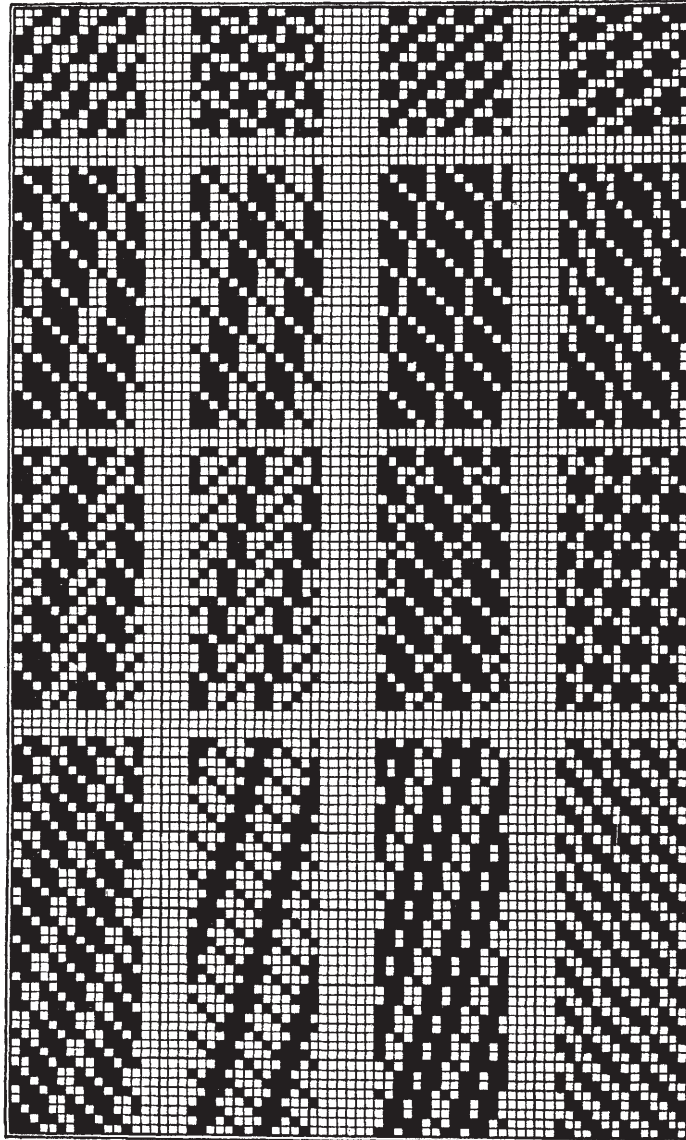


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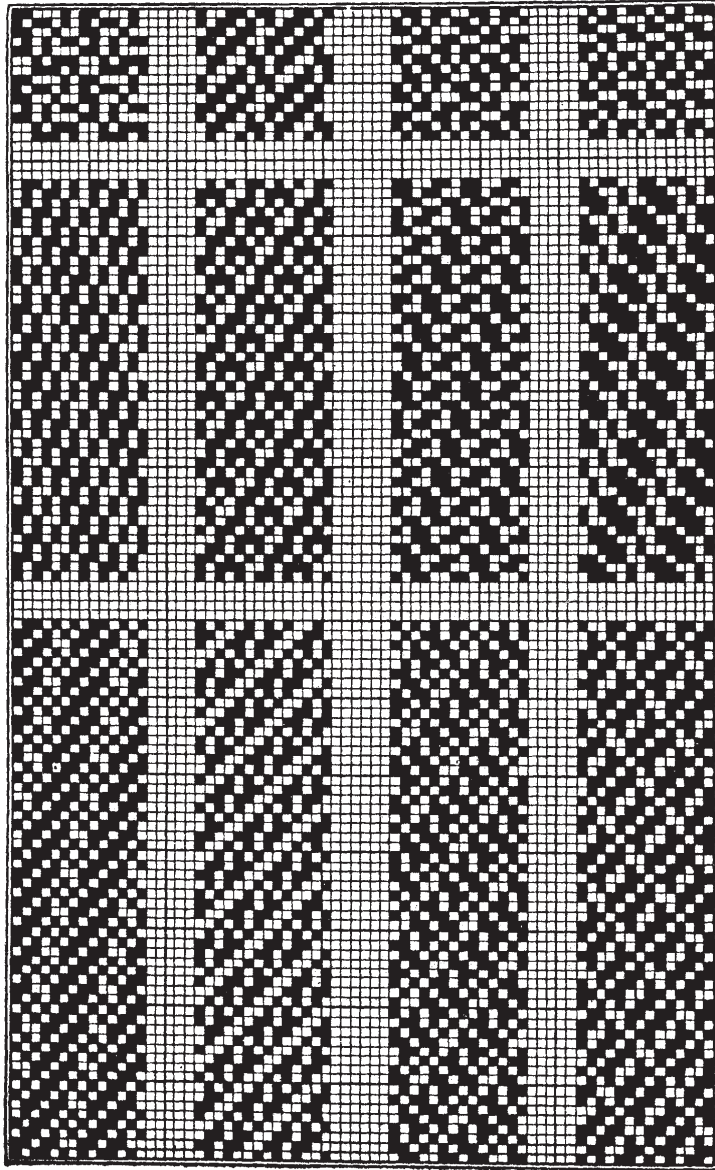


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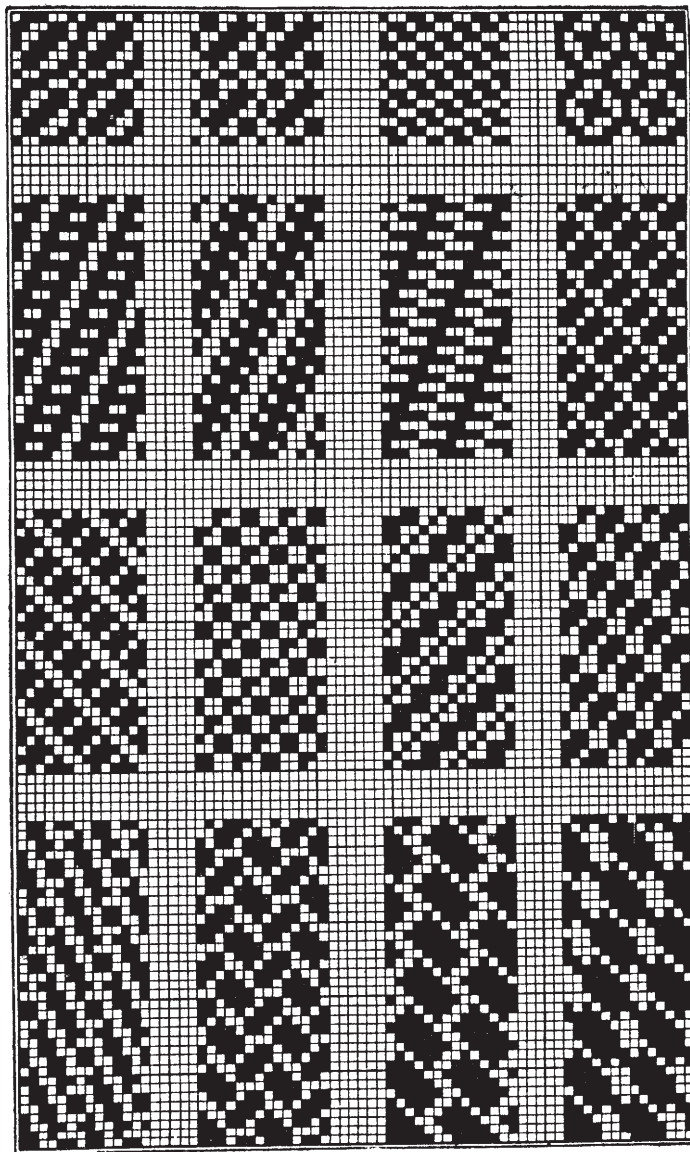


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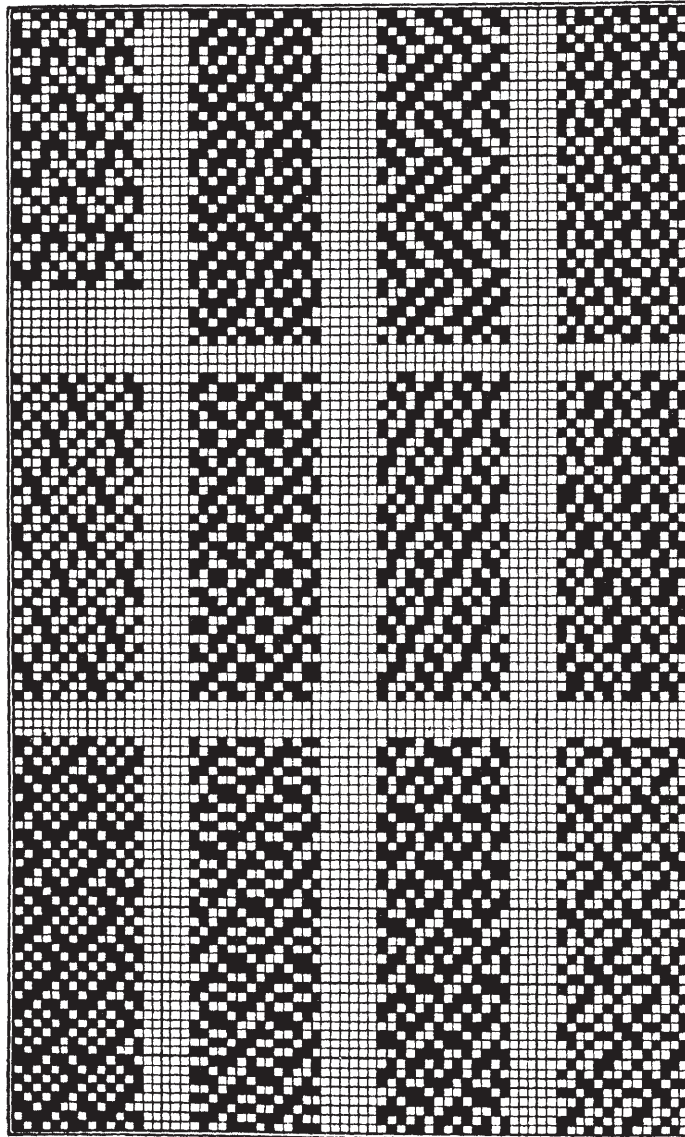
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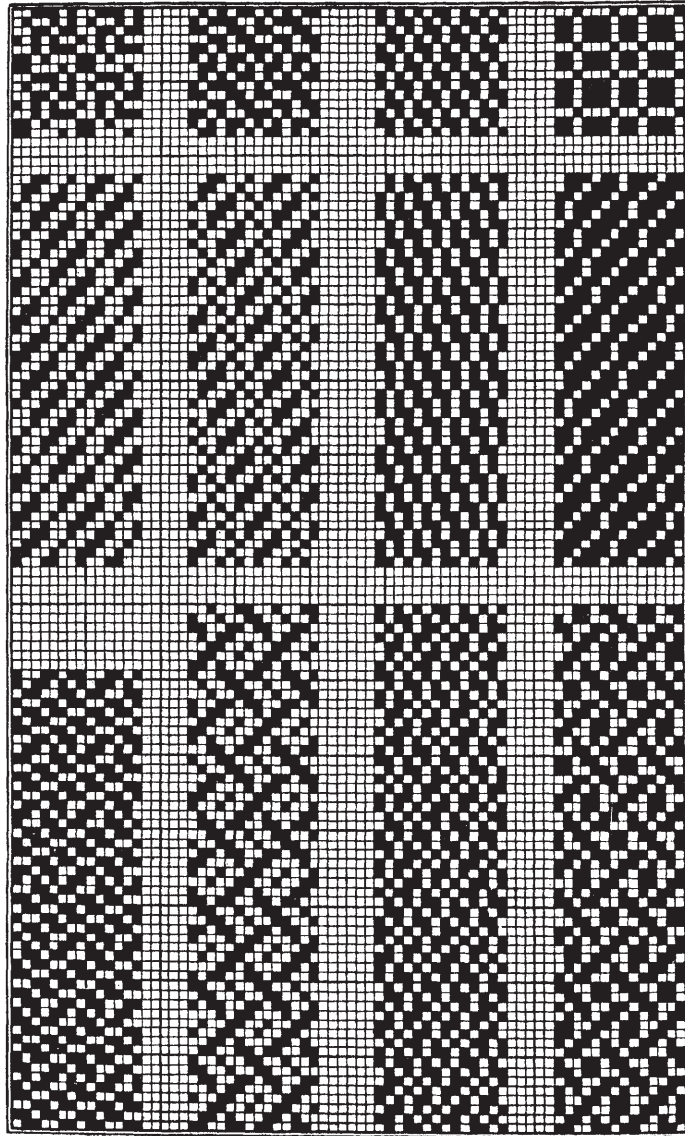


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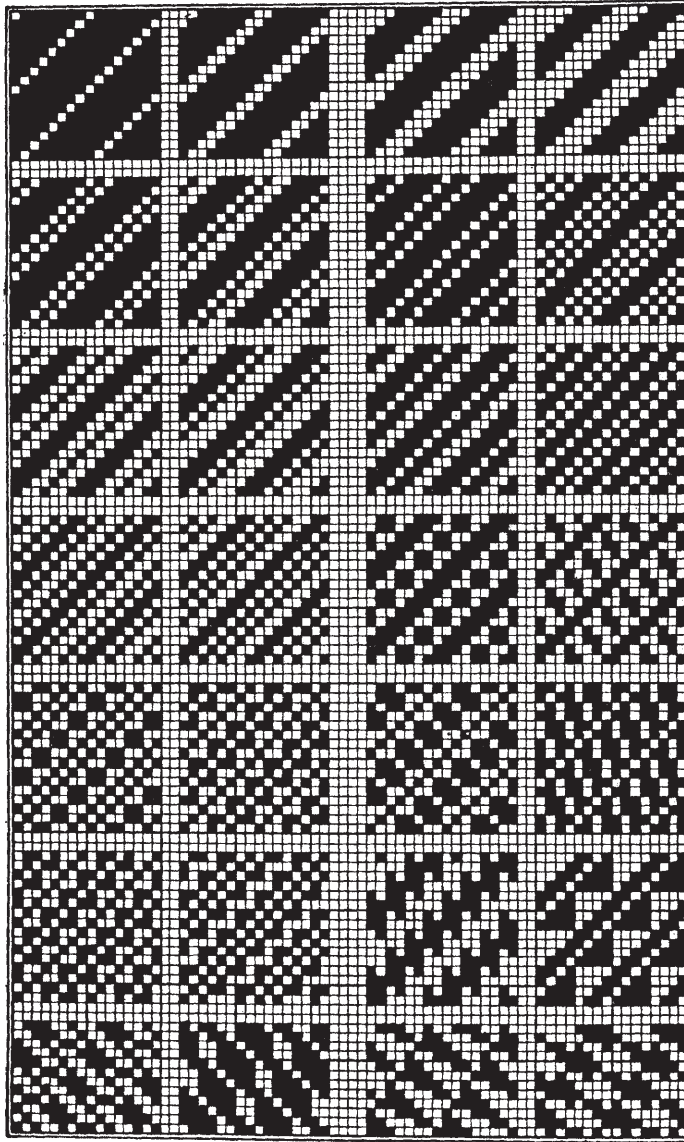
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EIGHT HARNESS

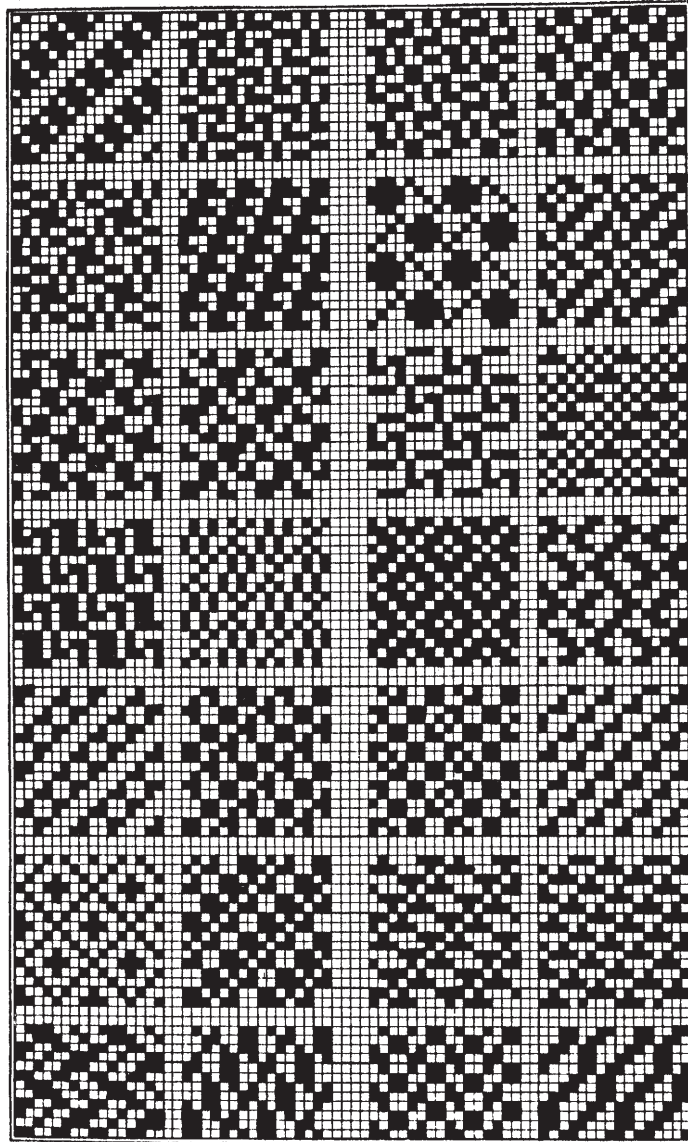


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EIGHT HARNESS

37

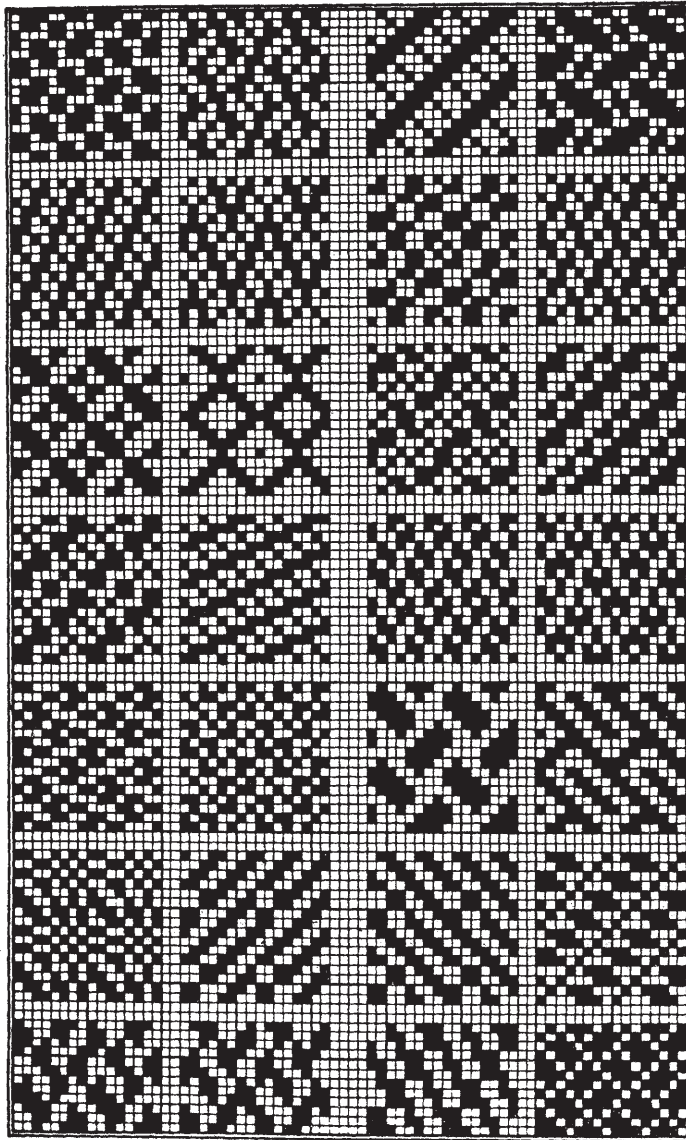


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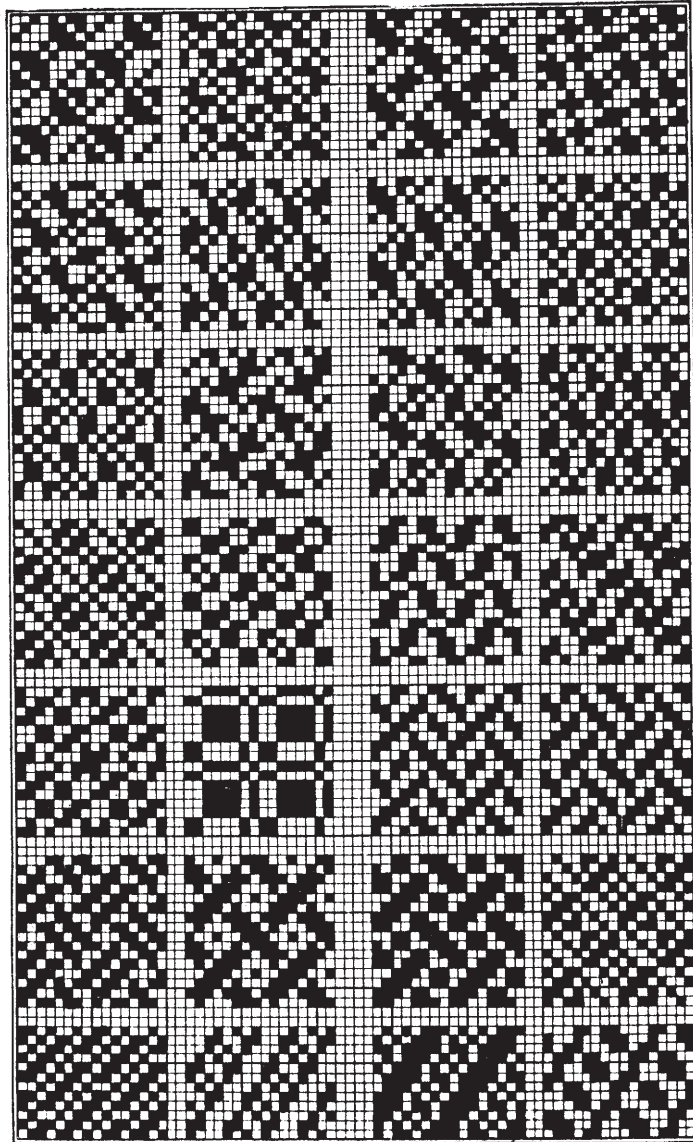


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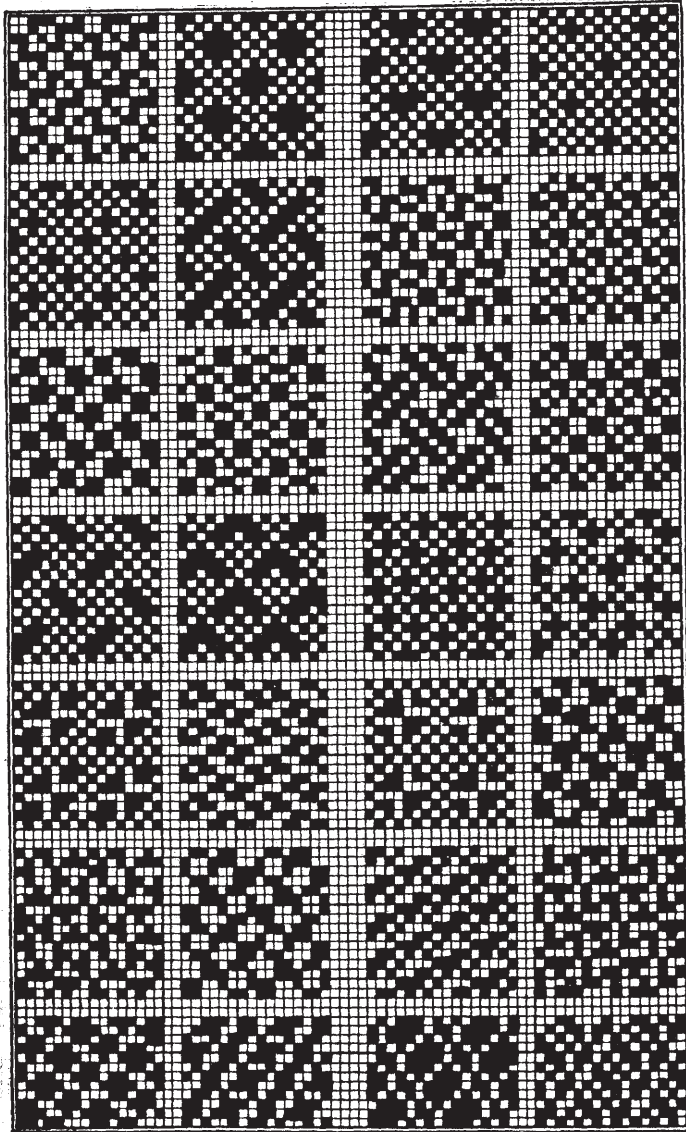
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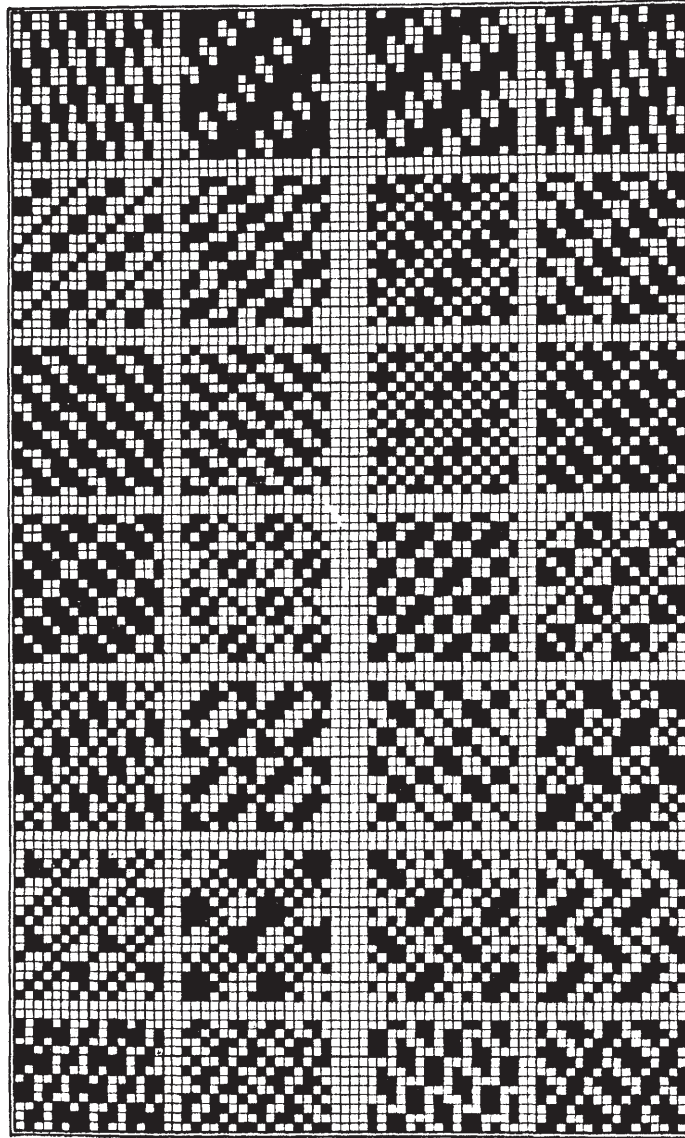
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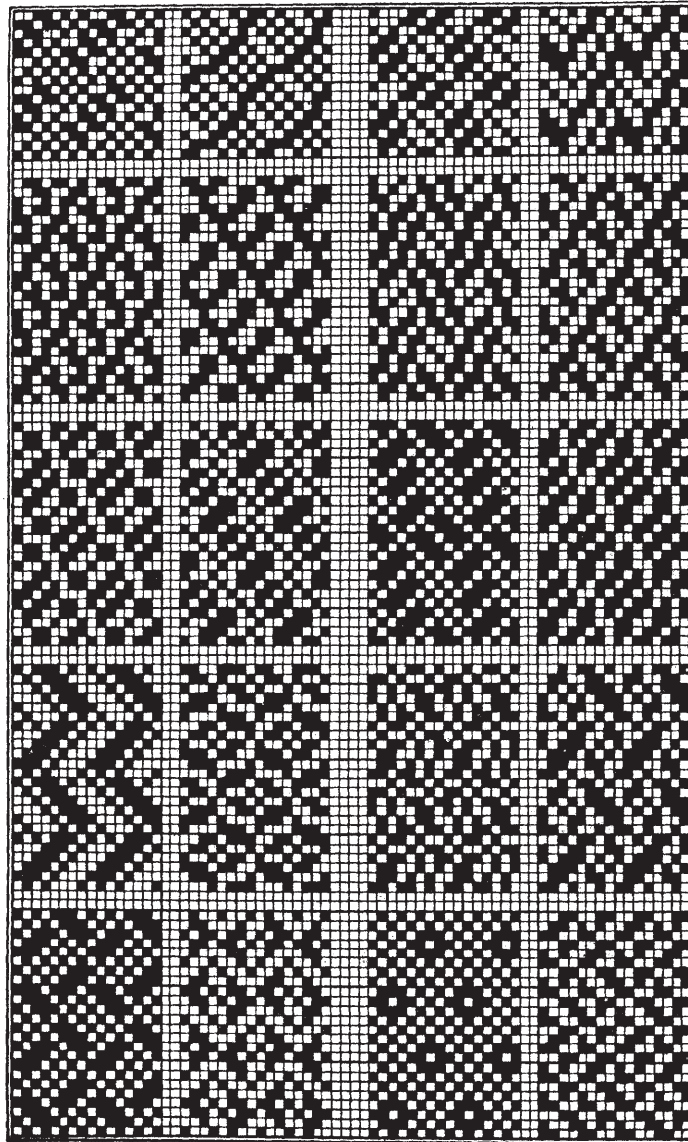
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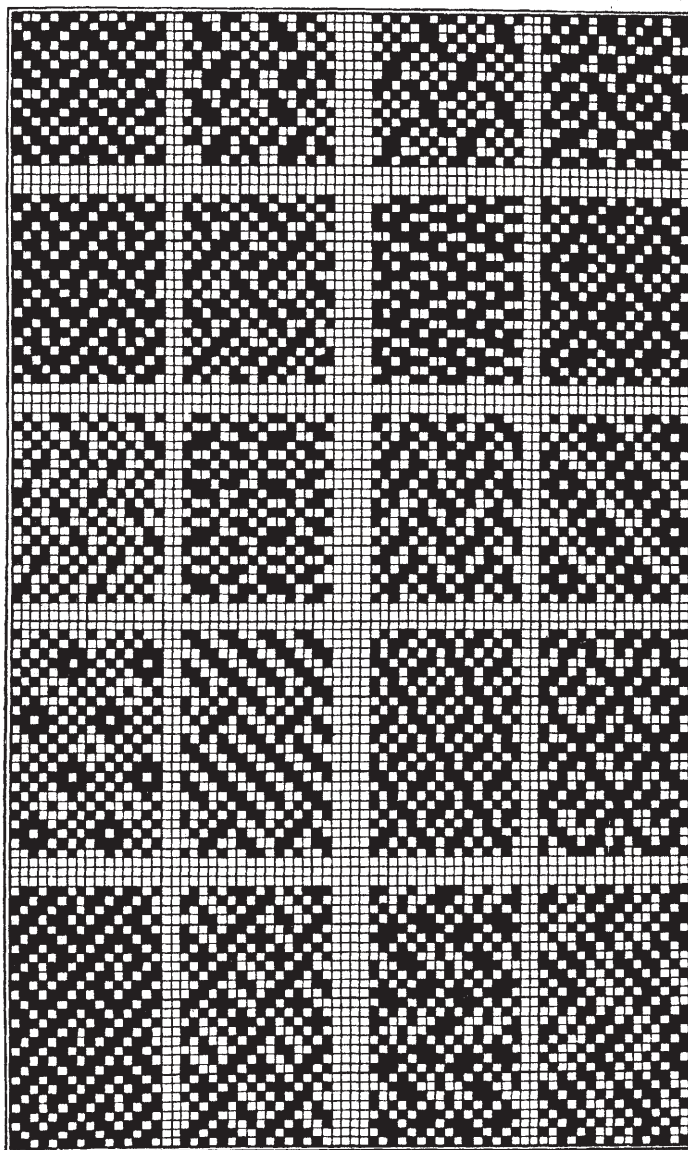


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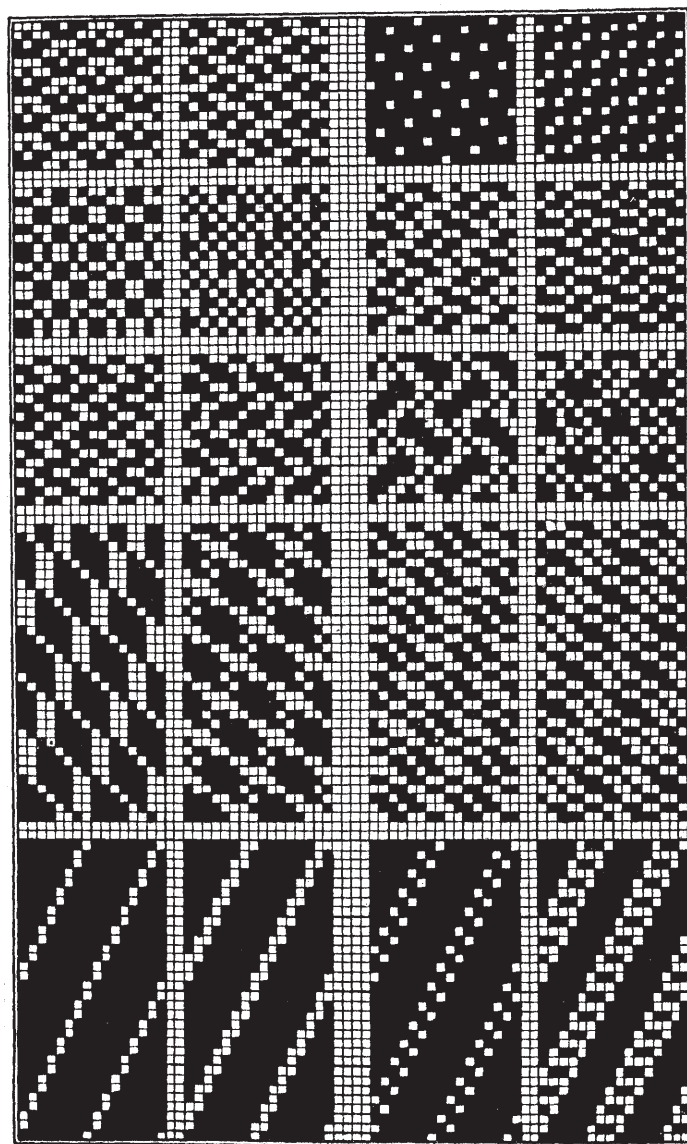
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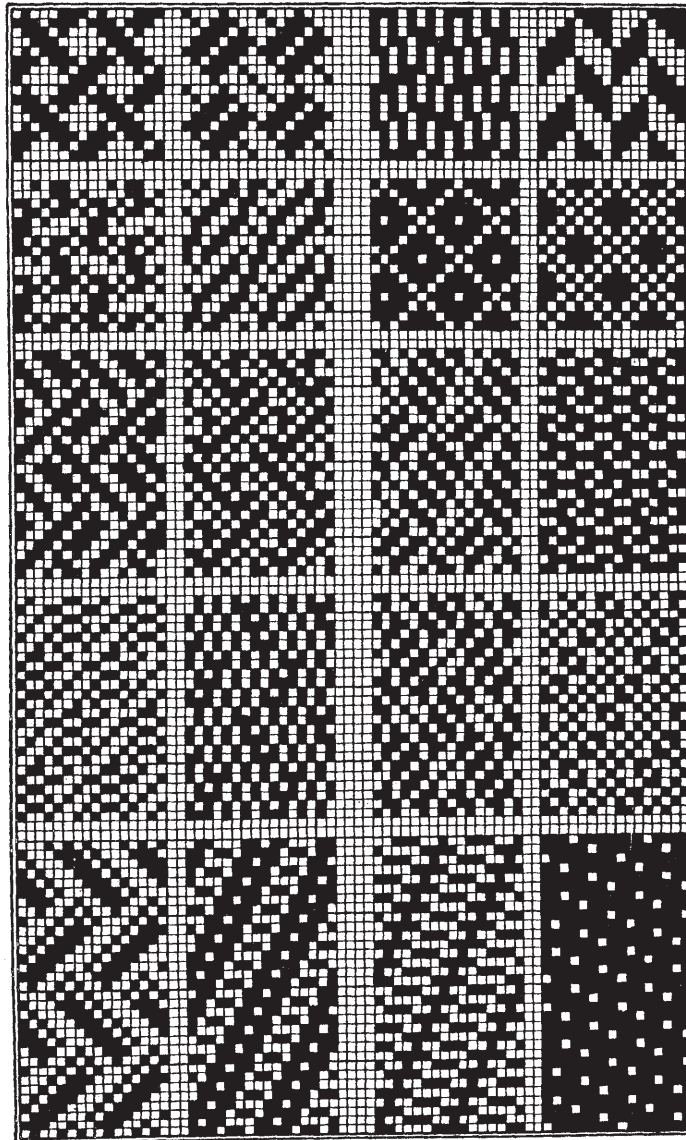
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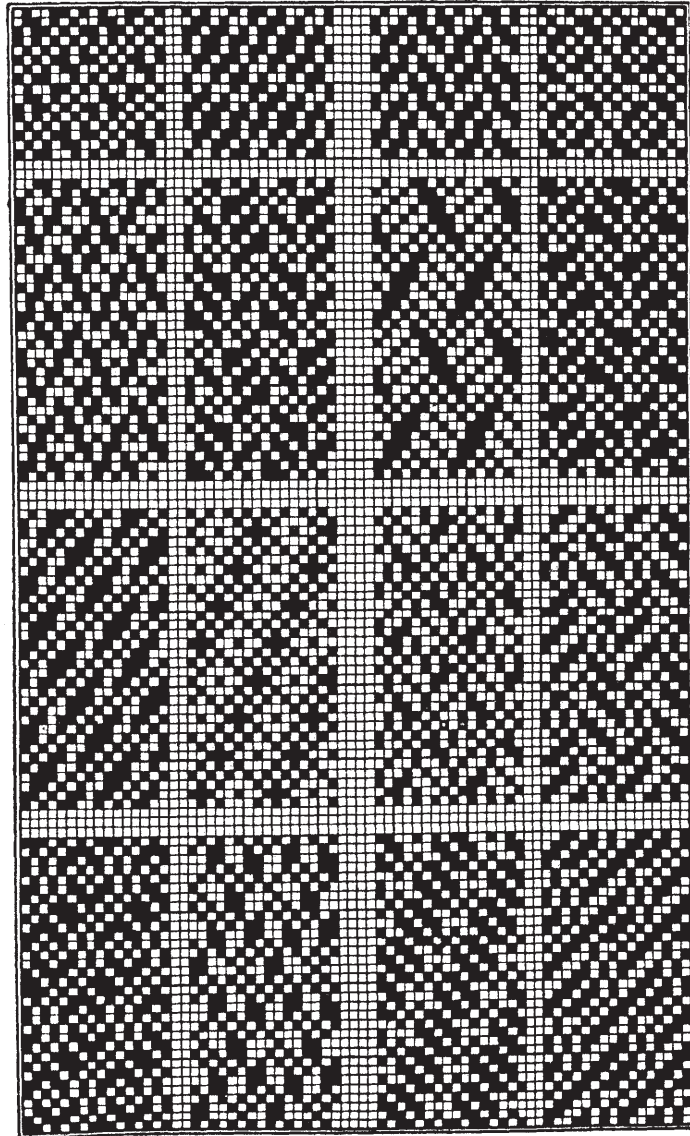
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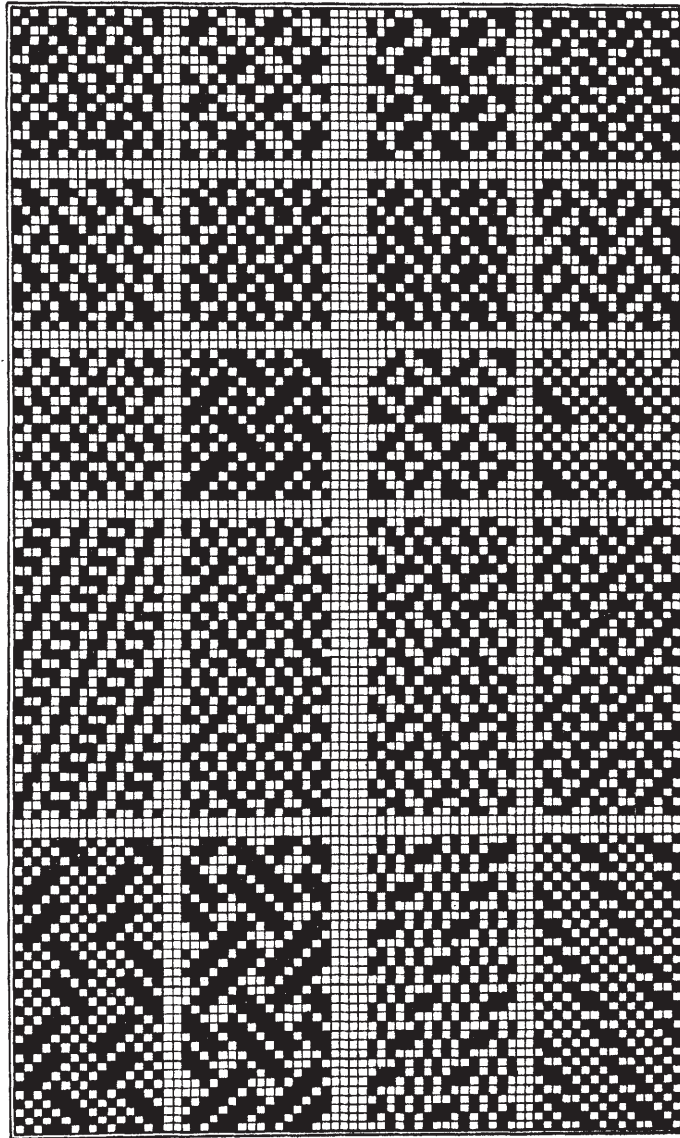
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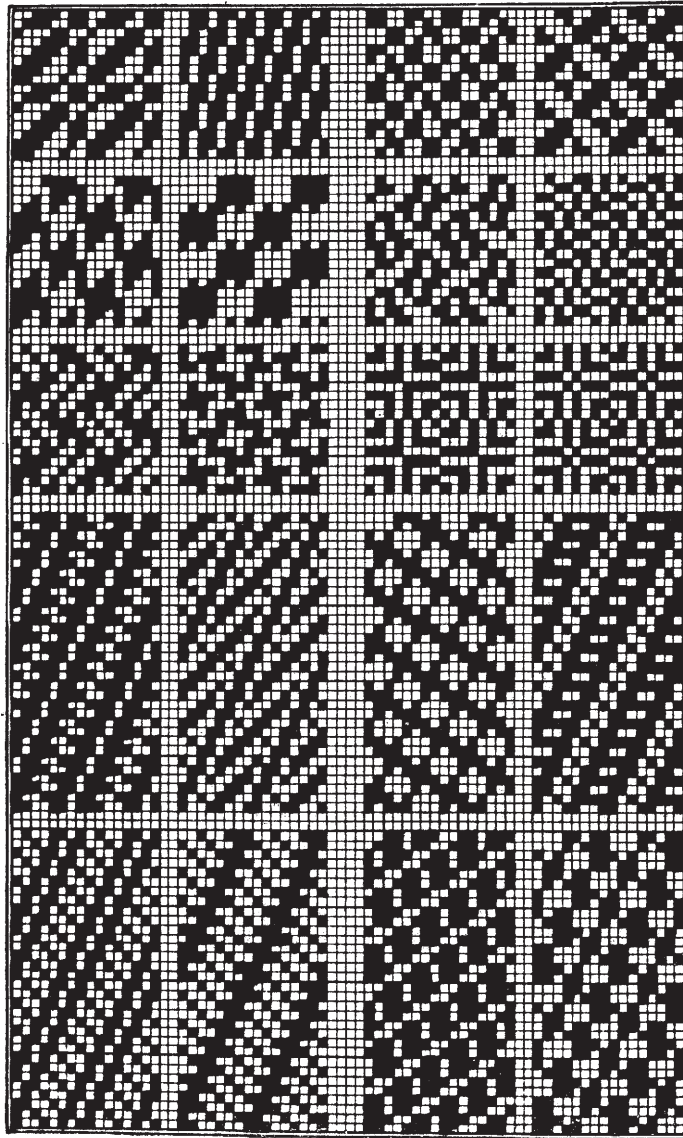
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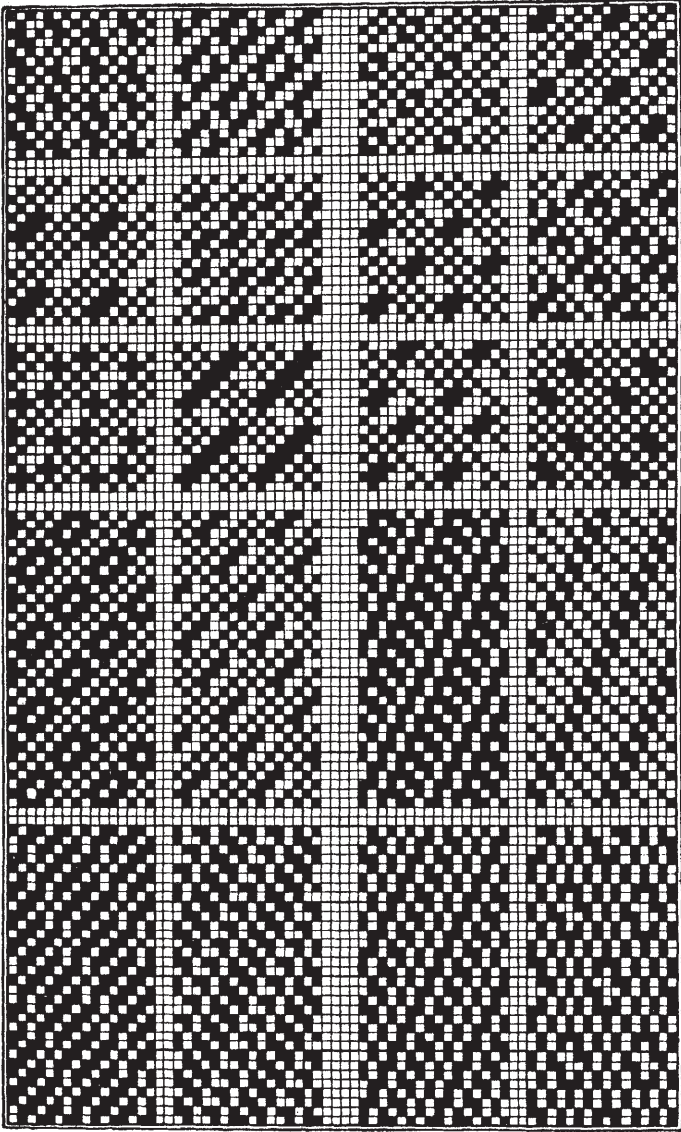
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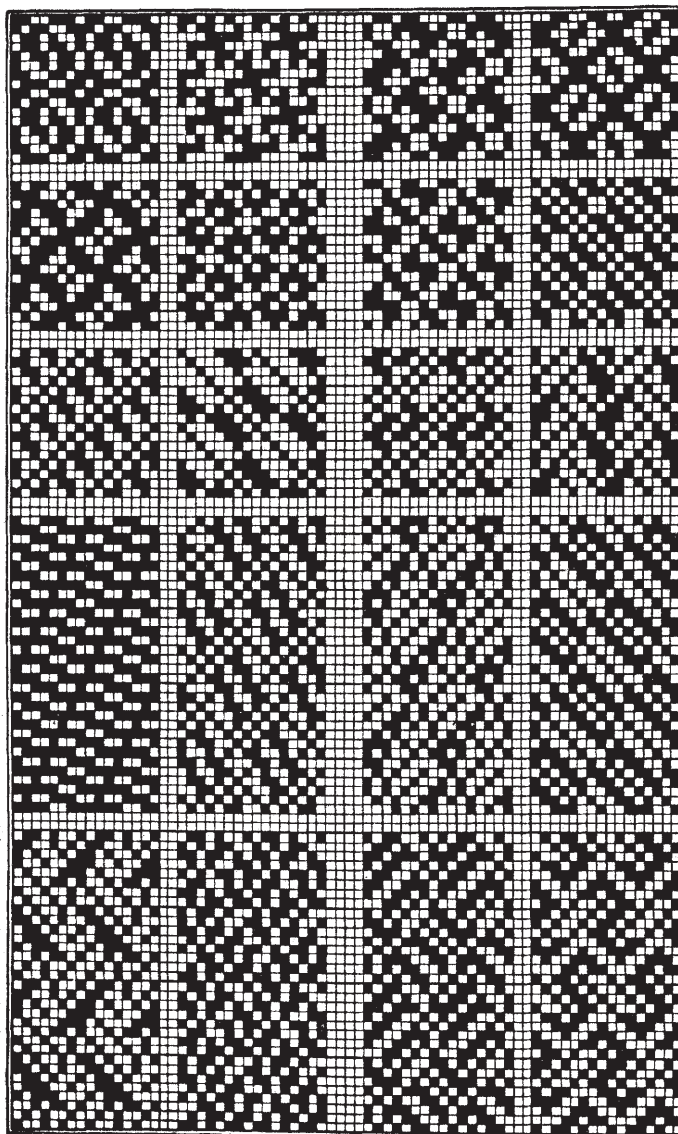
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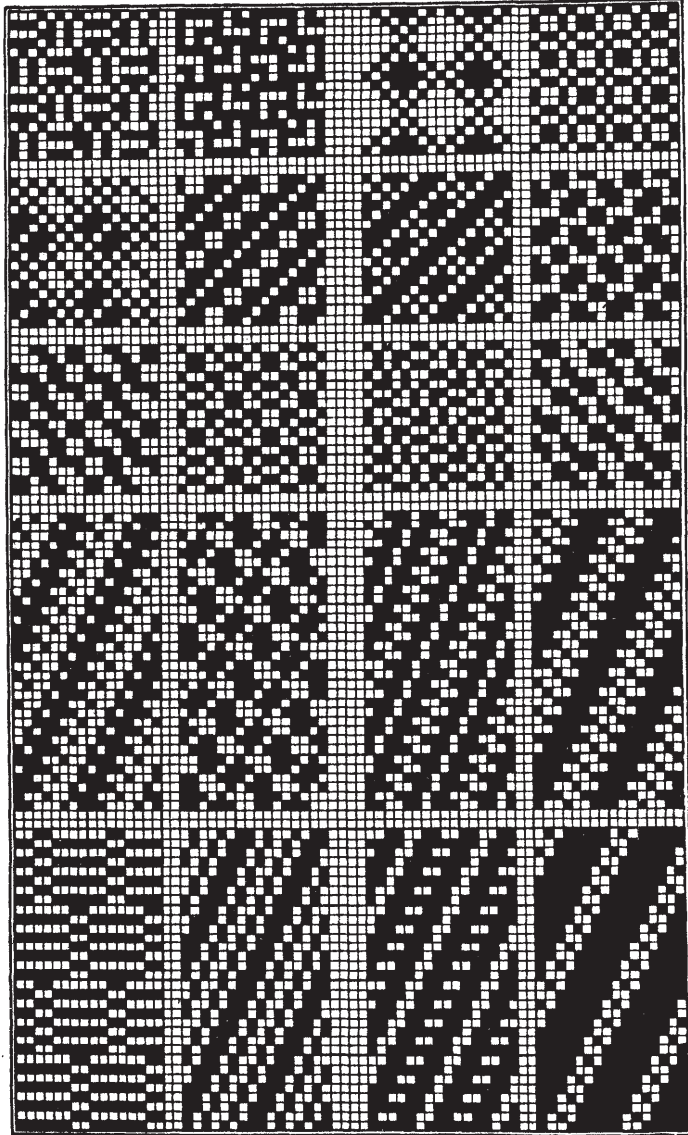
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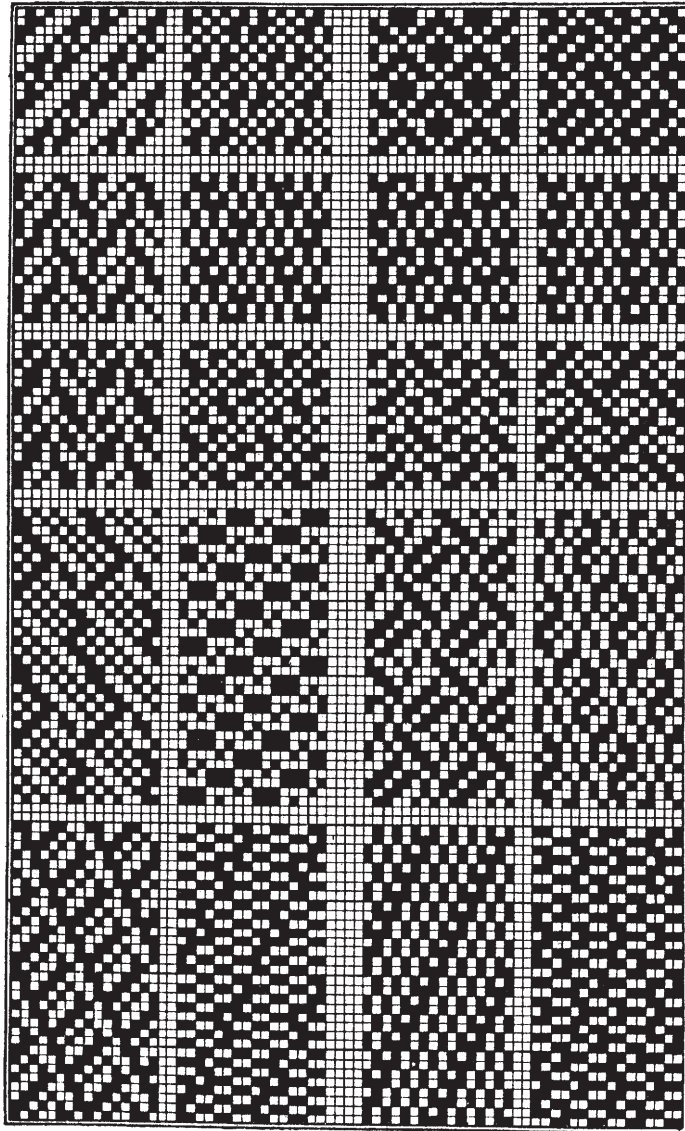
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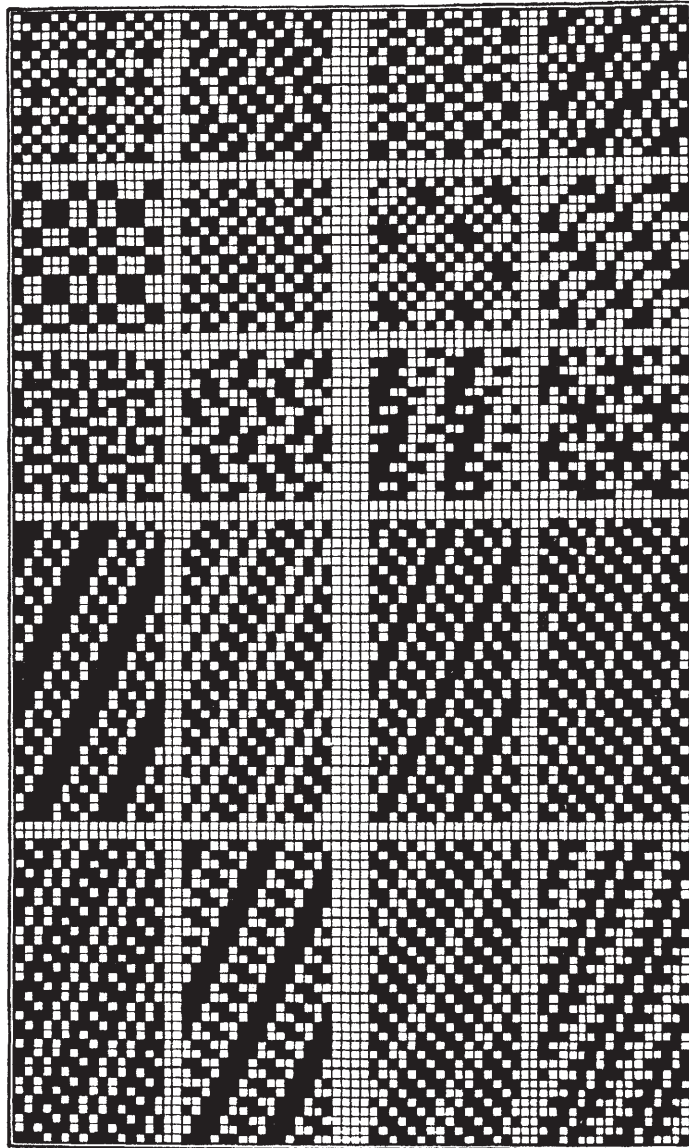
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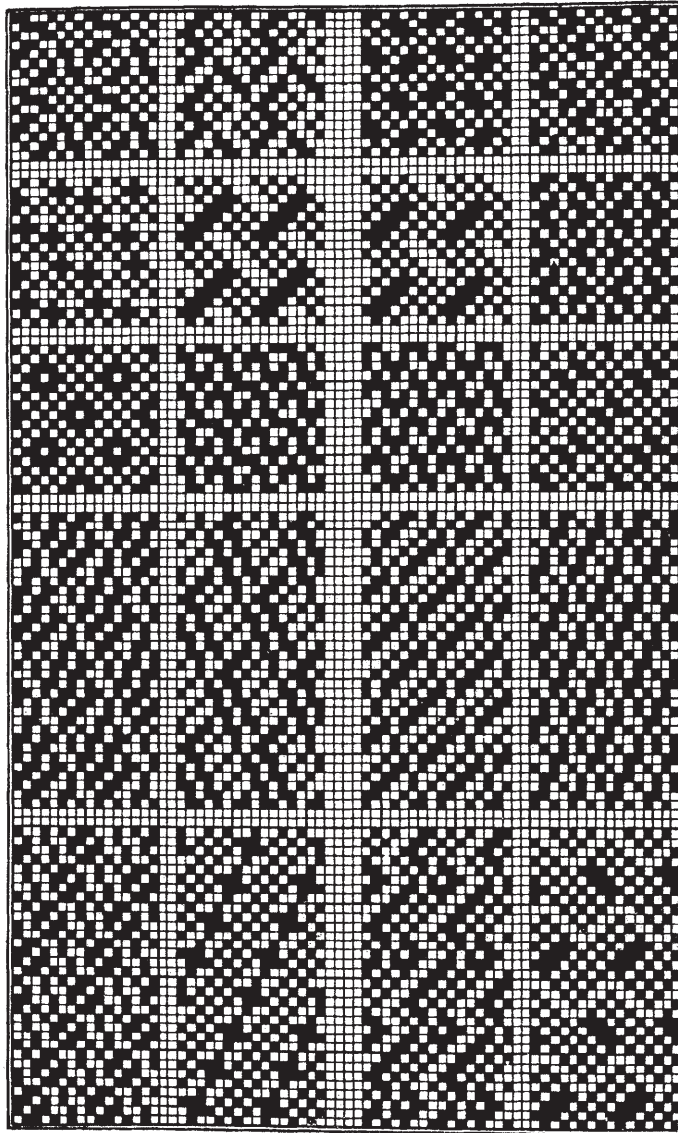
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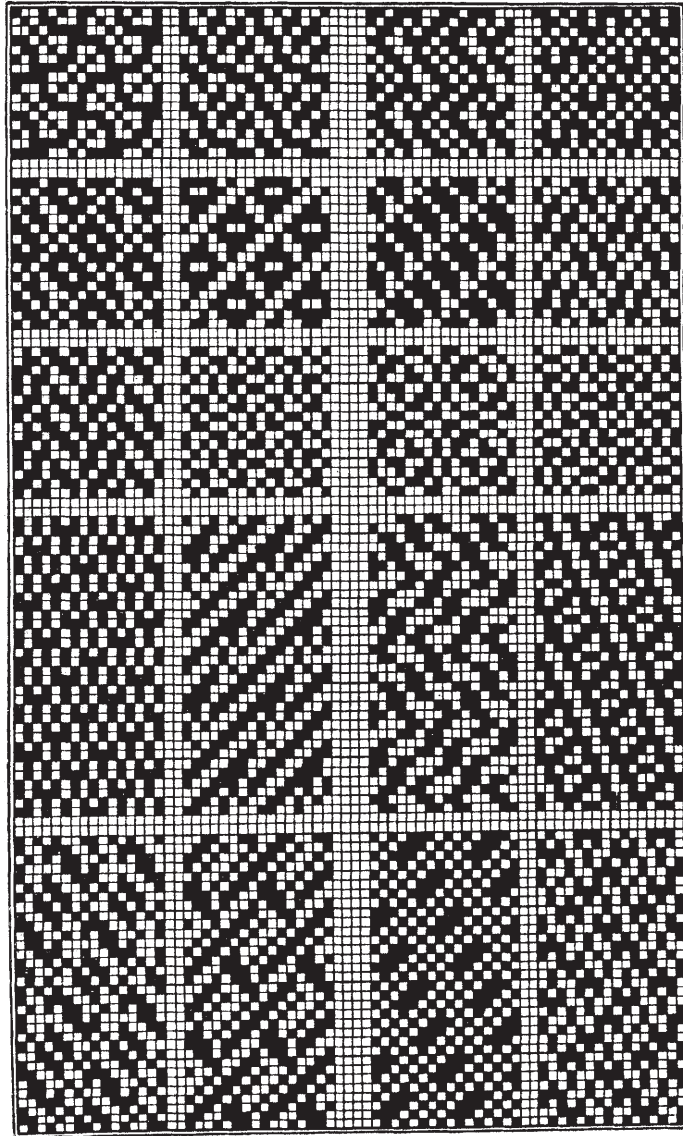
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EIGHT HARNESS



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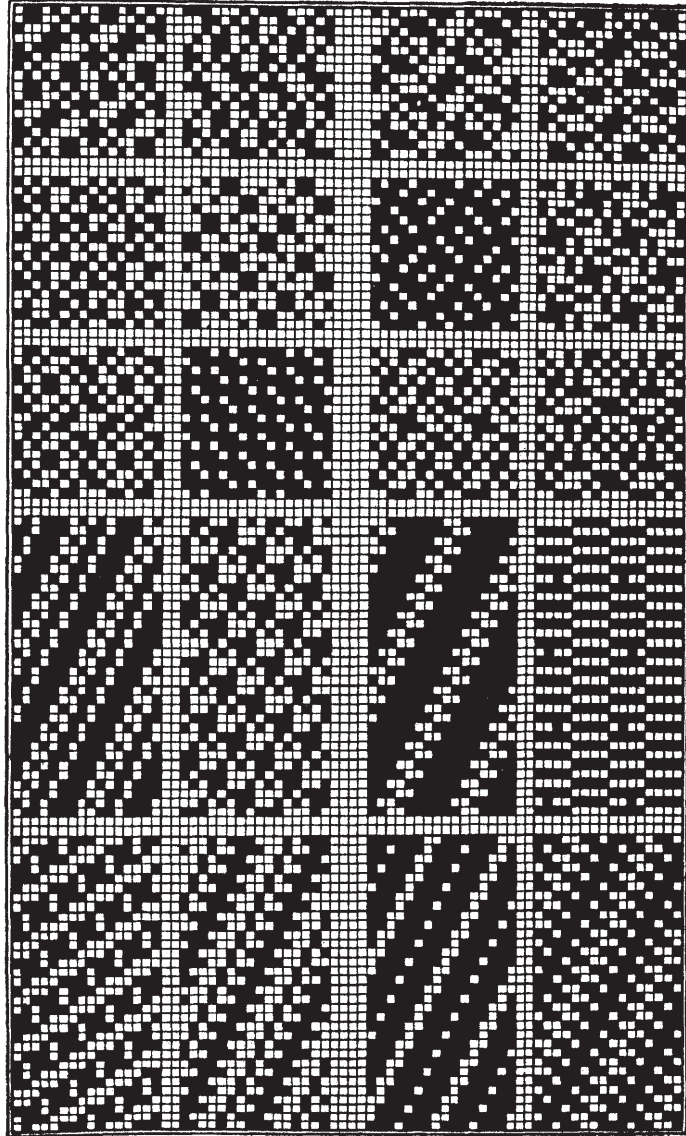
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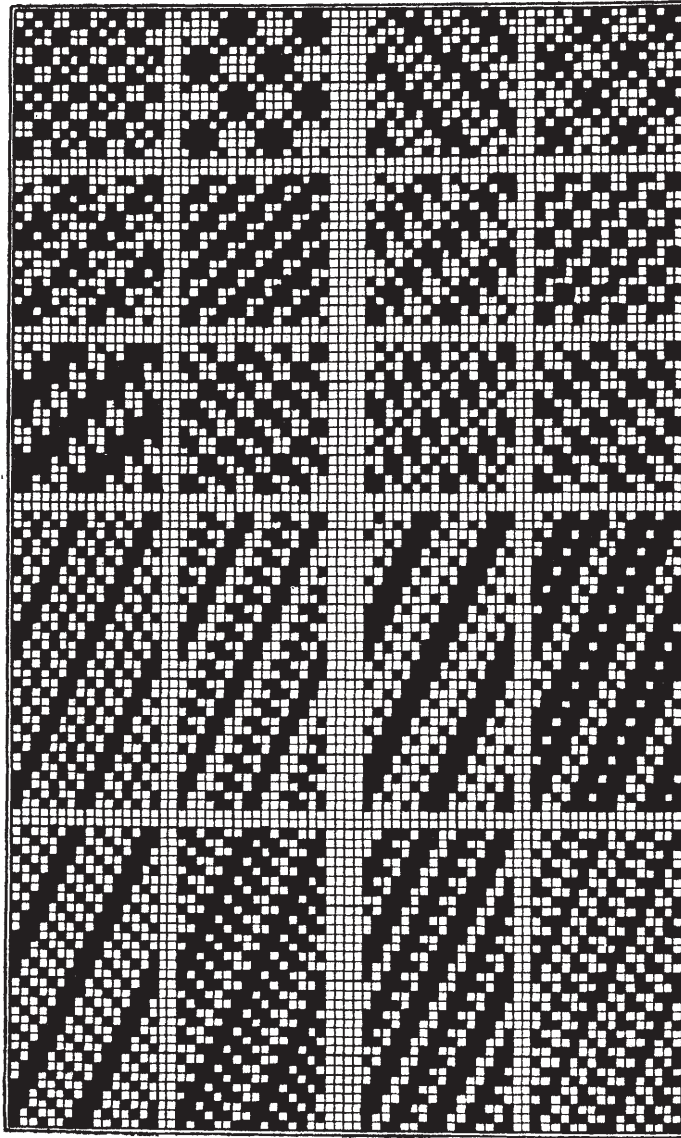
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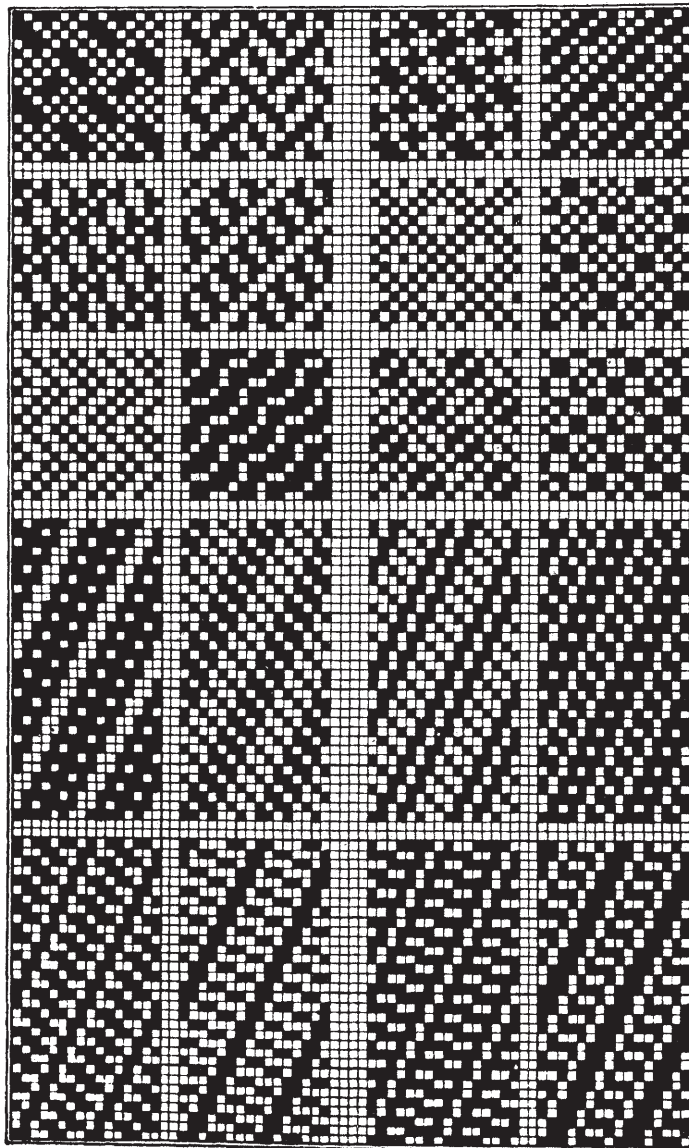
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EIGHT HARNESS



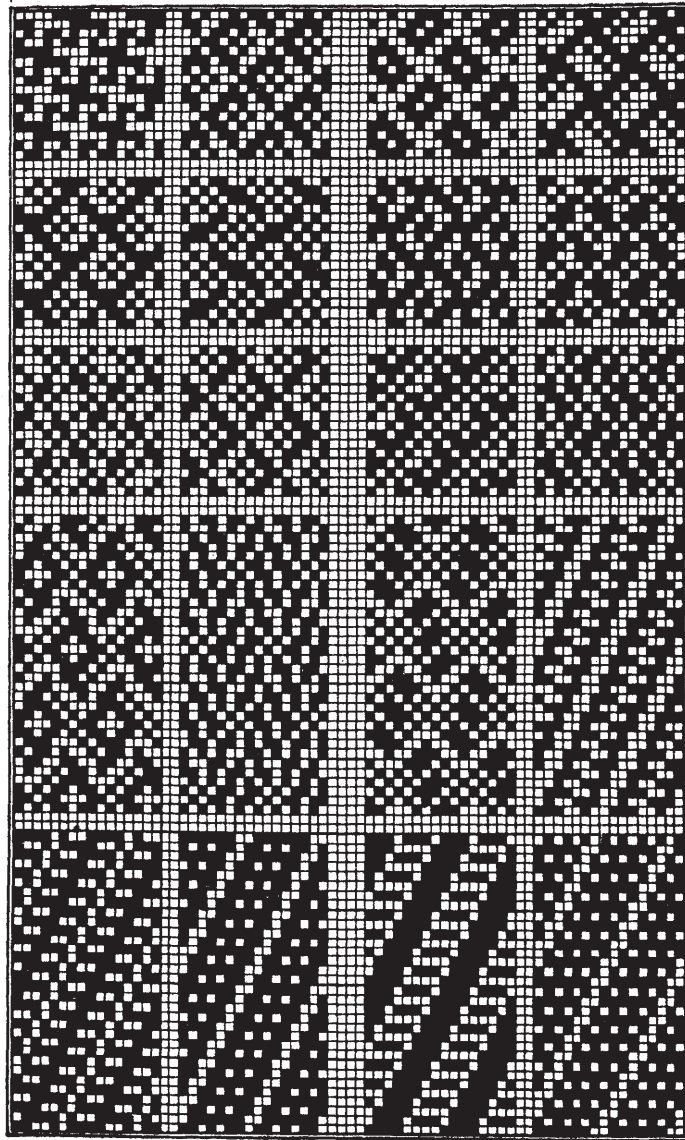
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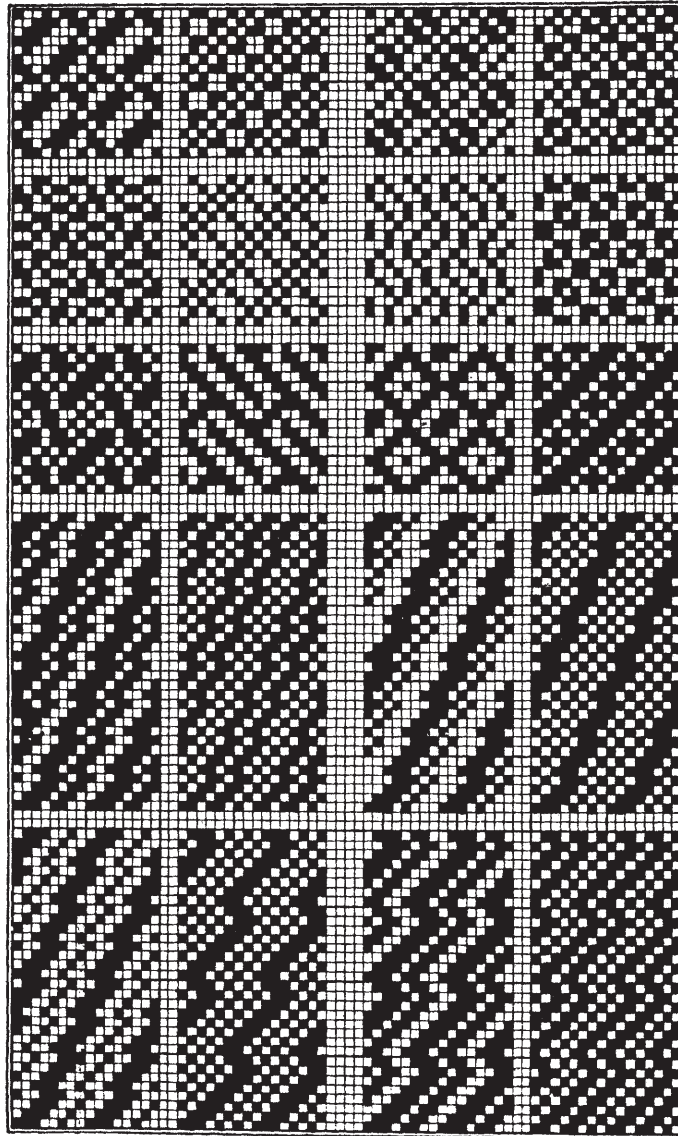
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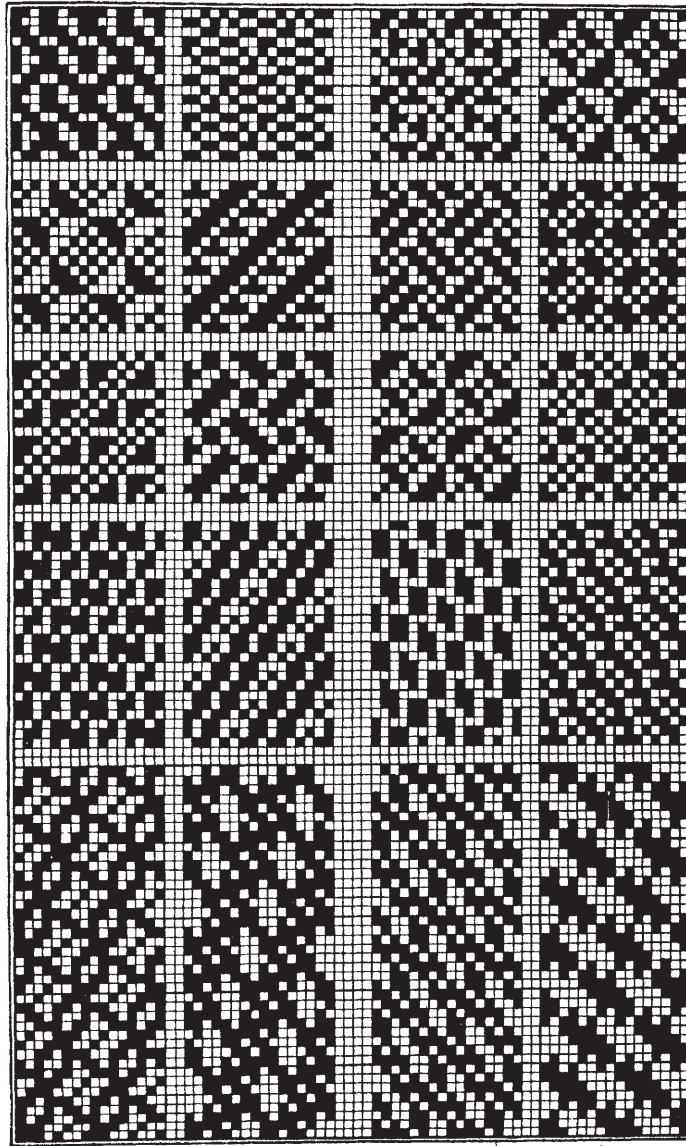
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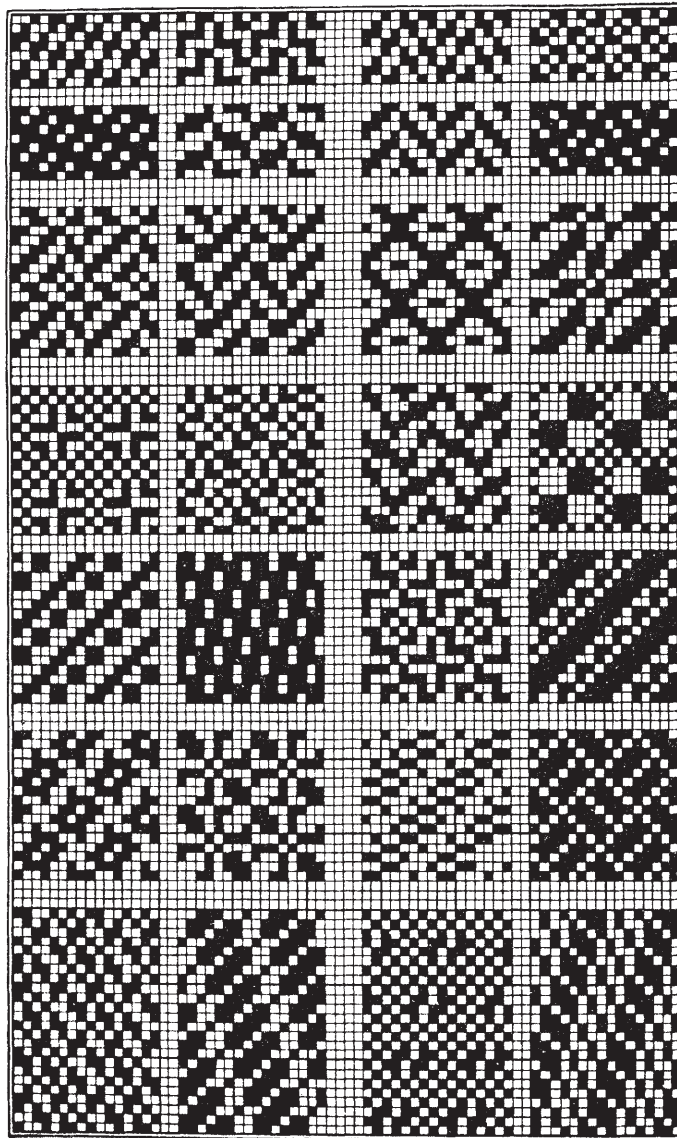
EIGHT HARNESS



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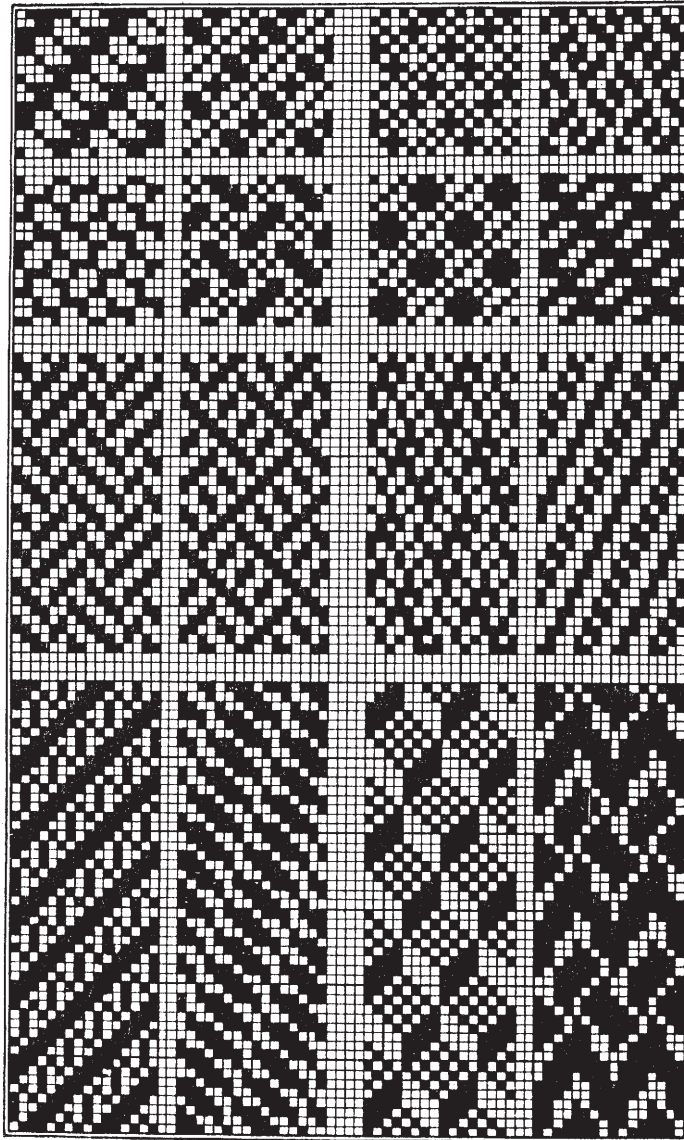


8 × 4

8 × 8

8 × 24

EIGHT HARNESS



8 × 8

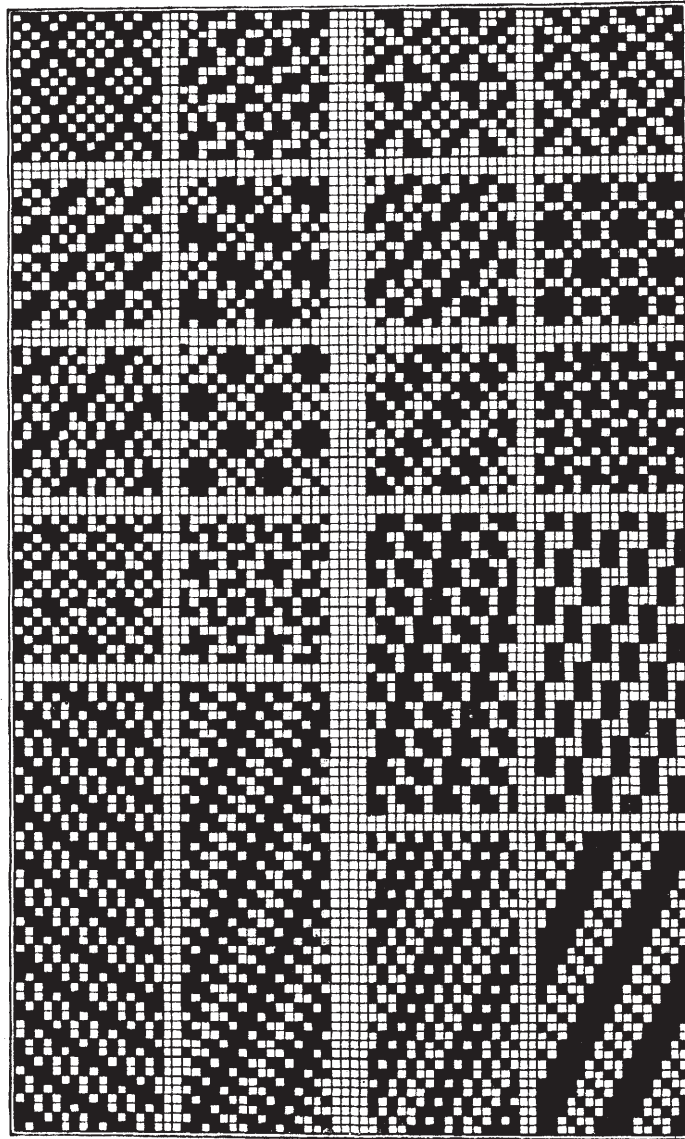
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8 × 24

EIGHT HARNESS

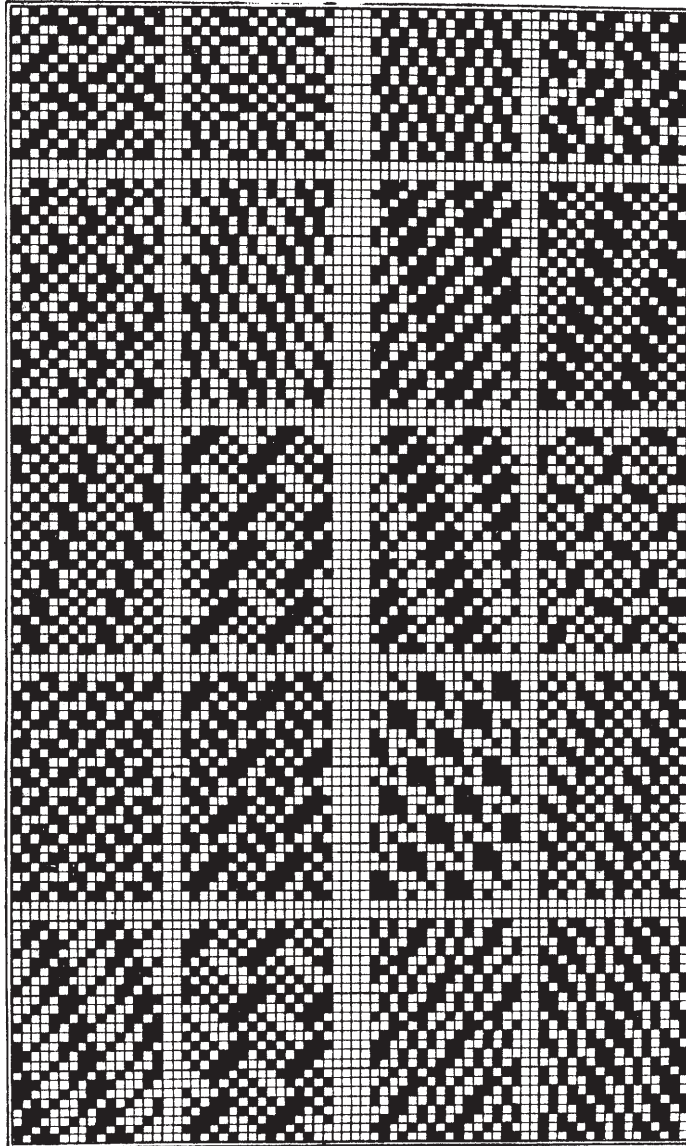


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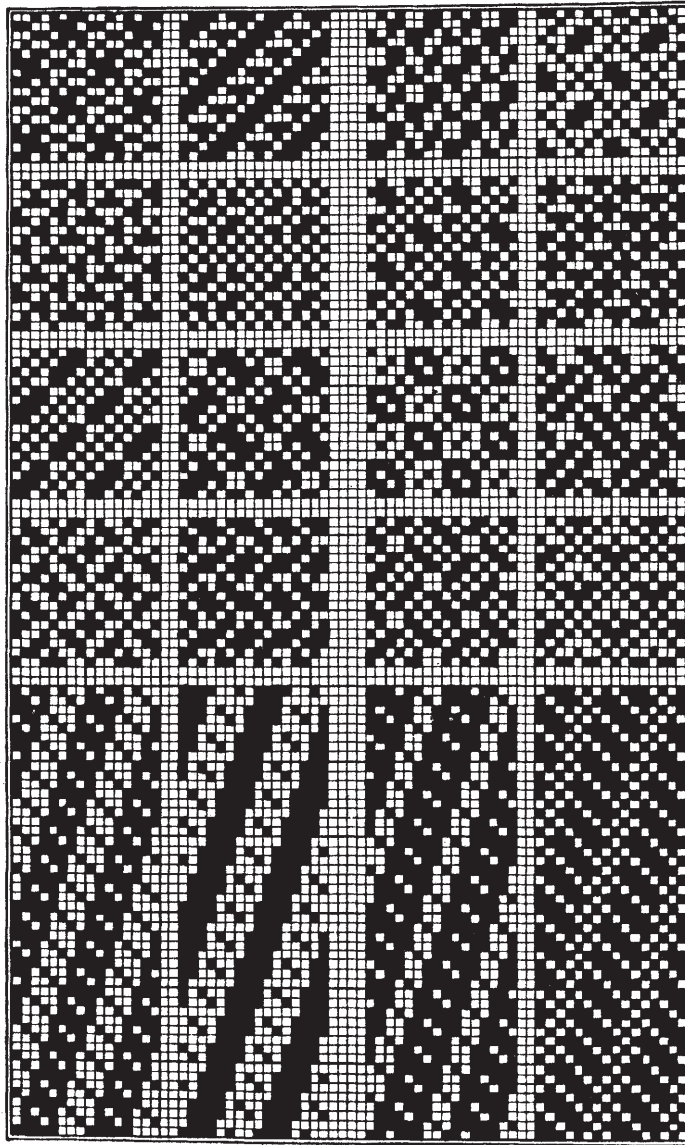
EIGHT HARNESS



8 × 8

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EIGHT HARNESS

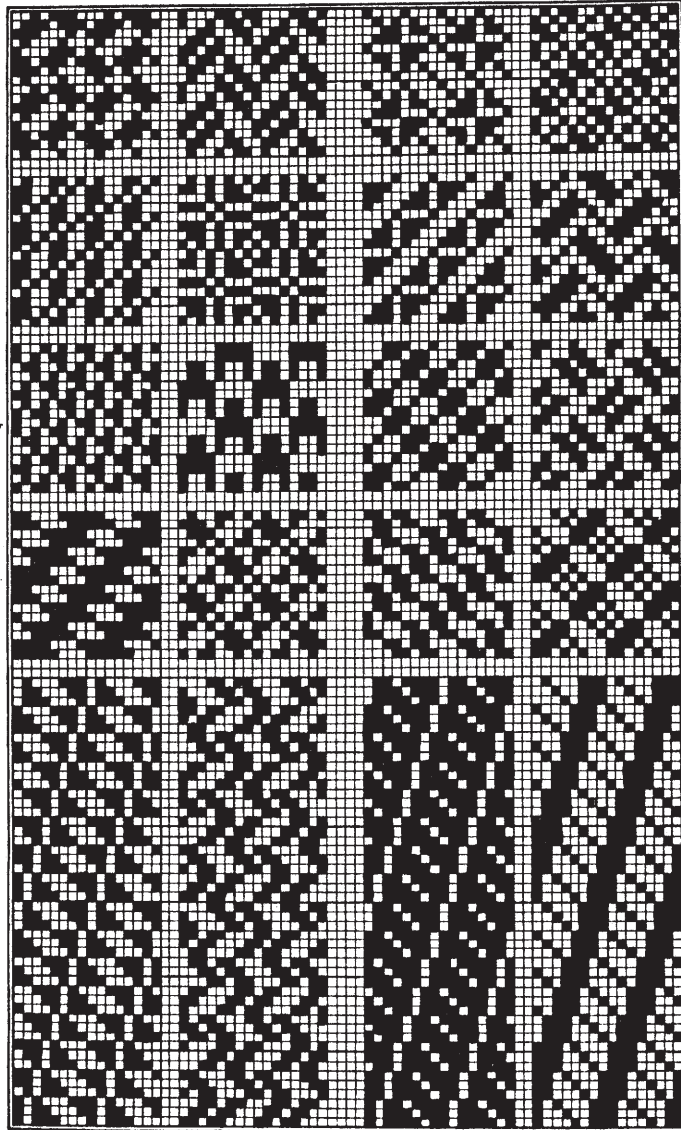


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EIGHT HARNESS

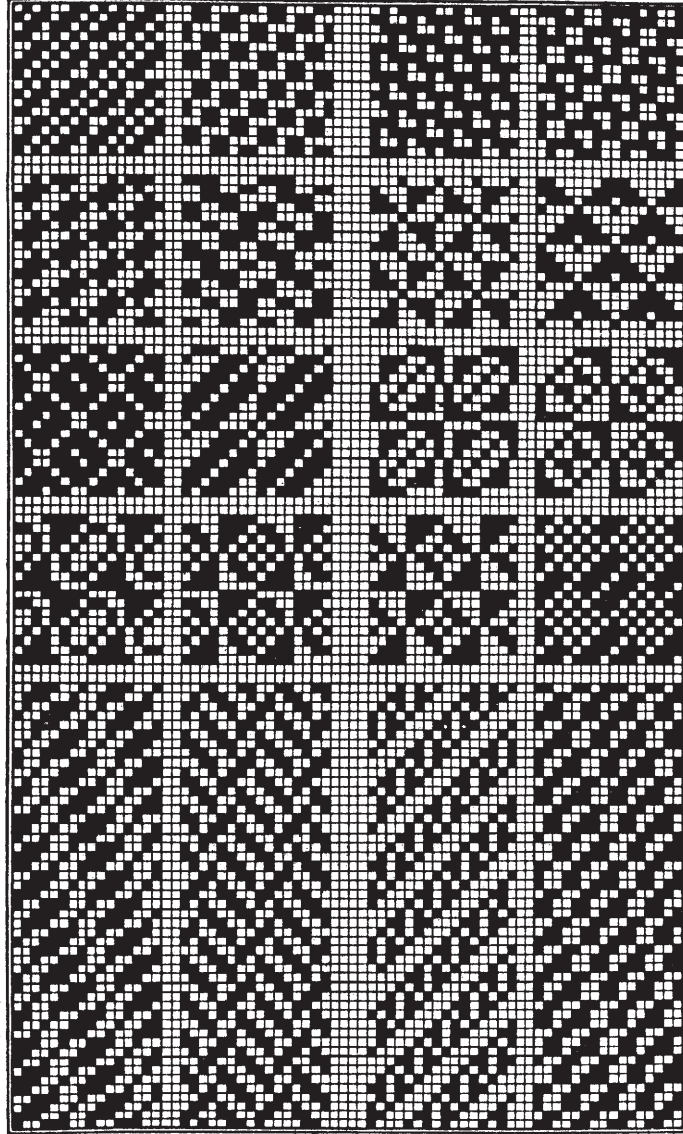
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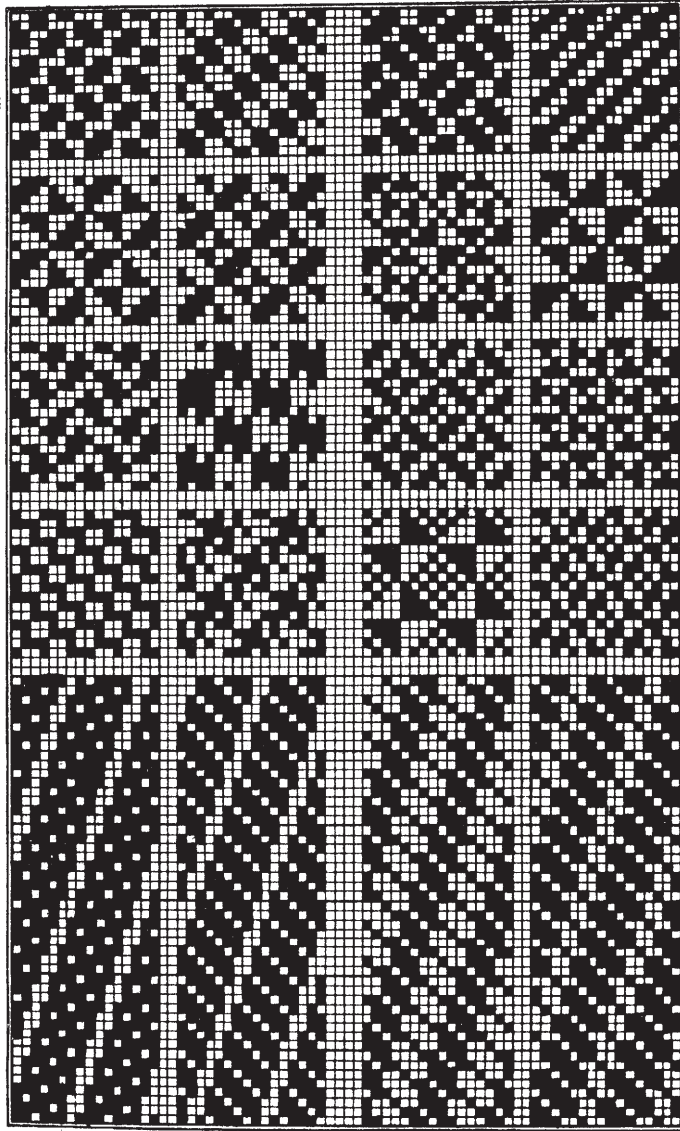
EIGHT HARNESS



8 × 8

8 × 24

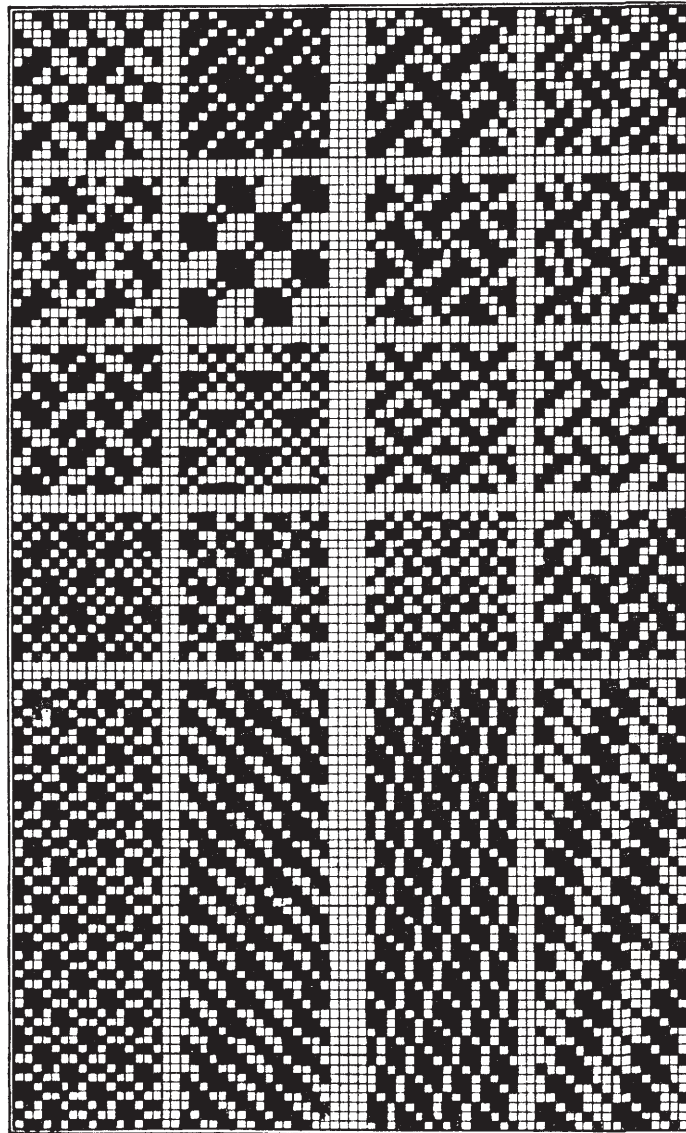
EIGHT HARNESS



8 × 8

8 × 24

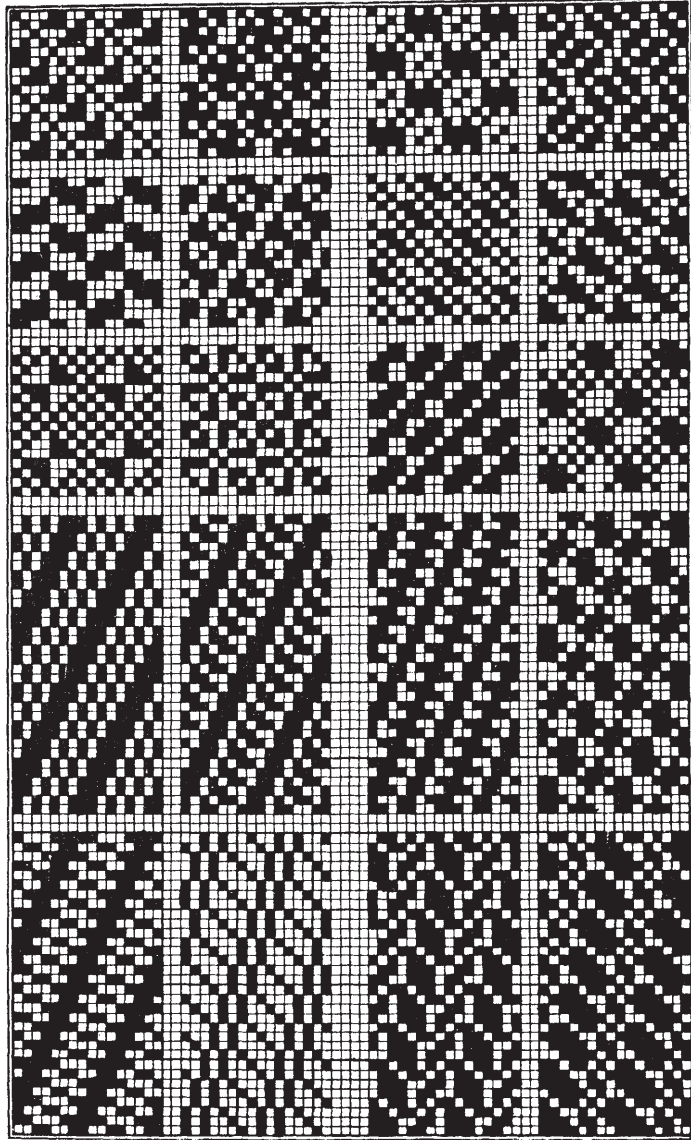
EIGHT HARNESS



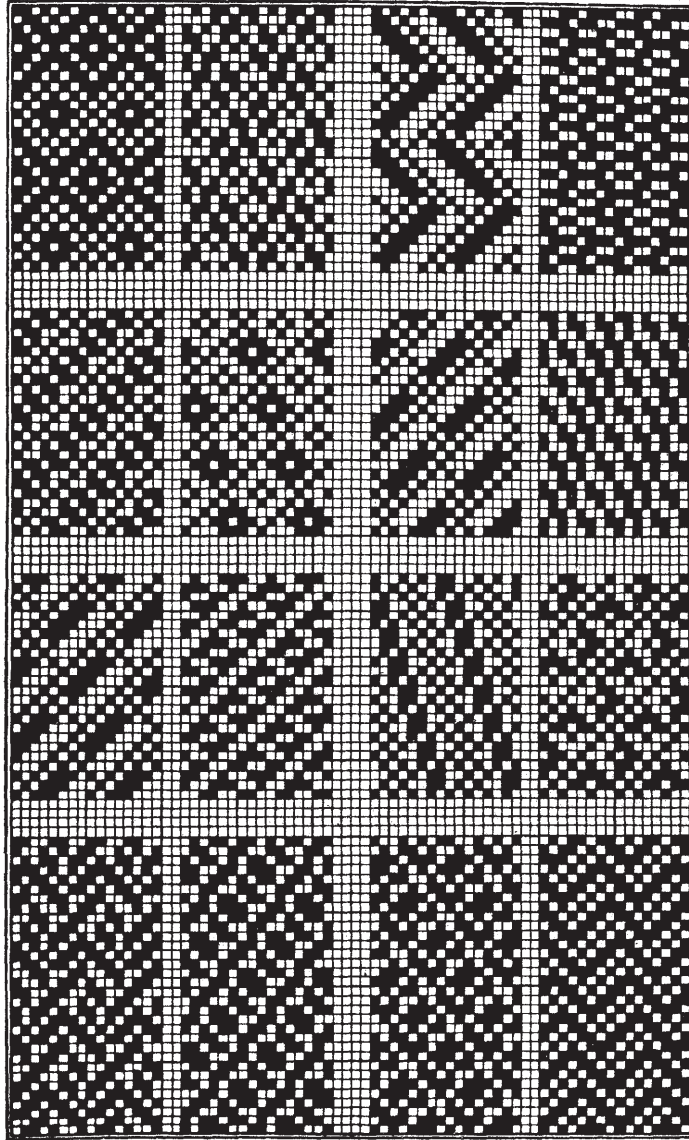
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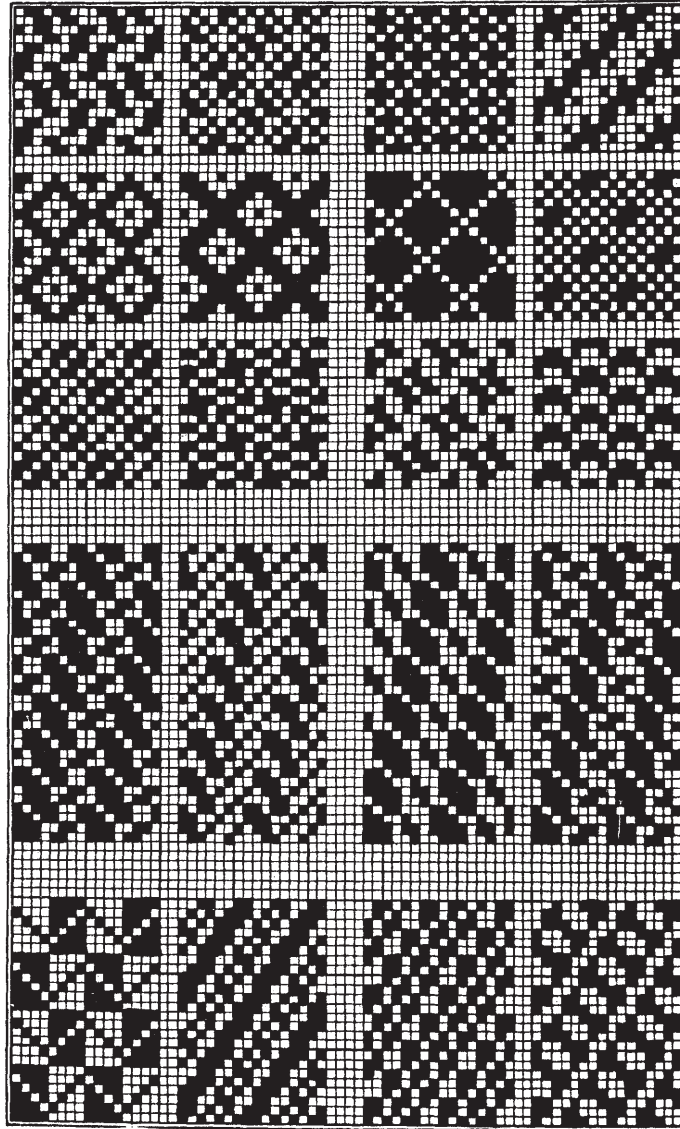
EIGHT HARNESS



8×5 8×8 8×12 8×16 8×24 8×32

 8×14 8×24 8×32

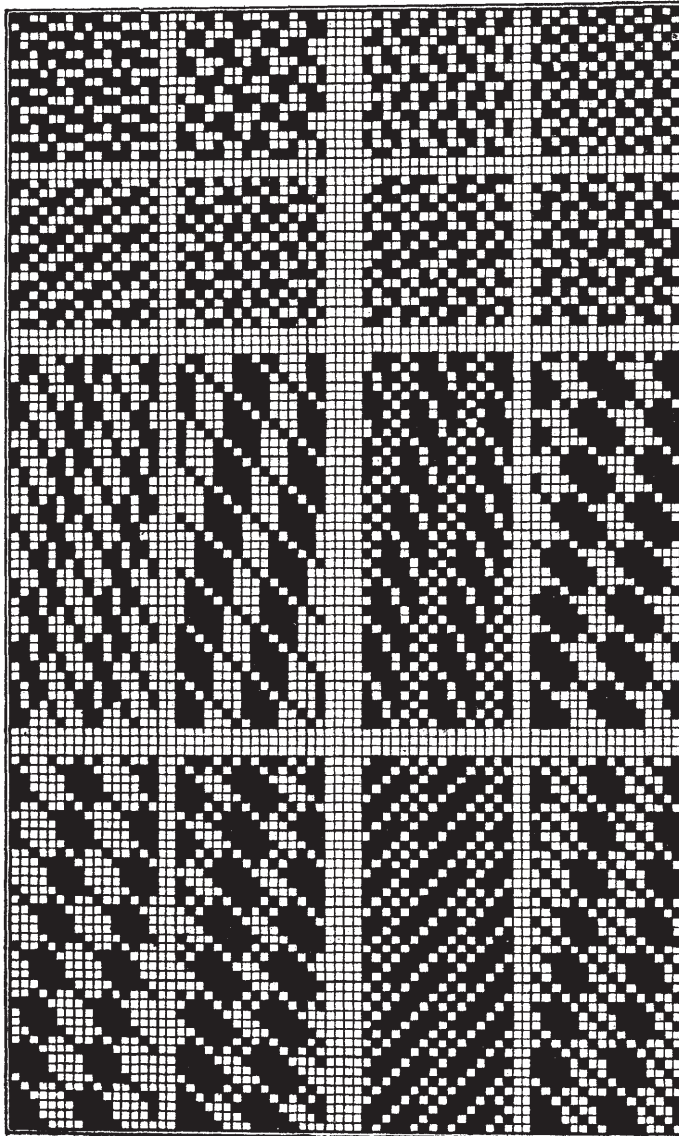
EIGHT HARNESS



8 × 8

8 × 32

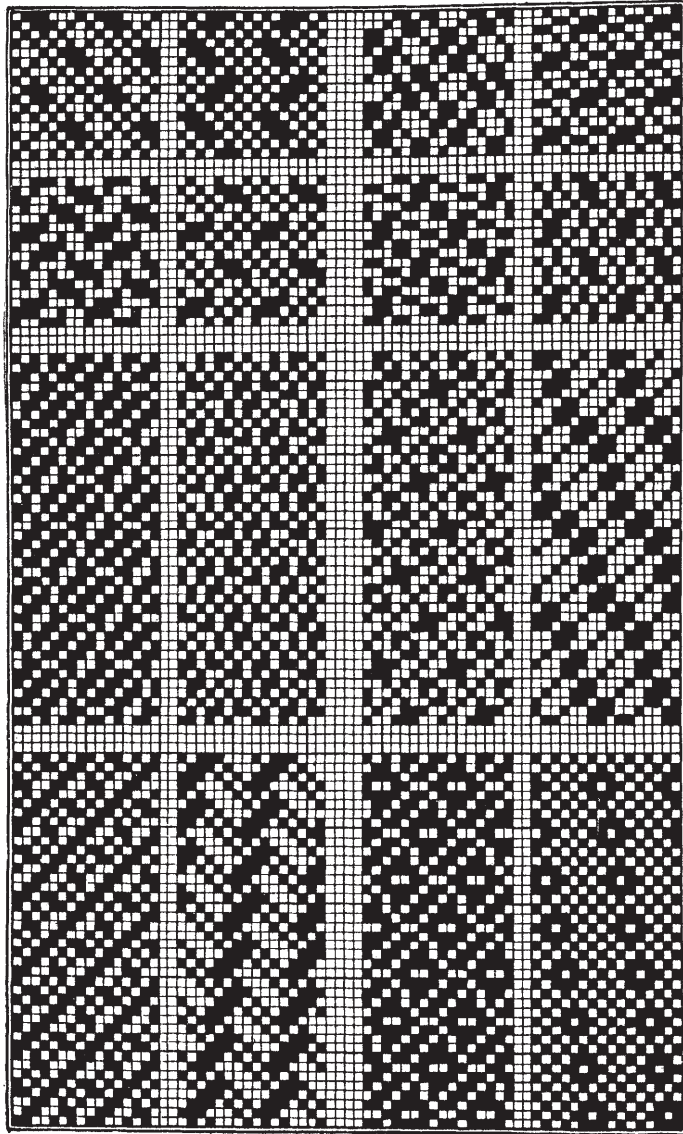
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8 × 8

8 × 40

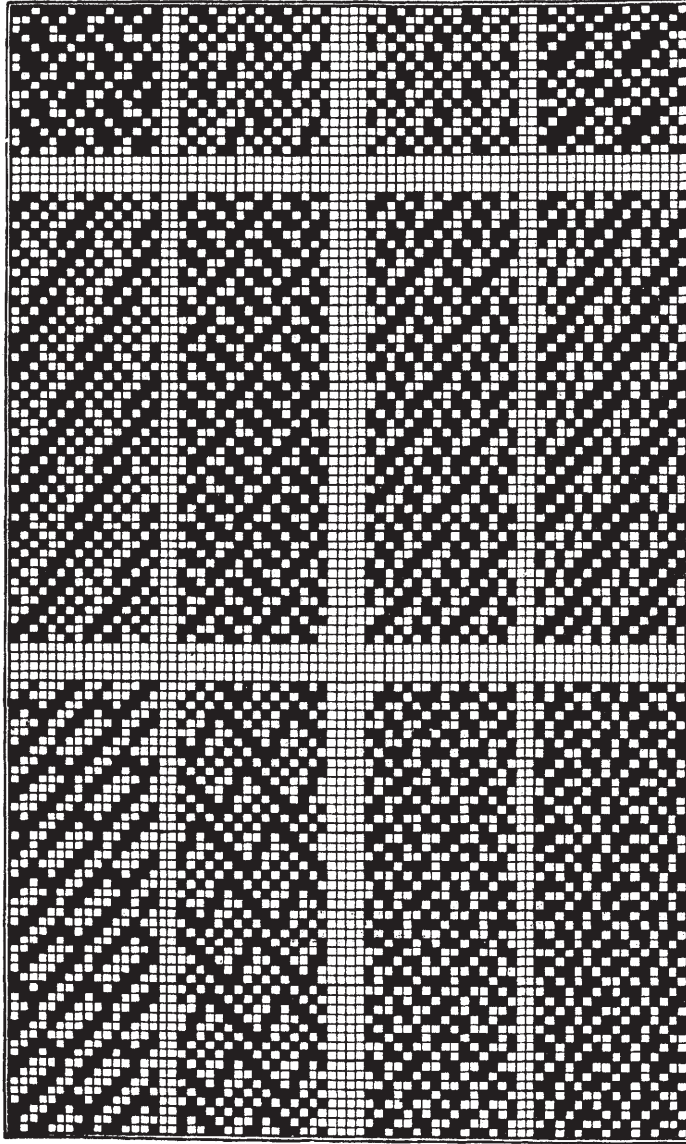
EIGHT HARNESS



8 × 8

8 × 40

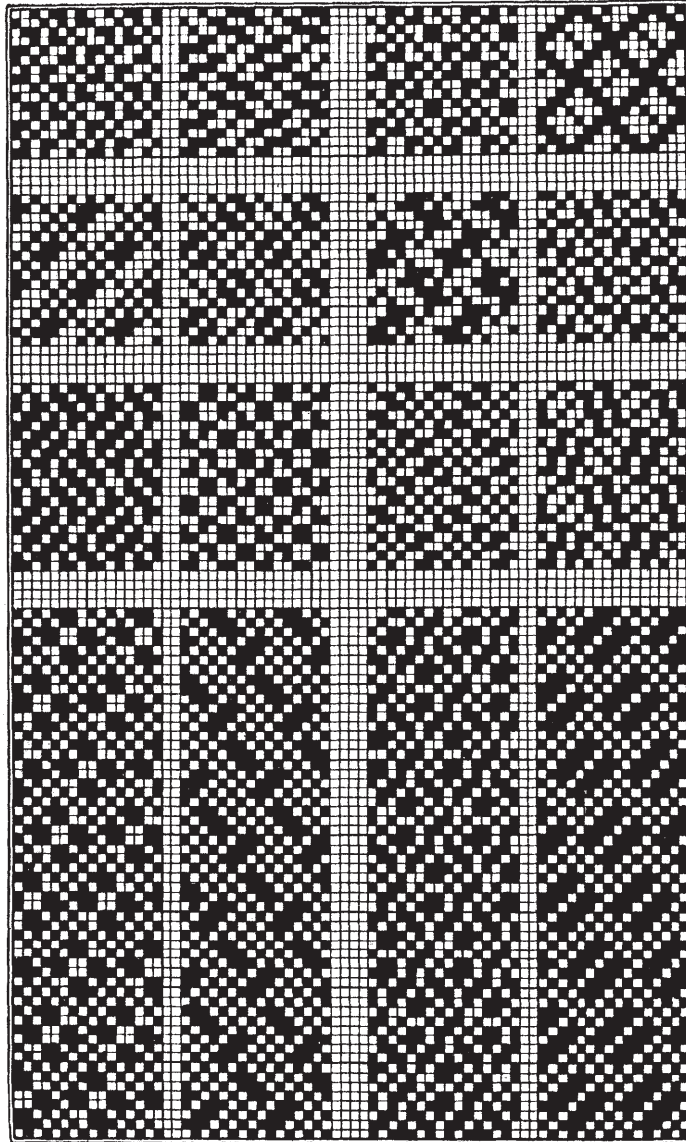
EIGHT HARNESS



8 × 8

8 × 48

EIGHT HARNESS

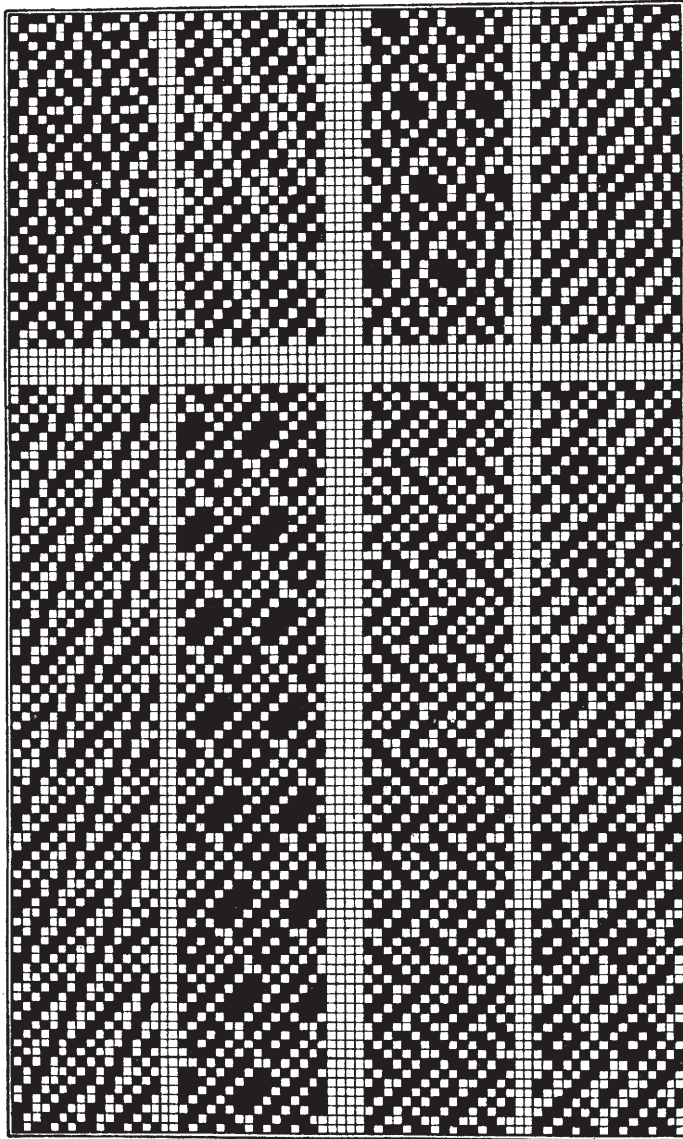


8 × 8

8 × 10

8 × 56

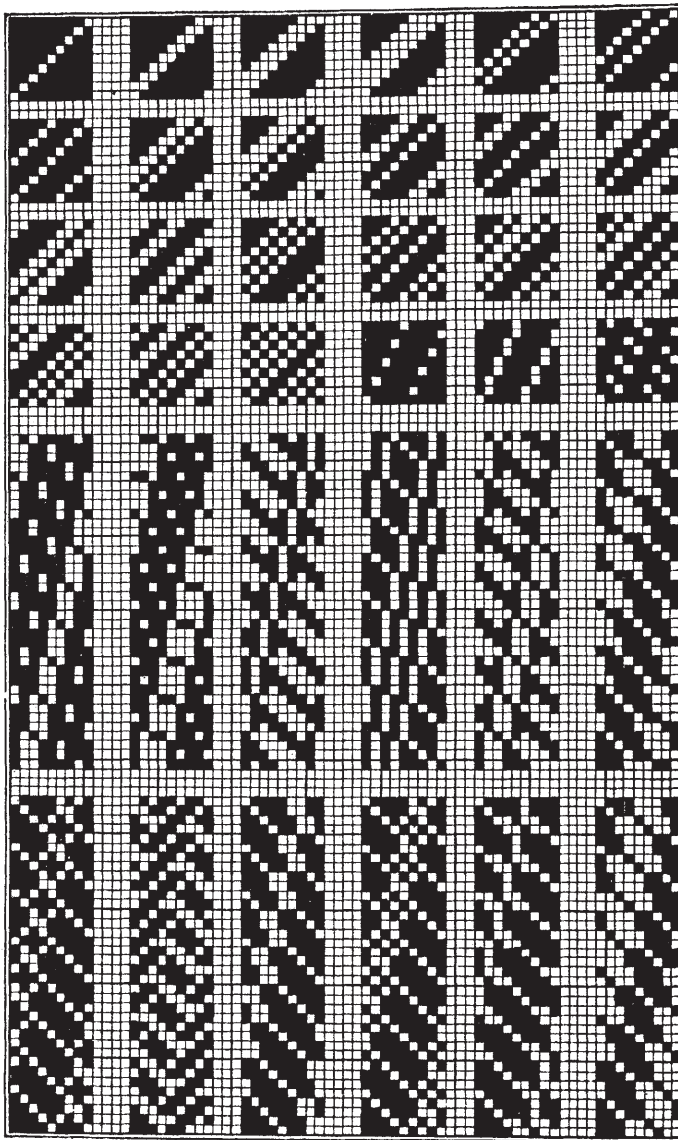
EIGHT HARNESS



8 × 36

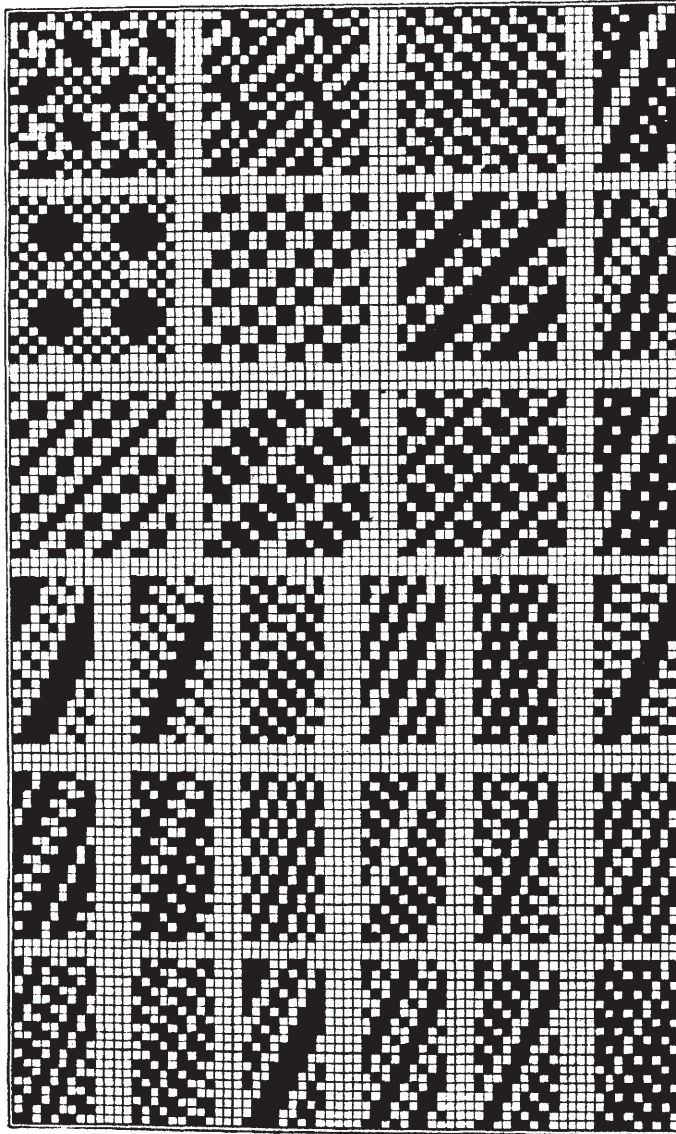
8 × 80

NINE HARNESS



9 × 9

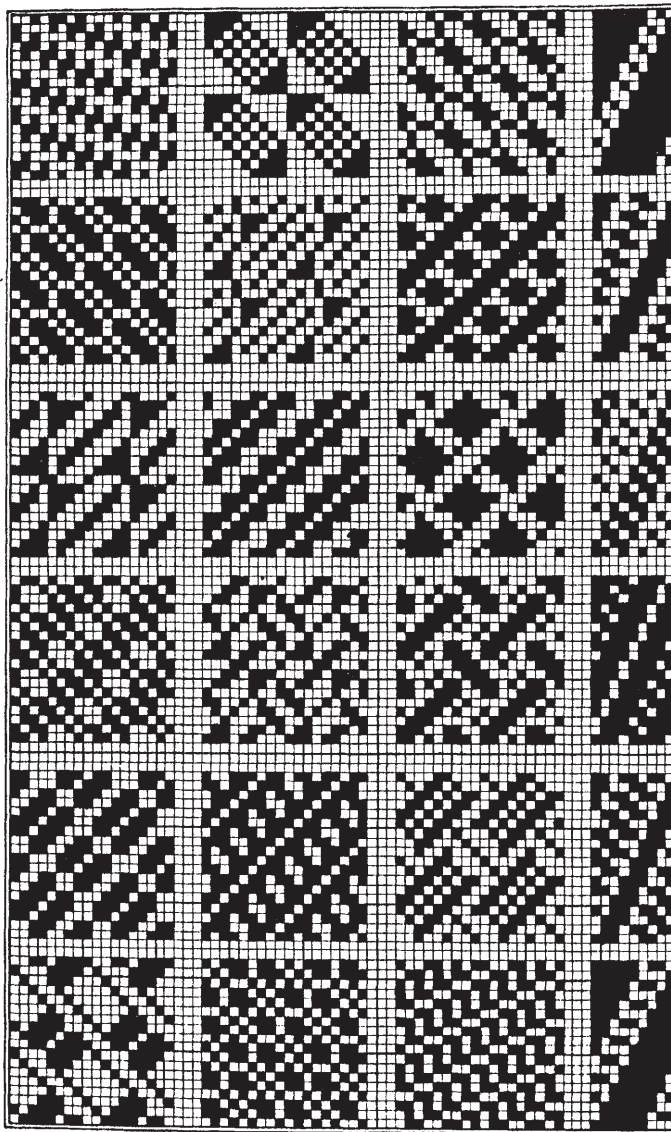
9 × 36



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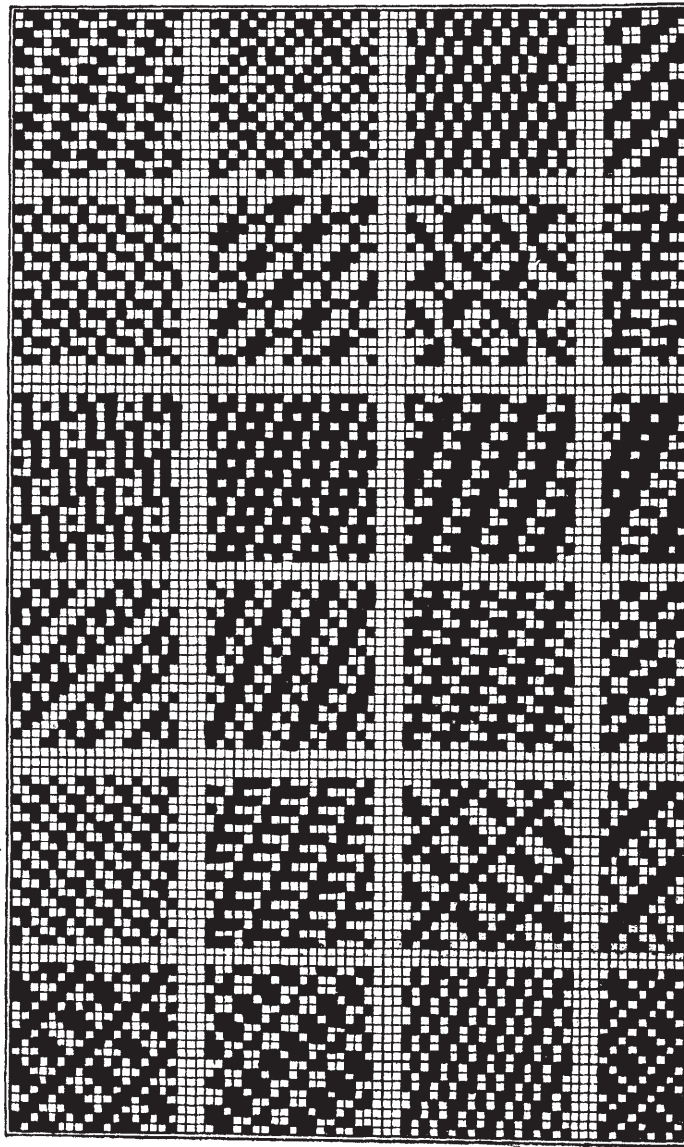
9 × 18

NINE HARNESS



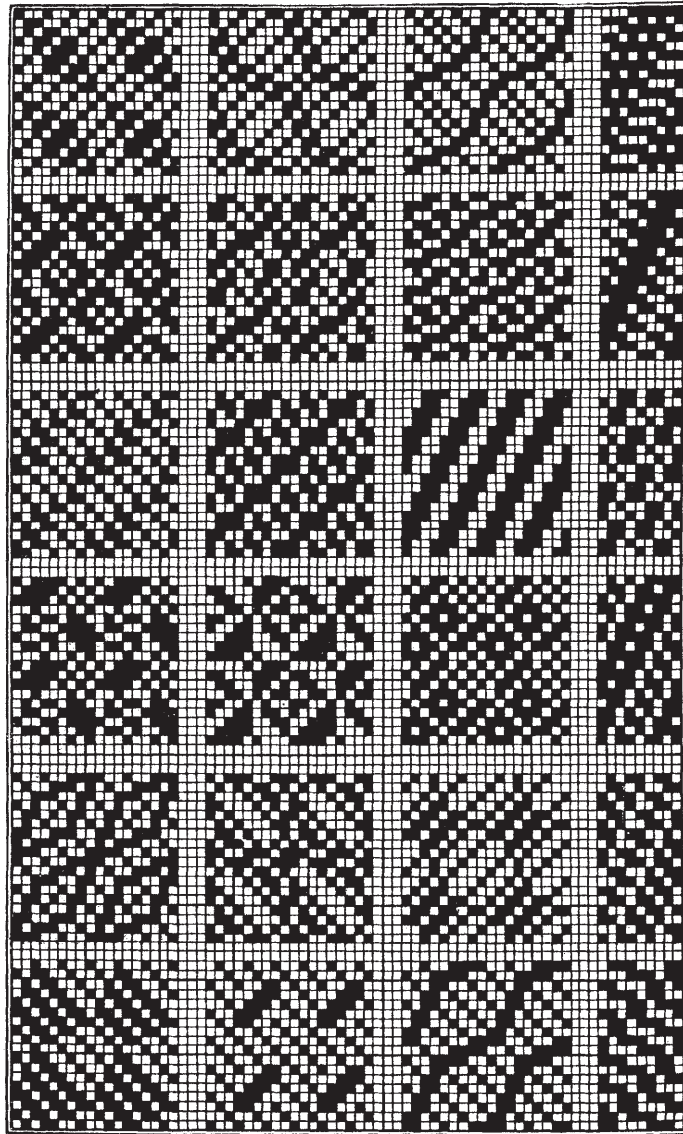
9 × 9

9 × 18



9 × 9

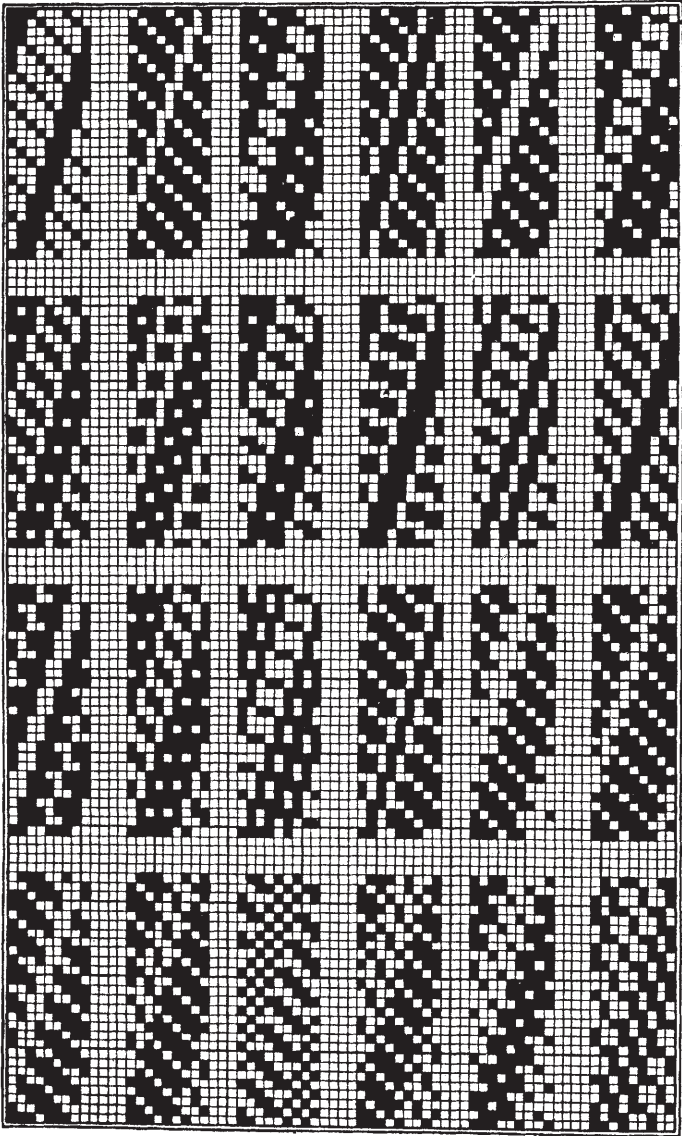
9 × 18



9 × 9

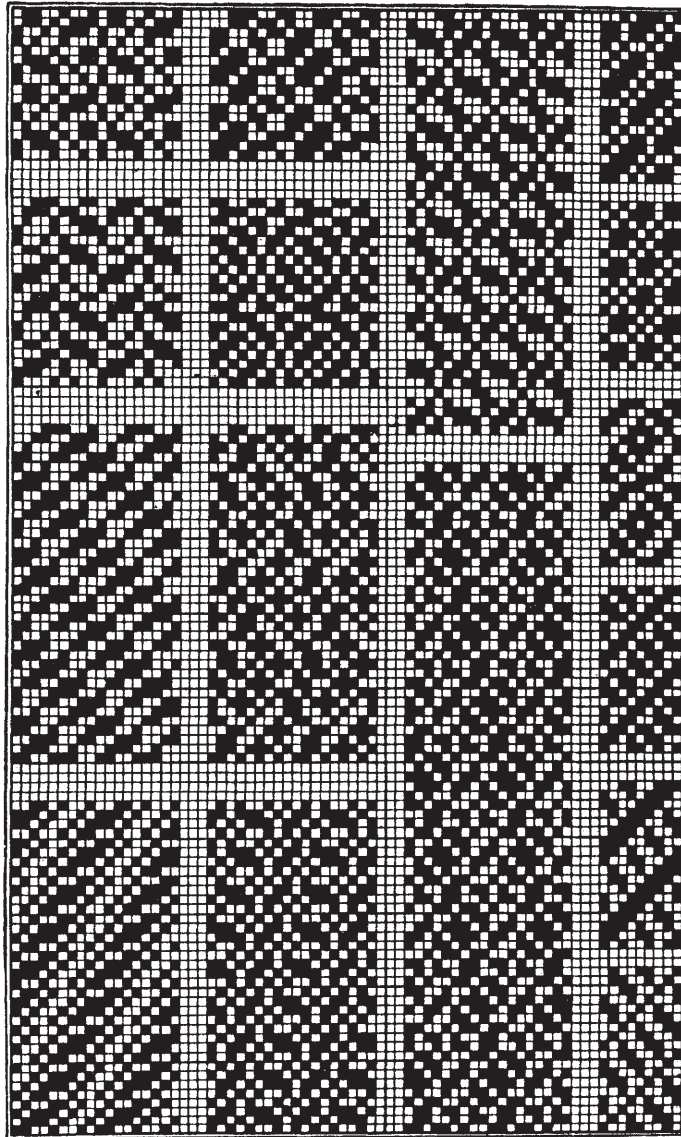
9 × 18

NINE HARNESS

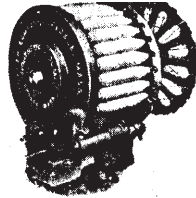


9 × 27

NINE HARNESS



9 × 8 9 × 9 9 × 10 9 × 18 9 × 20 9 × 36 9 × 45 9 × 72



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ABSTRACT OF CONTENTS:

DIVISION OF TEXTILE FABRICS ACCORDING TO THEIR CONSTRUCTION. SQUARED DESIGNING PAPER.

FOUNDATION WEAVES: PLAIN. TWILLS. SATINS.

DRAWING-IN DRAFTS.

DERIVATIVE WEAVES: RIB WEAVES. BASKET WEAVES. BROKEN TWILLS. STEEP TWILLS. RECLINING TWILLS. CURVED TWILLS. COMBINATION TWILLS. CORKSCREWS. ENTWINING TWILLS. DOUBLE TWILLS. CHECKERBOARD TWILLS. FANCY TWILLS. POINTED TWILLS. DOUBLE SATINS. GRANITES. COMBINATION WEAVES. COLOR EFFECTS.

SPECIAL SINGLE CLOTH WEAVES: HONEYCOMB WEAVES. IMITATION GAUZE WEAVES. ONE SYSTEM WARP AND TWO SYSTEMS FILLING. SWIVEL WEAVING. TWO SYSTEMS WARP AND ONE SYSTEM FILLING. LAPPET WEAVING. TRICOTS.

DOUBLE AND MORE PLY CLOTH: REGULAR DOUBLE CLOTH. WORSTED COATINGS. MATELASSES. QUILTS. RIB FABRICS. THREE, FOUR, ETC., PLY FABRICS.

PILE FABRICS: VELVETEENS. FUSTIANS. CORDUROY. CHINCHILLAS. CHENILLE. FRINGES. VELVETS. PLUSHES. TAPESTRY CARPETS. BRUSSEL'S CARPETS. DOUBLE FACED CARPETS. DOUBLE PILE FABRICS. TERRY PILE FABRICS. SMYRNA CARPETS AND RUGS. IMITATION TURKEY CARPETS.

TWO PLY INGRAIN CARPETS. GAUZE FABRICS. THE JACQUARD MACHINE. GOBELIN TAPESTRY. ANALYSIS OF TEXTILE FABRICS.

NOVELTIES IN DESIGNING: DESIGNING WEAVES BY FOUR CHANGES. SHADED FABRICS. SOLEIL WEAVES. CHECK PATTERNS. CRAPE WEAVES. HUCK PATTERNS. WOVEN TUCKS. CRIMP STRIPES. BEDFORD CORDS. CROCODILE CLOTH. LARGE DIAGONALS. TO INCREASE THE THICKNESS OF A FABRIC WITHOUT SPECIAL BACKING THREADS. BRACKET WEAVES. FRINGES. PEARL EDGES.

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The cuts in the fabric are shown at the places indicated by *e* and *f*. Letter *S* indicates the place where the first warp-thread and the first pick meet—the point for commencing to "pick-out."

After the sample is prepared according to the illustration just given, raise the first pick about $\frac{1}{4}$ of an inch with the "picking-out needle." See Fig. 1010.

Place the sample in the left hand as shown in diagram 1011, next ascertain the arrangement of interlacing pick number 1, warp-ways, until repeat is obtained.

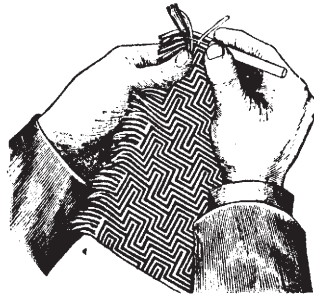


FIG. 1011

Every time a warp-thread is found situated above the filling, put a corresponding indication on the respective square of the designing paper (with pencil marks or prick holes with the needle), whenever you find the filling covering (floating over) one, two or more successive warp-threads, leave correspondingly one, two or more successive squares empty in the lateral line of small squares upon the designing paper.

After the intersecting of number 1 pick has been clearly ascertained liberate this pick out of the fringed warp edge and duplicate the procedure with pick number 2, to be followed by picks 3, 4, 5, etc., until the repeat is obtained. If dealing with a soft-spun filling yarn be careful in raising it, to avoid breaking the thread; also be careful that after the interlacing of the pick has been ascertained, it

is *entirely* removed so that no small pieces of the thread remain in the fringed part of the warp; for if such should be the case it might lead to mistakes in examining the next adjoining pick.

III. Ascertaining Raw Materials Used in the Construction of a Fabric.

In most cases an examination of the threads liberated during "picking-out" with the naked eye will be sufficient to distinguish the material used in the construction of the fabric yet sometimes it is found necessary to use the microscope or a chemical test for their detection. For example: Tests might be required to show whether a certain thread is all wool or whether a certain thread is all silk, etc. For solving such questions, the following methods are given:

A common and ready method for ascertaining the difference between animal and vegetable fibres is to burn some of the threads of yarn in a flame. The vegetable fibre is composed of carbon, hydrogen and oxygen, while the animal fibre, in addition to these, contains nitrogen. By burning, the threads used in testing the first mentioned fibre will result in carbonic acid and water, while those of the latter, or of animal fibre, result in combinations containing nitrogen which element readily makes itself known by its peculiar smell or disagreeable odor similar to burnt feathers. Another point which it is well to note is the rapidity with which the thread composed of vegetable origin burns as compared with the burning of the thread having an animal substance for its basis. In the latter case, only a little bunch of porous carbon forms itself at the end submitted to the flame, and it does not form a flame as in the case of the former. As in some instances these two tests will be found unreliable, a more exact analysis may be required. If so, proceed after one or the other of the following formulas:

To Detect Cotton or other Vegetable Fibre in Woolen or Silk Fabrics.

Boil the sample to be tested in a concentrated solution of caustic soda or potash, and the wool or silk fibre will rapidly dissolve, producing a soapy liquid. The cotton or other vegetable

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E. A. POSSELT, Editor and Publisher

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<p><i>Table of Contents</i></p>	
Dictionary of Woollen Fibres.....	51
Robbing, Finishing, Edge-work.....	63
Dyeing Black Silks.....	65
Silk Throwing.....	66
Carson System.....	67
Review of the Market.....	70
International Trade Marks Relating to the Textile Industry.....	71
International Trade Marks Relating to the Textile Industry.....	72
Steady and Range Trade.....	73
Neutral and Artificial Light upon Cotton.....	74
How to Test the Various Finishes of Cotton Goods.....	75
Optical Effects on Silks.....	76
The Manufacture of Spun Rayon.....	77
Test of the Heavy and Light Goods Trade.....	78
Review of the Market.....	79
Dyeing and Finishing of Hosiery and Knit Goods.....	80
Batterworth's Gas Singeing Machine.....	81
Mill News.....	82
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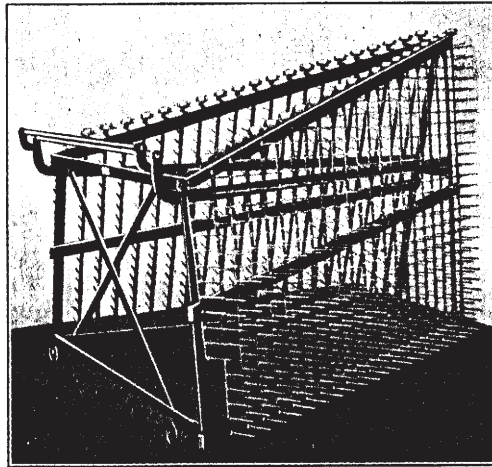
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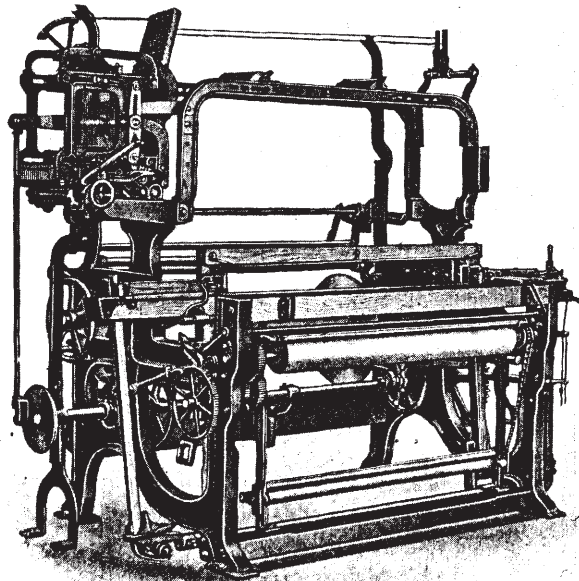
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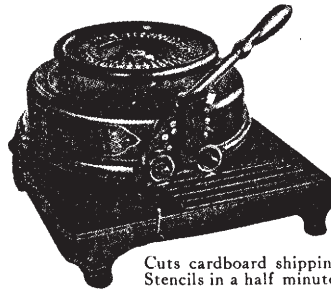
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Specimen Page of "Wool, Cotton, Silk from Fibre to Finished Fabric."

large, white, coarse, long wool, and the breed has become practically native to this country. The structure of the fibres is shown in Fig. 10. In the Cotswold, we find the lines indicating the edges of

fibres are examined in the natural state with the microscope, we find extending through the centre a band of matter more or less broad, which is very much more opaque than the matter surrounding it.

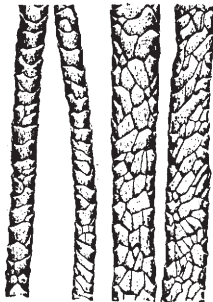


Fig. 9.

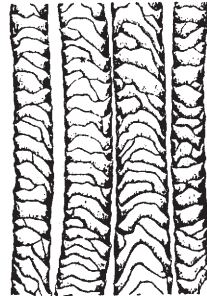


Fig. 11.

the scales more irregular and broken than in the Leicester and Lincoln; and more so in the Lincoln than in the Leicester. In all of them the scales are more or less oblong, but in width they are much larger than in the Down and Merinos.

The forms of this band are given in the illustration of Cotswold wools. It appears to be of irregular thickness and to allow more light to pass through at certain places than at others.

The Oxford Down Sheep is also of English origin, being a cross between the Cotswold ram and the Hampshire Down ewe. The wool produced by the Oxford Down is finer and firmer than that of the Cotswold and has a staple of from 5 to 7 inches in length, the average weight of the fleece being 9 pounds. Fig. 11 shows typical specimens of these fibres highly magnified. The wool of this sheep, as well as that from the Cotswold, the Leicester and the Lincoln are the most important classes of what we term long staple wools, vice versa the Merino and the Southdown sheep, which are the most important

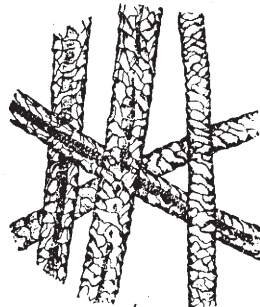


Fig. 10.

we find that a larger proportion of the fibres in the former are more white and opaque than the others, and that the whole bunch has very much less of lustre than the Lincoln wool. When these Cotswold

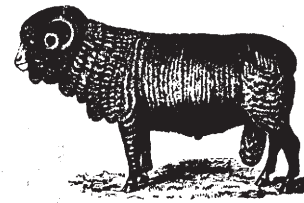


Fig. 12.

breeds of sheep, producing what we term short staple, carding or clothing wools.

The Merino sheep. The original home of this animal is Spain, from there they have been spread

The Jacquard Machine

ANALYZED AND EXPLAINED:

The Preparation of Jacquard Cards and Hints to
Learners of Jacquard Designing

By E. A. POSSELT

Editor of Posselt's Textile Journal.

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ABSTRACT OF THE CONTENTS:

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| <p>History of the Jacquard Machine.
The Jacquard Machine—General Arrangement and Application.
Illustration of the different parts of the Jacquard Machine—Method of Operation, etc.
The Jacquard Harness—The Comberboards.
Tying-up of Jacquard Harness.
I.—Straight-through Tie-up.
II.—Straight-through Tie-up for Repeated Effects.
III.—Straight-through Tie-up using Front Harness.
IV.—Centre Tie-up.
V.—Straight-through and Point Tie-ups Combined.
VI.—Straight-through Tie-up in Two Sections.
VII.—Tying-up for Figuring with an Extra Warp</p> | <p>VIII.—Straight-through Tie-up in Three Sections.
IX.—Point Tie-up in Three Sections.
X.—Combination Tie-up in Two Sections.
XI.—Straight-through Tie-up in Four Sections.
XII.—Tying-up with Compound Harness.
XIII.—Tying-up for Gauze Fabrics.
Modifications of the Single Lift Jacquard Machine.
I.—Double Lift Single Cylinder Jacquard Machine.
II.—Double Lift Double Cylinder Jacquard Machine.
III.—Substitution of Tail-cords for Hooks.
Tying-up of Jacquard Harness for Two-ply Ingrain Carpet.
Straight-through Tie-up.
Point Tie-up.</p> |
|--|--|

APPENDIX:

- | | |
|--|--|
| <p>Preparing and Stamping of Jacquard Cards.
Dobby Card-Punching Machines.</p> | <p>Piano Card-Stamping Machines.
Stamping, Repeating and Lacing.</p> |
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HINTS TO LEARNERS OF JACQUARD DESIGNING:

- | | |
|--|--|
| <p>Point Paper to Use, etc.
Sketching of Designs for Fabrics to be executed on the Jacquard Machine.
Enlarging and Reducing Figures for Sketches</p> | <p>Transferring of the Sketch to the Squared Paper
Outlining in Squares
The Shading of Textile Fabrics by the Weave.</p> |
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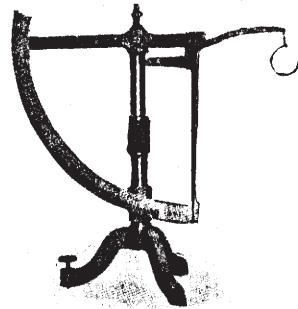
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BY

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ABSTRACT OF THE CONTENTS

YARN AND CLOTH CALCULATIONS

Grading of the Various Yarns Used in the Manufacture of Textile Fabrics According to Size or Counts. To Find the Equivalent Counts of a Given Thread in Another System. To Ascertain the Counts of Twisted Threads Composed of Different Materials. To Ascertain the Counts for a Minor Thread to Produce, with Other Given Minor Threads, Two, Three or More Ply Yarn of a Given Count. To Ascertain the Amount of Material Required for Each Minor Thread in Laying out Lots for Two, Three or More Ply Yarn. To Ascertain the Cost of Two, Three or More Ply Yarn. To Find the Mean or Average Value of Yarns of Mixed Stocks. Reed Calculations. Warp Calculations. Filling Calculations. To Ascertain the Amount and Cost of the Materials Used in the Construction of All Kinds of Plain and Fancy Cotton and Woolen Fabrics.

STRUCTURE OF TEXTILE FABRICS

The Purpose of Wear that the Fabric will be Subject to. The Nature of Raw Materials. Counts of Yarn Required to Produce a Perfect Structure of Cloth. To Find the Diameter of a Thread by Means of a Given Diameter of Another Count of Yarn. To Find the Counts of Yarn Required for a Given Warp Texture by Means of a Known Warp Texture with the Respective Counts of the Yarn Given. Influence of the Twist of Yarns upon the Texture of a Cloth. To Find the Amount of Twist Required for a Yarn if the Counts and Twists of a Yarn of the Same System, but of Different Counts, are Known. Influence of the Weave upon the Texture of a Fabric. To find the Texture of a Cloth. To Change the Texture for Given Counts of Yarn from one Weave to Another. To Change the Weight of a Fabric without Influencing its General Appearance. To Find Number of Ends Per Inch in Required Cloth. Weaves Which will Work with the Same Texture as the two and two Twill. Weaves which will Work with the Same Texture as the three and three, four and four, etc., Twill. Selections of the Proper Texture for Fabrics Interlaced with Satin Weaves. Rib Weaves. Corkscrew Weaves. Two Systems Filling and One System Warp. Two Systems Warp and One System Filling. Two Systems Warp and Two Systems Filling.

ANALYSIS

How to Ascertain the Raw Materials Used in the Construction of Textile Fabrics. Microscopical Appearance of Fibres. Tests for Ascertaining the Raw Materials Used in the Construction of Yarns or Fabrics. How to Ascertain the Percentage of Each Material Constituting the Fabric. How to Test the Soundness of Fibres or Yarns. How to Test Given Counts of Yarn. How to Ascertain the Weight of Cloth. How to Calculate the Weight. How to test and Analyze the Various Finishes. Cotton Spinning.

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Specimen Page of "Textile Calculations."

Example.—Find the proper texture for warp and filling, and also ascertain the weight of flannel per yard from loom (exclusive of selvage). Cloaking: Warp 5-run, filling 5-run, backing 2½-run. Weave, see Fig. 40 (8 warp threads and 12 picks in repeat). Take-up of warp, 10 per cent. Width of cloth in reed, 72 inches (exclusive of selvage).



FIG. 40

5-run=8,000 yards per lb.
 $\sqrt{8,000}$, less 10 per cent.=75 ends of 5-run yarn will lie side by side in one inch.
 $75 \times 4 = 300 + 6 = 50$ ends of warp must be used per inch, and
 $50 \times 72 = 3,600$ ends must be used in full warp.
 $100 : 90 :: x : 3,600$
 $3,600 \times 100 = 360,000 + 90 = 4,000$ yards of warp yarn are required per yard cloth woven.
 5-run yarn=500 yards per oz. $4,000 + 500 = 8$ oz. of warp yarn are wanted.
 52 picks (50+2 extra) of face filling, } are wanted per inch
 26 picks (corresponding to face picks) of back filling, }
 $52 \times 72 = 3,744$ yards of face filling are wanted.
 $3,744 + 500 = 7.5$ oz., weight of face filling.
 $26 \times 72 = 1,872$ yards of backing are required.
 $1,872 + 250$ (yards of 2½-run filling per oz.)=7.5 oz., weight of backing.

Warp,	8.00 oz.
Face filling,	7.50 "
Backing,	7.50 "
	23.00 oz.

Answer.—Total weight of cloth per yard from loom (exclusive of selvage), 23 oz.

SELECTION OF THE PROPER TEXTURE FOR FABRICS BACKED WITH WARP; i. e., CONSTRUCTED WITH TWO SYSTEMS OF WARP AND ONE SYSTEM OF FILLING.

To ascertain the texture of the warp in these fabrics we must first consider the counts of the yarn as used for the face structure, and secondly the weave.

After ascertaining this texture (for the single cloth) we must consider the weave for the back warp; i. e., the stitching of the same to the face cloth. If dealing with a weave of short repeat for the back warp (for example a 1—3 twill) we must allow a correspondingly heavy deduction from the threads as ascertained for the face cloth (about 20 per cent. for the 1—3 twill); whereas, if dealing with a far-floating weave for the back (for example the 8-leaf satin) we will have to deduct less (about 10 per cent. for the 8-leaf satin) from the previously ascertained texture of the face cloth. Since the 8-leaf satin is about the most far-floating weave, as used for the backing, thus, 10 per cent. will be about the lowest deduction, and as the 1—3 twill is the most frequently interlacing weave, in use in the manufacture of these fabrics, thus, 20 per cent. deduction from the respectively found texture of the face cloth is the maximum deduction. To illustrate the subject more clearly to the student we will give both weaves as previously referred to with a practical example.

Example.—Find warp texture for the following fabric: Fancy worsted trousering. Weave, see Fig. 41. Face warp, 2/36's worsted. Back warp, single 20's worsted.



FIG. 41

2/36's worsted=90 threads (side by side per inch).
 Face weave 2—3 twill =4 threads in repeat and 2 points of interlacing.
 $90 \times 4 = 360 + 6 = 60$ threads, proper warp texture for the single structure.
 60
 -12 (20 per cent. deduction caused by the back warp (1—3) stitching in the face structure).

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SHEDDING MECHANISMS.

THE KNOWLES SHEDDING MECHANISM.

This mechanism is shown in the accompanying three illustrations, of which Fig. 1 shows the complete shedding mechanism. Fig. 2 shows the top and bottom cylinders, also the vibrator and jack attachment. Fig. 3 shows the box mechanism for raising and lowering the shuttle boxes.

a, indicates arch of loom frame, *b*, the loom frame *c*, the bolts for fastening the arch *a*, on to loom frame *b*, *d*, indicates the top cylinder for operating shedding mechanism, *e*, the bottom cylinder for operating shed-

f, is a small rod running across the top of jacks for holding them down on the rod *k*.

l, chain cylinder gear, fastened to the chain cylinder *l'*, by means of a soft set screw (not shown), so that provided any catch occurs no other breakage but the breaking of said soft set screw will result; *l''*, the boxes for holding chain cylinder and which can be raised or lowered by set screws *l'''*.

m, two elliptical gears for transferring the characteristic fast and slow motion to chain cylinder *l'*. To the right of these two elliptical gears *m*, are seen two spur

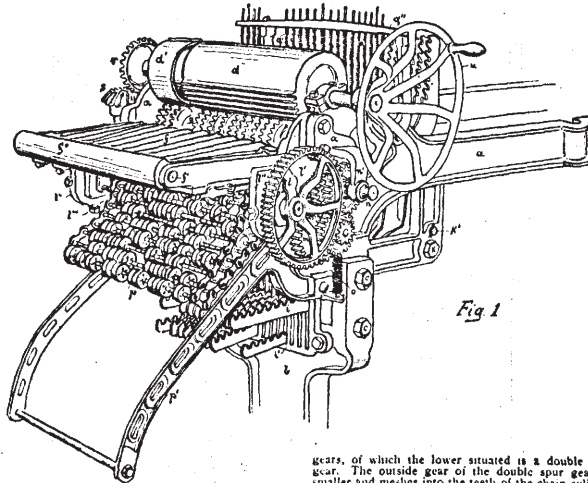


Fig 1

ding mechanism, *d'* the part of top cylinder for operating shuttle boxes, *e'*, the part of bottom cylinder for operating shuttle-boxes; *f*, the vibrator levers; *g*, the vibrator gears, *h*, the vibrator connectors; *i*, the harness jacks, *j*, the comb for keeping them in proper position.

Vibrator lever, gear and connector are the same for shedding and box mechanism, with the exception of the long connector *k*, used for raising single box.

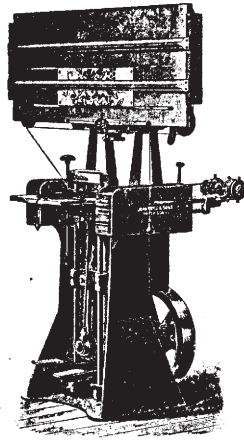
l, arbor of harness jacks, fulcrumed to rod *k*, fastened to the lower extension of arch *a*, of the loom frame

gears, of which the lower situated is a double spur gear. The outside gear of the double spur gear, is smaller and meshes into the teeth of the chain cylinder gear *l*.

n, the reverse key, held in position by casting *n'*, bolted on to loom frame *b*. This reverse key acts as a shaft for all the upper sections of previously referred to three sets of gears. It has a double key set in its shaft. When the loom is in motion and the chain cylinder running forward, one of the lips fastens the top elliptical gear and also the previously referred to outside situated upper gear, which meshes with the chain cylinder gear *l*. If required to reverse the chain cylinder the reverse key *n*, is drawn out, in turn liberating the top elliptical gear and fastening the middle spur

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