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TE - 03014

FABRIC DESIGN

B.Tech. (First Year)

Textile Engineering

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Part One

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CHAPTER 1

INTRODUCTION

1.1 Definition of Textile Design

Cloth, like any other manufactured article, must be planned before it can be manufactured. To plan a weave structure for a fabric, one must have a knowledge of the various methods of interlacing threads to form cloth and some understanding of the mechanism of the loom. If color is used, the designer must have insight into the problems of planning color combinations and knowledge of how color arrangements are provided for on a loom. This advance planning of a fabric is called textile design and the person responsible for the plan is called a textile designer. A textile designer working with woven design is usually a person with textile school training and almost invariably a man since the entrance to the business is through textile engineering.

Commercial artists plan the designs used on print cloth. The design might conceivably be imprinted on paper, on cloth, or on plaster and be equally artistic and satisfactory in any of these mediums. For the artist, the cloth is merely a background for the design which is printed on the cloth after it is woven. This designer is usually trained in an art school, is primarily interested in the color and form of his design, not in the cloth background. If he specializes in designs for textiles, his business is identified as textile design and he may be called a textile designer. Both men and women enter this field.

Since the term "textile design" may properly refer to two very different activities, it is desirable to know which meaning is intended. This course is restricted to the consideration of woven design and the problems of weave structure, and is prepared for textile engineering students interested in fabric construction.

1.2 Classification of Fabrics

Fabric classified in terms of structure are:

A. Woven Fabrics.

1. A single fabrics, such as sheeting, drills, and sateens.
2. Compound fabrics, such as pique, and reversible blankets.
3. Pile fabrics, such as corduroy, terry toweling, and plush.
4. Lene fabrics, such as curtain marquisette.

B. Kait Fabrics.

5. Hoisery: full-fashioned, shaped or cut, and seamless.
6. Underwear, such as men's shirts, balbriggens.
7. Outerwear, such as sweater coats, sweaters, and bathing suits.

C. Lace Fabrics.

8. Hand made lace.
9. Machine made lace.

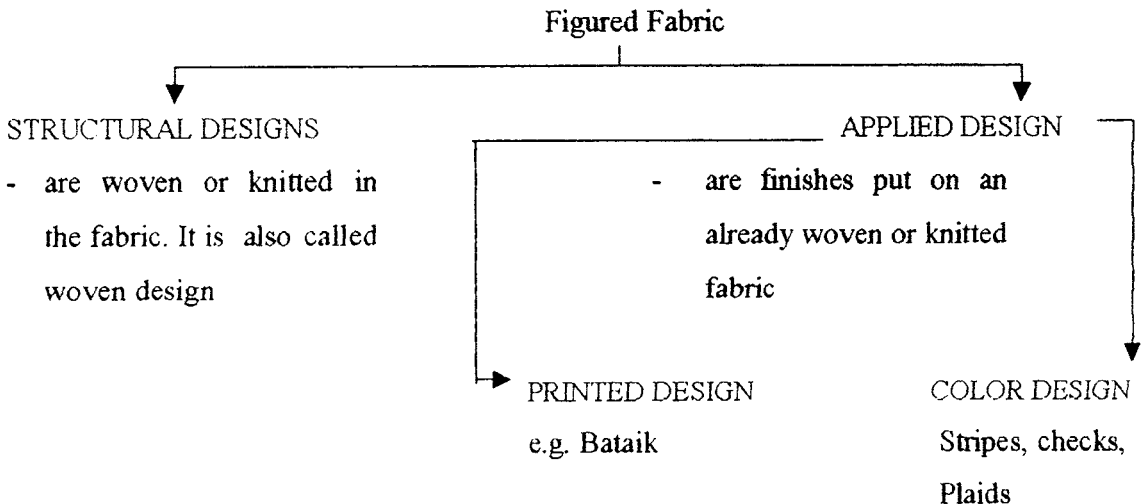
D. Felt Fabrics.

10. Felt as in hats.

Scope of Elementary Textile Design Course. - - In the preceding paragraph fabrics are classified as woven and knit fabrics, laces and felts. These in turn are subdivided so that single fabrics such as sheeting, print cloth, drills, and sateens are listed as one sub-division in a group of ten. Elementary Textile Design, Part I. deals with single fabrics only Part II. deals with compound fabrics, pile fabrics and lenes.

1.3 Fabric Design

Figures and designs are put on the fabrics to embellish them. Figured fabric may be structural designs or applied designs.



TEXTURE : rough, smooth, thick, thin, rigid, bulky, etc

PATTERN : man, flower, animals, circle, triangle, etc

COLOUR : white, red, brown, blue, etc.

1.4 Fabric Construction

Woven fabrics are constructed by interlacing one system of parallel threads at right angles to another system of parallel threads. The system of threads that runs lengthwise of the good is known as the warp; the system of threads that runs across the cloth is known as filling. They are also commonly referred to as ends and picks respectively.

1.5 Design Paper

Weave plans can be shown on square paper on which parallel vertical lines are crossed by parallel horizontal lines because cloth consists of parallel warp threads crossed at right angles by parallel filling threads.

A special square paper called design paper is used for textile designing. The design paper is 8 x 8 or 10 x 10 design paper.

The spaces between the vertical lines represent warp threads, the spaces between the horizontal lines represent filling threads. On the squared paper, each square can be used to represent a warp 'thread' over a filling or a filling thread over a warp thread.

Painted square is used to indicate the warp over filling and unpainted square indicates the warp under filling.

A warp thread which is up is called a raiser, a warp thread down is called a sinker.

1.6 The Three Basic Weaves

The three basic weaves – plain, twill and satin can be made on the simple loom without the use of any attachment.

Plain Weave

Plain weave is the simplest. It is formed by yarns at right angles passing alternatively over and under each other. Each warp yarn interlaces with each filling yarn to form the maximum number of interlacings. Plain weave requires only a two – harness loom is the least expensive weave to produce. It is described as a $\frac{1}{1}$ weave: one harness up and one harness

Down when the weaving shed is formed.

Plain weave fabrics tend to wrinkle more, ravel less and be less absorbent than other weaves because there are many interlacings per square inch. Interesting effects can be achieved by the use of different fibre contents, novelty or textured yarns, yarns of different dyes, high or low twist yarns, filament or staple yarns and different finishes.

Balance Plain Weave

The simplest form of plain weave is one in which warp and filling yarns are the same size and the same distance apart so they show equally on the surface balanced plain weave.

Plain-weave balanced fabrics have a wider range of end uses than fabrics of any other weave and are, therefore, the largest group of woven fabrics. They can be made in any weight, from very sheer to very heavy.

Unbalanced Plain Weave

Increasing the number of warp yarns in a plain woven fabric until the count is about twice that of the filling yarns creates a crosswise ridge called a filling rib, as well as a warp surface in which the warp yarns completely cover the filling yarns.

Small ridges are formed when the warp and filling yarns are the same size and larger ridges are formed where the filling yarns are larger than the warp.

If the yarns are of different colors, the only color showing on the surface will be that of the warp yarns.

Ribbed fabrics with fine ribs are softer and more drapable than comparable balanced fabrics. Those with large ribs have more body and less drapability and are good for garments where a bouffant look is desired.

There are few sheer rib fabrics except those used in glass curtains. Broad cloth, Taffeta, Faille, Shantung, Rep fabrics are medium – weight ribbed fabrics. Poplin, rep and bengaline are usually bottom weight fabrics.

1.7 Classification of Weave

The ways in which the filling yarns are interlaced with the warps change the appearance of the fabric and produce many intricate designs that are woven into the cloth.

Weaves are named according to the design or system followed in interlacing warp and filling yarns. The different weaves are named as follows:-

- (1) Plain
- (2) Twill
- (3) Satin
- (4) Pile
- (5) Jacquard
- (6) Dobby
- (7) Leno or gauze
- (8) Swivel
- (9) Lappet
- (10) Clip spot
- (11) Schiffli Embroidery

CHAPTER 2

DESIGN FOR PLAIN WEAVE

2.1 Fabric Construction of Plain Weave

Woven fabrics are constructed by interlacing one system of parallel threads at right angles to another system of parallel threads. The system of threads that runs lengthwise of the goods is known as the warp; the system of threads that runs across the cloth is known as filling. They are also commonly referred to as ends and picks respectively.

The order in which the warp and filling threads interlace in a fabric is called the weave. The simplest is the plain weave in which there is an alternate interlacing of warp and filling yarns, one over, one under, the entire width of the fabric.

2.2 Design for Plain Weave

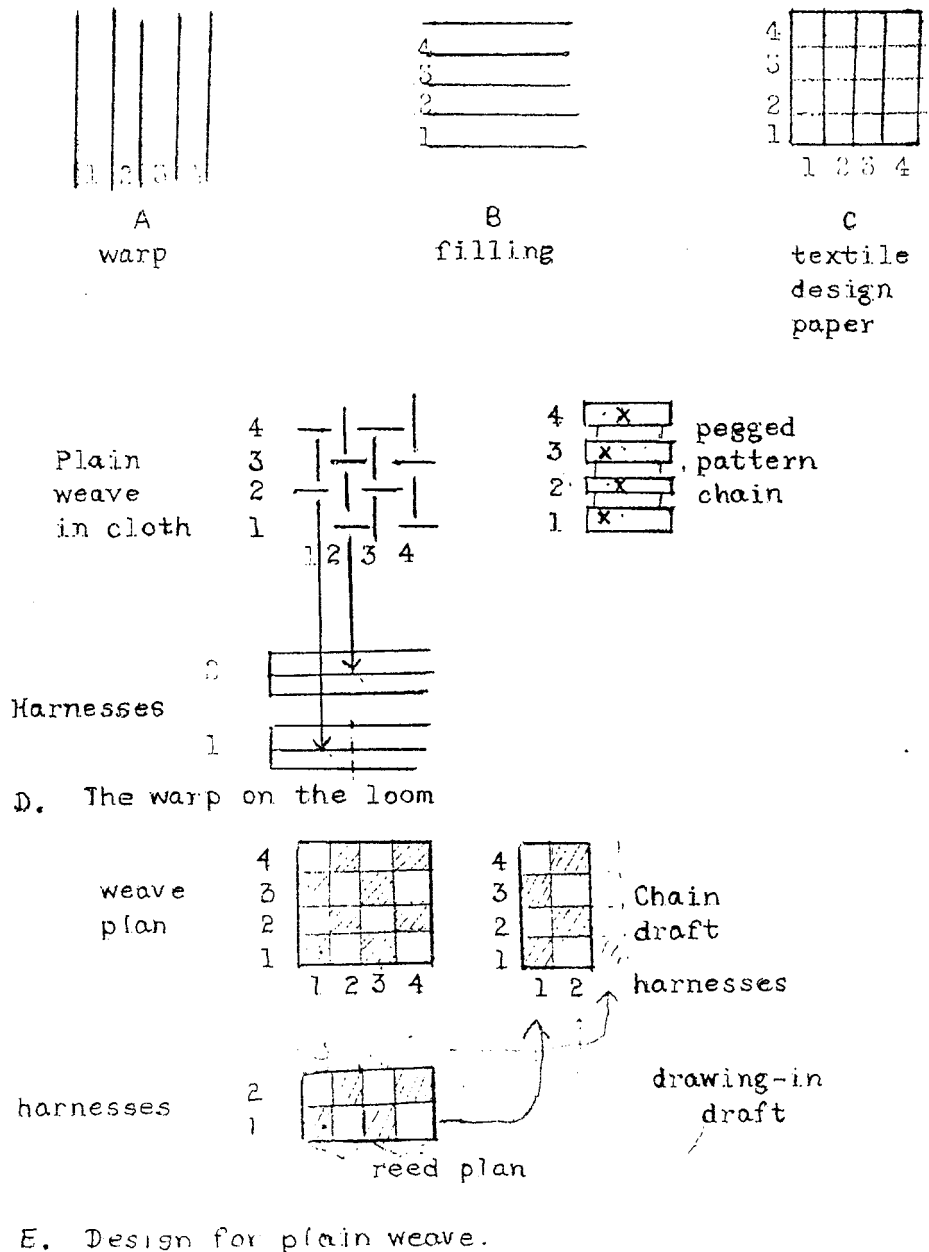
Turning to Figure 1 the space between the horizontal lines shown at A represent warp threads, the spaces between the horizontal lines in B represent filling threads. On the squared paper, each square can be used to represent a warp thread over a filling or a filling thread over a warp thread. Instead of drawing a sketch of interlacing threads, as in D the interlacing can be more clearly and conveniently shown by the use of design paper as in E. Notice in the sketch that the interlacing of the first pick and the first end, shown at D lower left, indicates that a warp thread is over a filling thread.

The corresponding square on the design paper E is painted in to indicate that the warp is up--that is over the filling. Just above, the warp end is under the filling. The fact that the warp thread is down is indicated on design paper by leaving the square blank.

A warp thread which is up is called a raiser, a warp thread down is called a sinker; a warp raiser is shown by a painted square, a sinker is shown by a blank square.

Painting in the design shows the weave pattern and is the first step in preparing the design. The next step is to add necessary loom directions for that particular weave pattern. These directions include the drawing-in draft, the chain draft, and the reed plan.

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Figure 2.1 Above is a step-by-step analysis of a design for plain weave. This includes much explanatory detail. All of the necessary directions for the weave are given in condensed form in the design shown at E.

2.3 Drawing-in Draft

The simplest arrangement for a plain weave uses two harnesses. When one harness is raised and the other harness is lowered, the two warp sheets form a V-shaped shed within which is laid a filling thread, placed in position by a shuttle which carries the filling through the shed. This filling is beaten into place and then the position of the two sheets of warp is reversed by lowering one harness and raising the other. This cycle of movements is already familiar to you in the names of the three primary motions of the loom: viz., shedding, picking and beating-up.

On plain weave using two harnesses, the odd numbered warp threads are drawn in on one harness, the even numbered warp threads are drawn in on a second harness. This forms two sheets of warp--odd ends in one sheet, even ends in the other. Directions for drawing-in are given in the form shown in Figure 2.1-E below the weave plan. The first and third warp ends are drawn in the first harness. To indicate this, paint in the first and third squares for harness No.1. The even numbered warp ends are drawn in the second harness. The order for drawing the warp threads in the harnesses has now been indicated. This is called the drawing-in draft, abbreviated to D.I.D.

2.4 The Chain Draft

The plan for raising and lowering the harnesses for each pick is shown in the chain draft. The basic rule for making a chain draft from a given design and drawing draft is:

Start with the first harness in the drawing-in draft, and locate an end that is indicated in the draft as being drawn through this harness. Trace this end up to the design and see the interlacing of this end with the filling. The interlacing of this end is copied in the first vertical line of squares in the chain draft which represents the first harness. See the analysis in Figure 2.1. Locate the end drawn through the second harness and copy the interlacing of this end in the next vertical line of squares in the chain draft. Continue until all harnesses have been traced. There should be as many harnesses indicated in the chain draft as are shown in the drawing-in draft.

2.5 Reed Plans

The warp threads from the loom beam are first drawn through drop wires, through the handle eyes, and then through the dents of the reed. Each space between reed wires is called a dent. The number of warp threads per dent may be one, two, three or more. The number varies according to the weave, the reed number, or the ends per inch desired in a given place

in the fabric. For instance, fabrics of low construction may be reeded one or two ends per dent; fabrics of high construction with three or more ends per dent; and other fabrics may be reeded 2 ends per dent in some places and 4 or more in other places. In Figure 2.1, the indicated reed draft shows two ends are to be placed in each dent in the reed.

2.6 Plain Weave Fabrics

Plain weave is used in weaving many different fabrics. Some standard plain woven fabrics are sheeting, gingham print cloth, Outing, Osnaburg, Voile, Lawn, Organdy, Crinklet, Chambray, Typewriter cloth, Duex, Percal, Poplin, Repp, Broad cloth, Ratine, Critonne.

An unfinished fabric as it comes from the loom is called gray or grey goods. Grey goods have many different names. For instance, duck is a closely woven fabric of fine yarns. Cheese cloth and tobacco cloth are of loose construction. Sometimes one name is used for the fabric in the grey and a different name for the finished cloth. For instance various weights or print cloth are renamed lawn, cretonne, and percal according to the finish.

Variations in construction or yarn size account for additional names given to plain weave fabrics. A cloth using heavy filling yarns has a characteristic ribbed effect and is called poplin or repp.

As a general rule, fabrics produced with more warp than filling threads are extra strong and serviceable because the warp threads contain more twist and are usually made of better raw material. Such cloth is used for overalls, shirting and suitings.

Cloths containing more filling than warp are commonly used in underwear and linings, because the soft filling yarn makes a soft fabric which can be highly finished and made very attractive in appearance.

Some Standard Plain Woven Fabrics Are:

Sheeting: -- A plain fabric woven and finished white for bed sheets and other similar uses.

Gingham: -- A yarn-dyed fabric woven in solid colors, stripes, or checks. Used for dresses, aprons, and children's clothes.

Print Cloth: -- A plain white cloth woven for the application of color by printing or other types of finish. Muslin, percal, and cretonne are the names of some fabrics made from print cloths.

Outing: -- A fabric woven with light sley and heavy, soft filling for napping. Used for clothing, linings, etc.

Osnaburg: -- A service fabric made from low quality cotton and cotton waste. Used for bags, mattress covering, shoe lining, draperies, and coarse clothing.

Voile: -- A smooth transparent dress material made from hard twisted yarns. Used for dresses, draperies, and blouses.

Lawn: -- A fine, soft, sheer fabric usually made of combed yarns. Used for underwear, dresses, shirts, and handkerchiefs.

Organdy: -- A thin, transparent, wiry muslin made of fine yarns finished in white, solid color, or print.

Crinklet: -- A striped fabric in which the stripes are crinkled due to a greater lot-off of yarn on the threads forming the stripes. This fabric which is also known as seersucker is used for suitings, dresses, and bedspreads.

Chambray: -- A type of gingham woven from a colored warp and white filling and finished for work shirts and children's clothes.

Type writer Cloth: -- A fine, soft, plain fabric made from Egyptian cotton or American Egyptian cotton and used for linings, typewriter ribbons, etc.

Duck: -- A strong, heavy service fabric woven from 2-ply warp and 2-ply filling. Used for sails, tents, trousers, etc.

Percal: -- A printed fabric used for dresses and men's shirts. These fabrics are usually closely woven and finished in conservation patterns.

Poplin: -- A characteristic of the poplin is the rib effect which runs across the width from selvage to selvage. This rib effect is formed by the use of heavy filling yarn and few picks per inch. Used for shirts, drap dries, gowns, and robes.

Repp: -- A plain cloth similar in appearance to poplin except that the ribs along the filling are more pronounced. Repp has a heavier filling yarn and is a wider fabric used for hangings and upholstery.

Broadcloth: -- A fine, plain woven fabric with a poplin or transverse rib effect secured by using a high sley and light pick on the plainweave. The finest quality of broadcloth is made from 2-ply long staple cotton yarns and is highly mercerized.

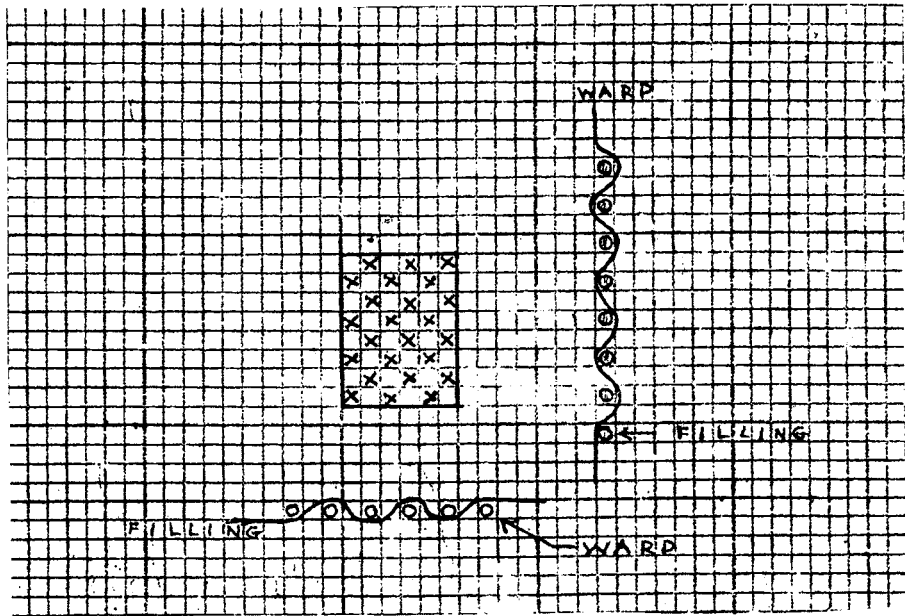
Ratine: -- A rough appearing plain fabric woven from fancy yarns with novelty loop and color effects.

Cretonne: -- A plain woven fabric printed in somewhat bright and elaborate colors and patterns. It is used for hangings, upholstery, etc.

2.7 Plain Weave Designs

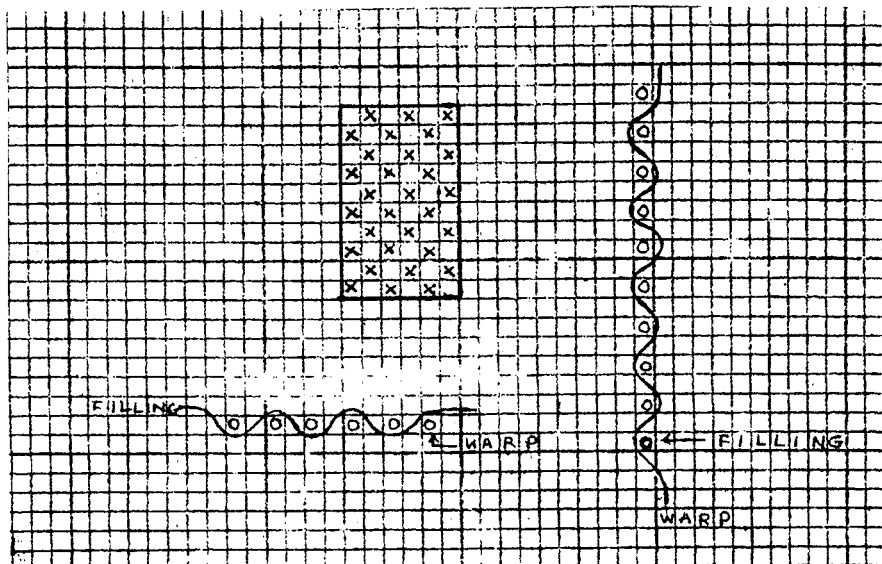
Example (1)

Draw (3 x 4) repeat of plain weave and its cross-section parallel to warp and filling.



Example (2)

Design a plain weave and its cross-section parallel to warp and filling. Draw (3 x 5) repeat.



CHAPTER 3

DESIGNING A TWILL

3.1 Twill Weave

In twill weave, the ends and picks interlace with each other every third thread or more as shown in Figure (3.1). This method of weaving produces a diagonal line in the cloth which is the identifying characteristic of a twill weave. Figure (3.1) A, B, C and E are right hand twills. If the diagonal in cloth or design extends from right to left as in Figure (3.1) F, the fabric is a left hand twill. The most commonly constructed twills have a 45° line but other angles are also used. In all regular twills, each end interlaces one pick above or below the preceding end. If the interlacing moves one pick higher and to the right, a right hand twill is formed. If the interlacing moves one pick lower and to the right, a left hand twill is formed.

3.2 Classification of Regular Twills

Twill weave has interlacings which occur every third thread or more.

Warp twill - 3 up, 1 down, Figure (3.1) - A

Filling twill - 1 up, 3 down, Figure (3.1) - B

Balanced twill - 2 up, 2 down - Figure (3.1) - A & D

3.3 Twill Repeat

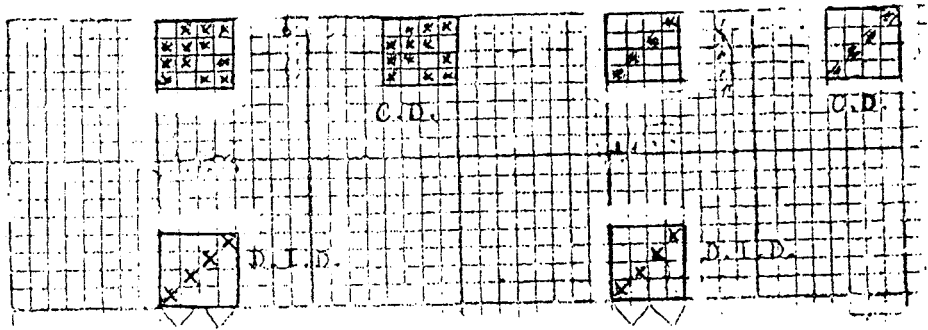
All regular twills repeat on as many ends and picks as the sum of the twill. Thus the 2/1 twill repeats on 3 ends and 3 picks, adding ends up and ends down.

3.4 Left Hand Twills

The design a left hand twill, start as usual expect each end interlace one pick lower than the producing end. As the design drops downward, the raisers are carried to the top. Figure (3.1) G shows the two repeats each way of a 3/1 1/1 left hand twill.

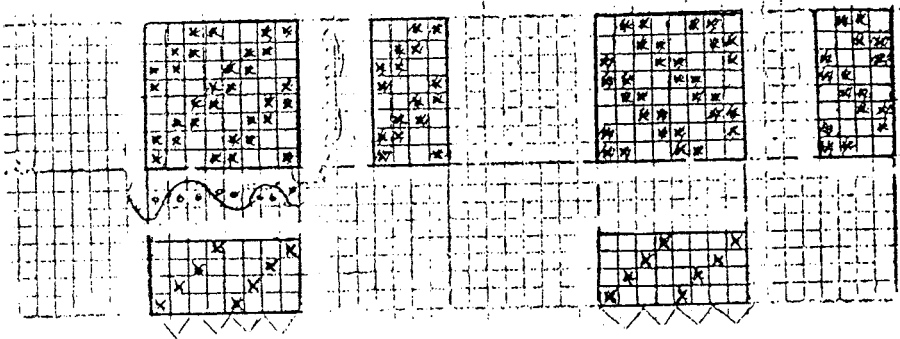
3.5 The Drawing-in Draft for Twills

Straight drawing-in drafts are required for regular twills because every end weaves differently in one repeat of the pattern as shown in Figure (3.1).



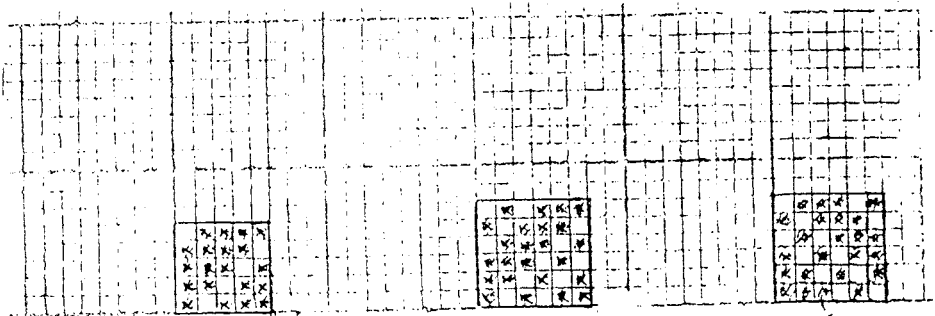
A. 3/1 warp twill
Right hand

B. 1/3 filling twill
Right hand



C. 2 repeats each way
2/2 balanced twill.
Right hand

D. 2 repeats each way
2/2 balanced twill.
Left hand



E. 4/1 twill.
Right hand.

F. 3/1/1/1 twill.
Right hand

G. 3/1/1/1 twill
Left hand

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Figure 3.1 Representative Twills

3.6 The Chain Draft

Twills requiring six harness or less are produced on either cam or dobby looms. Twills requiring more than six harness are usually woven on dobby looms. The designer prepares a chain draft which indicates the order in which the harnesses are to be lifted. The person employed as chain pegger must know how to read the chain draft and have the simple manual skills required for pegging the chain.

3.7 Prominence of the Twill Line in the Cloth

The following factors affect the prominence of the twill line in the cloth:-

- (1) The twill line will be more pronounced if the weave has longer floats but this must be balanced by more threads per inch.
- (2) Fine yarns or yarns with more twist will give more distinct twill line than coarse or soft yarns.
- (3) Fabric with a high construction will show a more distinct twill line than fabrics of low construction.
- (4) Warp twills in combination with 'S' twist yarn and filling twills in combination with 'Z' twist will produce more pronounced twill lines.

3.8 Twill Weave Fabrics

Some standard twill fabrics are:

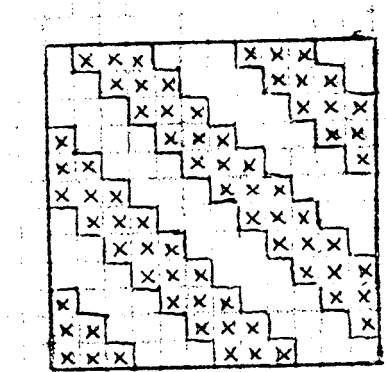
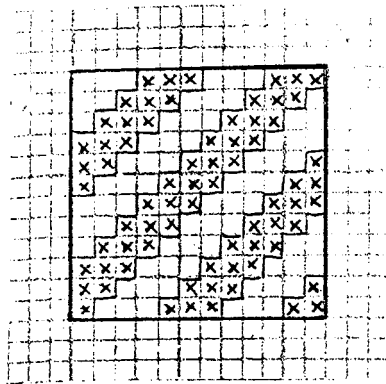
1. Drills. -- These are three harness warp-faced, left-twill cloths which are woven in medium and heavy weights. These fabrics are used for uniforms, rubberized fabrics, shoe linings, and tents.
2. Jean. -- This is a three harness warp-face, left twill fabric but lighter than drill. This fabric is used for middie blouse, work and sports shirts, and as base for imitation leather.
3. Three Leaf Filling Twills. -- These fabrics are woven in three harness filling-face, right-twill. These fabrics are lighter than drill and jean and are used for linings, umbrellas, and shirts.
4. Four Leaf Warp Twills. -- These fabrics are woven in four harness warp-face, left-twills. These fabrics are used for uniforms, overalls, slacks, and shoe linings.
5. Four Leaf Canton Flannel. -- This fabric is woven in four harness warp-faced, left-twill with a heavy, coarse, soft filling yarn which is napped on the back. This fabric is used for gloves in gray state and the lighter weights are converted into bleached flannels.

6. Four Leaf Filling Twills. -- These fabrics are woven in four harness filling-face, right-twill. They are used for linings, men's clothing, and pocketings.
7. Serge Twills. -- These fabrics are woven in the 2/2 right-twill but usually finished with the left-twill side as the face. They are used for suitings, shirts, skirts, and slacks.

3.9 Twill Weave Designs

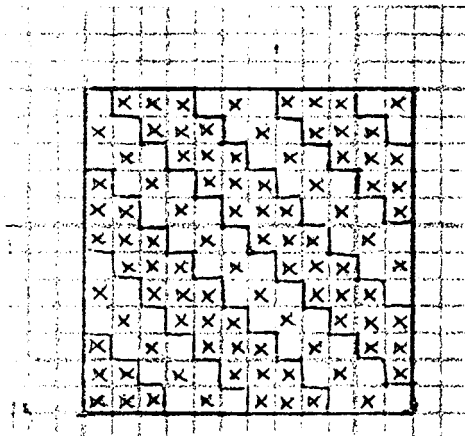
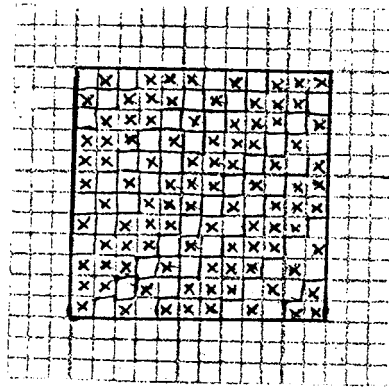
Example (1)

Design a $\frac{3}{3}$ right hand twill and left hand twill. Draw (2 x 2) repeat.



Example (2)

Design a $\frac{3}{1} \frac{1}{1}$ right hand twill and left hand twill. Draw (2 x 2) repeat.



CHAPTER 4

DESIGNING SATIN OR SATEEN WEAVES

4.1 Satins and Sateens

Satins and sateens are soft, smooth, lustrous fabrics. The same weave is used for both but if the material is cotton, the fabric is called sateen. If the material is silk or rayon, the fabric is called satin.

4.2 Sateen Weave

In order to produce the beauty of a smooth lustrous surface, the number of interlacings between warp and filling is reduced to a minimum and the interlacings themselves are arranged in an approximately random order.

Sateen are produced with five harnesses or any number of harness above five, with the exception of six. There is no regular 6-harness sateens because the system of distributing the interlacings cannot be used with a repeat of six.

The one repeat of a 5-harnesses sateen is shown in Figure 4.1. The method of distribution is the essential peculiarity of sateen design. All regular sateens repeat on as many ends and picks as the number of harnesses required to weave them.

Thus a 5 harness sateen repeat on 5 ends and 5 picks. To find the system of distributing the points of interlacing, the number indicating the sateen is divided into two unequal parts which have no common divisor and one must not be a multiple of the other. Thus the number 5 indicating a 5 harness sateen may be divided into 2 and 3. Each of these numbers is called a counter and may be used as a basis for distributing the points of interlacing. In using these counters, first mark off 5 ends and 5 picks representing one repeat of the weave. Place a raiser in the square in the lower left-hand corner. Then starting on the square directly over this raiser, count 2 ends to the right and put a raiser in the third. Continue in this way starting directly above the last raiser until a point of interlacing has been placed on each end and each pick. Counting off in this manner produces a 5 harness filling sateen with 2 as a counter.

When using 3 as a counter, count off 3 ends to the right and put the raiser on the fourth. Warp sateens have more ends on the face of the cloth than on the back of it. A warp sateen is made in the same way as a filling sateen except that in counting off, a dot is used instead of a raiser. In completing the weave, all the squares are painted in except those containing the dots. Figure (4.1) B and D are warp sateens.

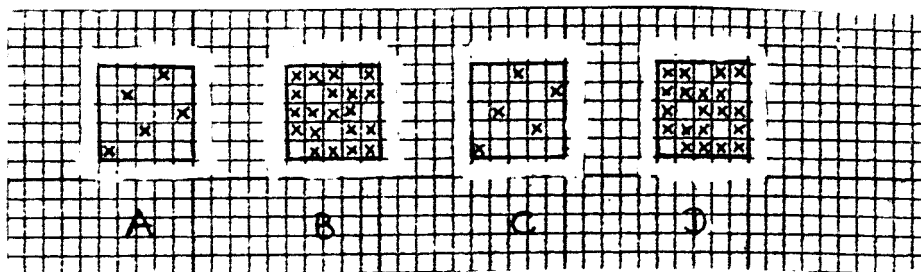


Figure 4.1 Four examples of 5-harness sateen. A uses 2 as a counter to produce a filling sateen with only five warp raisers per repeat. B is a warp sateen or the back of A. C and D use 3 as a counter and are filling and warp sateens respectively.

4.3 D.I.D and C.D. for Sateens

The drawing-in drafts and chain drafts for sateens are the same in principle as those for twills.

4.4 Checking of Sateen Designs

In one repeat of a sateen, each end interlaces once with each filling thread. Each filling thread interlaces once and once only with each end. In constructing weave patterns for sateens, always inspect your design to conform this rule.

4.5 Sateen Weave Fabrics

Filling Sateens. -- Filling sateens are not as strong as warp sateens but having less twist thread the warp yarns, they produce a softer surface. These fabrics contain more filling than warp threads per inch. In 5 harness sateen, the counter of 3 produces a smoother face than the counter of 2 provided that regular or 'g' twist filling yarn is used. In both twills and sateens, a were pronounced diagonal line is produced when the twill or sateen line runs counter to the twist in the predominate face yarns. Filling sateens are used for linings, trimmings, underwear and other uses where a lustrous finish and softness are desired.

Warp Sateen. -- Warp sateens are stronger and heavier than filling sateens and are used where strength and wear are essential. These fabrics contain more warp than filling threads per inch. The lighter and finer warp sateens are made in both shadow stripes and

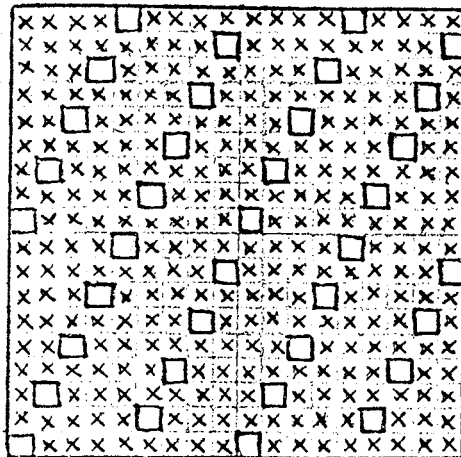
plain. Regular and reverse twisted warp threads (“Z” and “S”) are woven in sections of 6, 8, or more threads and the refraction to light given off by the different twists produces stripes of light and shadow. These fabrics are used for uniforms, corset linings, shoe uppers, tickings, mattresses, and has a base for imitation leather and rubberized fabrics.

Venetians. -- Venetians are 8 harness warp sateens and are stronger and heavier than regular sateens. Fine, long staple cotton of single or ply yarn is used in the warp and ordinary filling yarn. “S” twist is used in the single warp in playing the ply yarn. This cloth has a slight twill line effect to the right. Venetians are used for men’s overcoat linings, women’s coats, pocket books, and cushion coverings.

4.6 Sateen Weave Designs

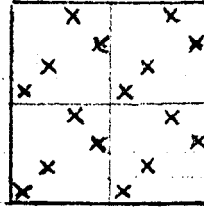
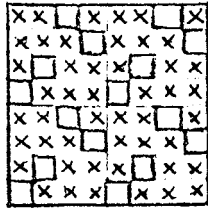
Example (1)

Design 9 harness, 2 counter warp sateen. Draw (2 x 2) repeat.

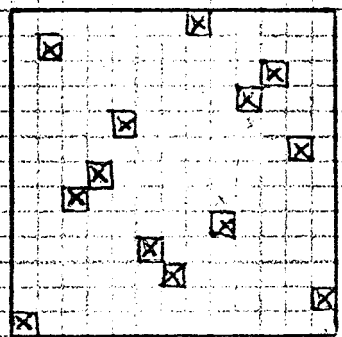
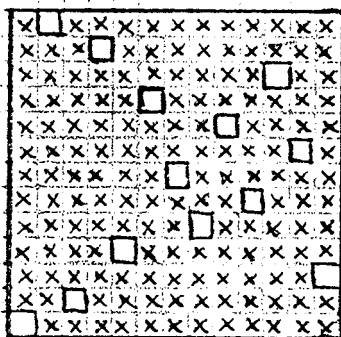


Example (2)

Design 4 harness warp and weft sateen. Draw (2 x 2) repeat.

**Example (3)**

Design 13 harness irregular warp and weft sateen. Draw (1 x 1) repeat.



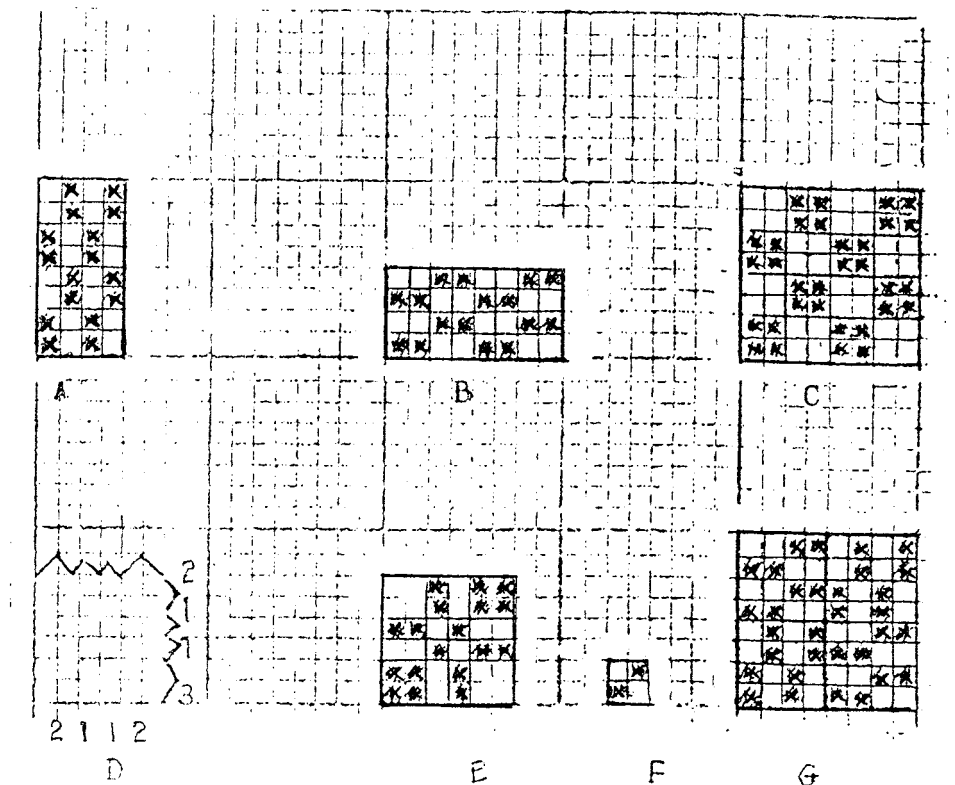
CHAPTER 5

WEAVES DERIVED FROM THE PLAIN WEAVE

5.1 Warp Rib Weaves

Fabrics woven with a warp rib have two or more picks in the same shed, which produces a corded or rib effect running from selvage to selvage in the direction of the filling. Two repeats each way, of a 2/2 warp rib weave are shown in Figure (5.1) A. The second end weaves opposite to the first and, thus the weave repeats on two ends. The sum of the weave count is the number of picks in one repeat. The 2/2 warp rib in Figure (5.1) A repeats on 2 ends and 4 picks. A 2/4 warp rib weave repeats on 2 ends and 6 picks.

Fabrics woven with two or more ends in the same shed produce a corded or rib effect running in the direction of the warp or the length of the fabric.



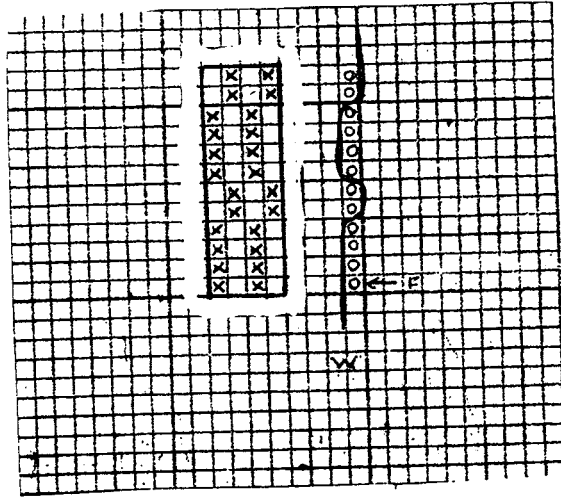
<http://textilelibrary.wordpress.com/>

Figure 5.1 Several rib and basket weaves derived from a plain weave. See the text for details of construction.

5.2 Warp Rib Weave Designs

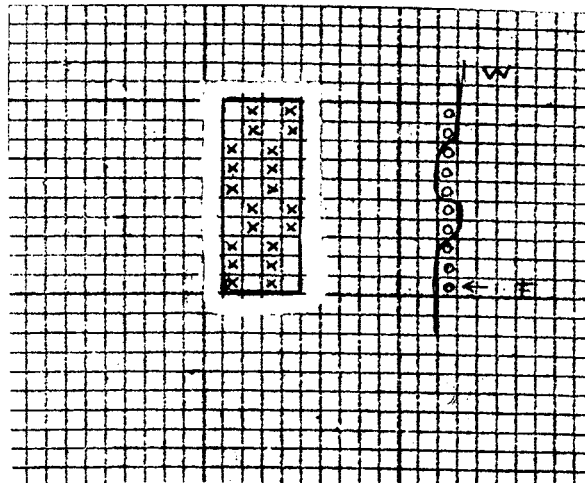
Example (1)

Design a (4-2) warp rib weave. Draw cross-section parallel to the warp, (2 x 2) repeat.



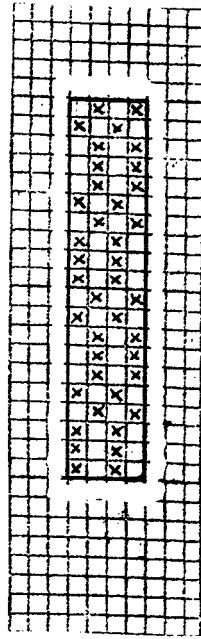
Example (2)

Design (3-2) warp rib weave. Draw cross-section parallel to warp, (2 x 2) repeat.

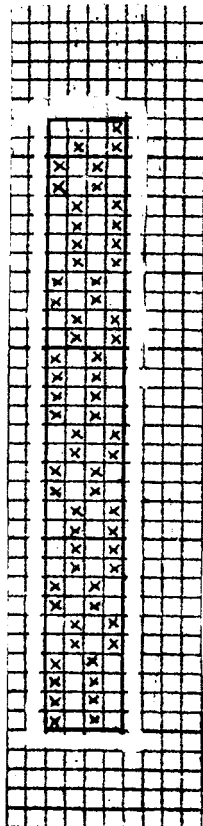


Example (3)

Design a (3-1-1) warp rib weave. Draw (2 x 2) repeat.

**Example (4)**

Design a (4-2-2) warp rib weave. Draw (2 x 2) repeat.



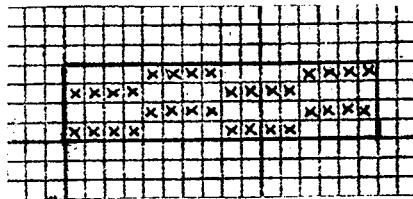
5.3 Filling Rib Weaves

Fabric woven with a filling rib have two or more ends in the same shed, which produced a corded or rib effect in the direction of the warp. All filling rib weaves repeat on two picks and the sum of the wave count is the number of ends in one repeat. A $3/5$ filling rib weave repeats on 2 picks and 8 ends. Two repeats each way of a $2/2$ filling rib weave is shown in Figure (5.1) B.

5.4 Filling Rib Weave Designs

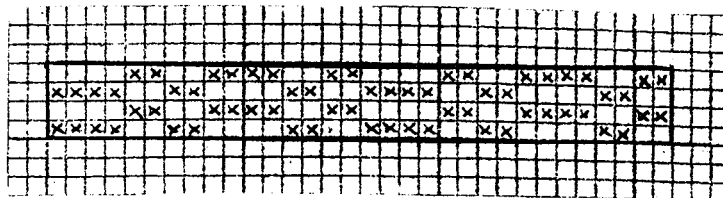
Example (1)

Design a (4 - 4) filling rib weave. Draw (2 x 2) repeat.



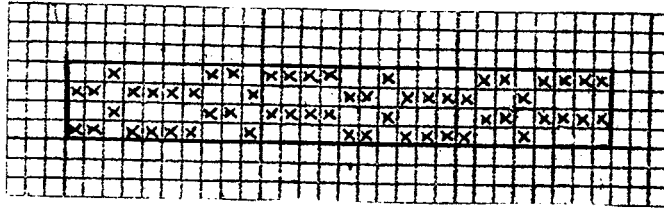
Example (2)

Design a (4 - 2 - 2) filling rib weave. Draw (2 x 2) repeat.



Example (3)

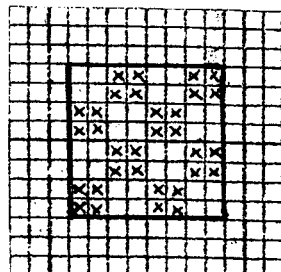
Design a (2 - 1 - 4) filling rib weave. Draw (2 x 2) repeat.

**5.5 Basket Weaves**

Basket weaves are formed by combining warp rib and filling rib weaves. Figure (5.1) C shows two repeats each way of a 2/2 basket weave formed by arranging two ends and two picks to weave alike. The sum of the weave is the number of ends and picks in one repeat. This basket weave repeats on 4 ends and 4 picks. A 2/4 basket weave repeats on 6 ends and 6 picks.

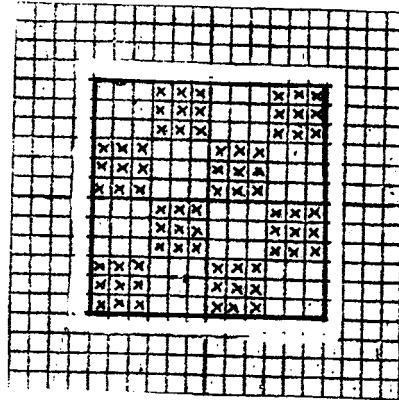
5.6 Basket Weave Designs**Example (1)**

Design a (2 - 2) plain basket weave. Draw (2 x 2) repeat.

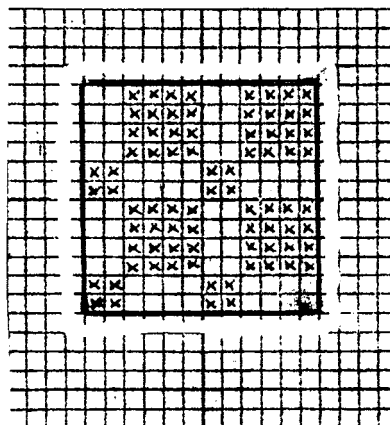


Example (2)

Design a (3-3) plain basket weave. Draw (2 x 2) repeat.

**Example (3)**

Design a (2-4) fancy basket weave. Draw (2 x 2) repeat.



Example (4)

Design a (3-1-1-3) fancy basket weave. Draw (2 x 2) repeat.

