

divide the latter into spaces in systematic order. The lines of the figure can be arranged to distinctly follow the base lines, or the latter may be partly or entirely eliminated. In the last case the use of the base lines is simply to ensure that proper balance and accurate repetition are secured.

Factors which influence Woven Design.—In textile fabrics the style of the ornament and the way in which it should be developed are largely influenced by the following:—

(1) The comparative smoothness, lustre, fineness, and sett (or number per unit space) of the threads.

(2) The kind of finish that is applied to the cloth.

(3) The purpose of the cloth.

(4) The mechanical means of production.

(1) Silk fabrics, owing to the lustrous nature of the material, the smoothness and fineness of the threads, and the large number of threads per unit space that are generally employed, lend themselves in the highest degree to elaborate figure ornamentation. It is possible in these fabrics to obtain extreme fineness of detail, but, as a general rule, the rich, lustrous quality of the material is displayed to the greatest advantage by treating the ornament boldly, and varying the weave development of the figure in the manner illustrated by the example given in Fig. 299.

Elaborate ornamentation and minute weave detail can be introduced in cotton and

linen fabrics that are fine in structure and finished with a clear surface, as shown in the texture represented in Fig. 300. On the other hand, in coarse fabrics composed

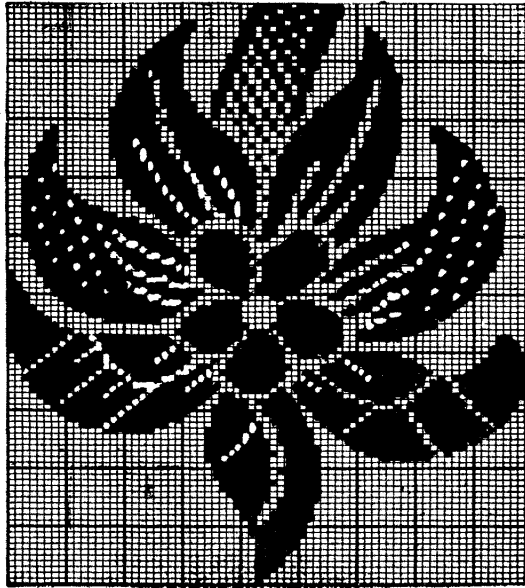


Fig. 301.

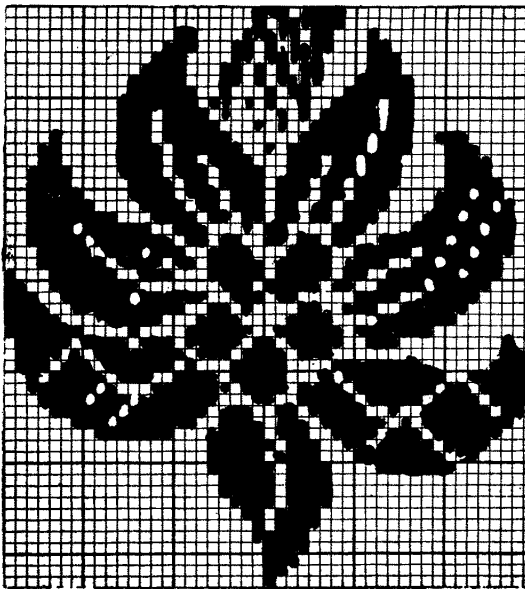


Fig. 302.

either of cotton or other material, fine weave variations cannot be introduced. In order to illustrate how the relative number of threads per unit space in a cloth



Fig. 303.

influences the weave development and the amount of detail that can be used in a design, a portion of the figure, represented in Fig. 300, is shown worked out on design paper in Figs. 301 and 302. Fig. 301 shows the figure drafted at the rate of 96 ends and 120 picks per inch (this corresponds with the sett of the cloth), whereas in Fig. 302 the sett is taken as 64 ends and 64 picks per inch. The plans will produce exactly the same size of figure in the respective setts; but while in the finer structure it is possible to get a figure intricately developed and graceful in outline, in the coarser fabric the curves of the figure turn more rapidly, and there are fewer spaces to work upon, so that it is necessary for simpler treatment to be employed. The example, further, is illustrative of the adaptation of a design from a fine to a coarser fabric.

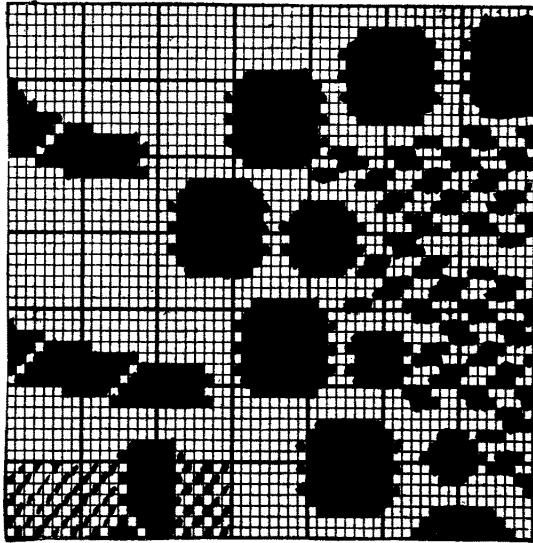


Fig. 304.

In figuring with mohair or lustre-worsted yarn it is desirable that the brightness of the material be developed as much as possible. These yarns are frequently employed in conjunction with cotton or woollen yarns, and the cloths are not usually fine in structure. The ornament, as a rule, should be somewhat massive in order that it may be developed boldly in fairly long floats of the lustrous threads. A lustrous cloth is represented in Fig. 303, which has been woven with 2/120's cotton warp, and 24's mohair weft, 66 ends and 60 picks per inch. A portion of the design to correspond is given in Fig. 304. The ground weave is plain, and a crêpe weave, that fits with the plain, is introduced, the example illustrating how a design may be effectively varied without the prominence of the main lines of

the figure being detracted from. which is illustrative of the variety of weave effect that may be introduced in massive figures which are woven in lustre-worsted weft.

Botany - worsted fabrics (which are composed of yarns made from short fine wool) are duller in appearance, and have a less smooth surface than lustre - worsted fabrics, hence the designs for them should be more massive in character and less elaborately developed than for the latter. An example of a botany texture is represented in Fig. 305, the weaving particulars of which are 2/60's

Also, in Fig. 278 (p. 248) a fabric is represented



Fig. 305.

warp, and 30's weft, 72 ends and 68 picks per inch. A portion of the design is given in Fig. 306, in which it will be seen that the figure is woven in a 4-thread weft sateen weave, and the ground in a similar warp-face weave, but variety of effect is obtained by the insertion of 1-and-3 twill weave inside the large objects in place of the 4-sateen ground weave.

(2) The influence of the finish that is applied to a cloth, in deciding the style of

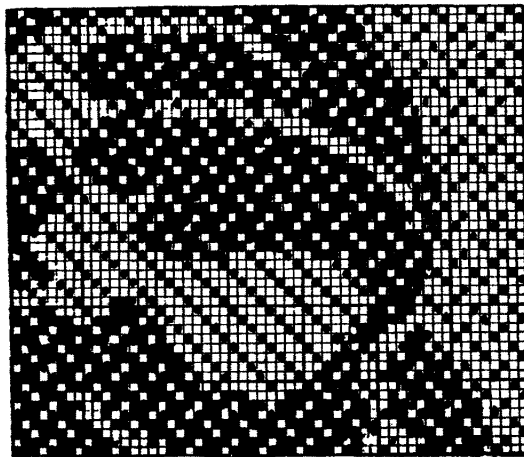


Fig. 306.

ornament and weave development that are suitable, will be understood by comparing a figured woollen or cotton rug which has a raised surface (see Fig. 141, "Advanced Textile Design") with a clear finished cloth. The pile or nap, formed on the surface

by raising, completely conceals the thread structure, so that the introduction of fancy weaves or fine detail in the figure is useless, and only flat massive ornament is suitable.

(3) The effect that the purpose of a cloth has upon the style of ornamentation will be readily evident from a comparison of figured textures that are in regular use such as, carpets, hangings, table-cloths, bed-covers, dress fabrics, mantles, etc. A fabric that is used to cover a flat surface, and is observed from many different points of view, requires different decorative treatment from a texture that has to hang in folds; while the necessity to cut up cloths for certain uses will render a particular style of ornament totally unfit, whereas another style is quite appropriate.

The use to which a cloth is to be applied, in many cases, largely influences its structure, and the ornament requires to be adapted to the structure as well as the use. Further, cloths that are used for similar purposes may vary extremely in structure, and different treatment of the ornament be necessary in each case.

(4) The mechanical means employed in producing cloths impose very varying limitations, and an intimate knowledge of the type of loom and loom mounting that will be employed is essential to successful designing for most classes of fabrics. Brief consideration will, in most cases, enable the limitations to be realised. For instance, in a plain box loom only one kind or colour of weft can be employed, and in a loom with changing boxes at only one end, the picks of each kind of weft require to be inserted in even numbers; while the number of boxes limits the number of different kinds of wefts that can be used unless changing the shuttles by hand is resorted to.

Different types of shedding mechanism have different limitations: A dobby will operate only a certain number of healds; the size of repeat of a jacquard is limited; only a certain maximum number of ends per unit space can be woven in a given harness; a certain harness tie compels a definite form of ornamentation; a combination of healds with a harness limits the order in which certain ends can be operated; in jacquards and harnesses that are specially constructed to produce certain weave structures—*e.g.* quilts and carpets (see “Advanced Textile Design”)—prescribed orders of interlacing are necessary, etc.

Construction of Sketch Designs.—In sketching a jacquard design the width of repeat that is employed should preferably be equal to, or a measure of that of the machine in which the design will be woven, otherwise the figure will require to be altered in size. The size of a design can be readily increased or decreased in the process of drafting the figure from the sketch, but obviously the nearer the repeat of the design is to the proper size, the truer is the resemblance of the woven effect to the original sketch. It is frequently very difficult to guard against the formation of improper stripes or bars in the cloth if only one repeat of a sketch design is made, a defect sometimes not becoming visible until the figure is repeated in width and length in the loom. As a general rule, therefore, it is advisable to roughly sketch several repeats of a design in each direction in order that the relation of the different parts of the ornament to each other in succeeding repeats may be conveniently seen. A simple illustration is given in Fig. 307 which will serve as a general indication of the method of preparing a sketch of a repeating figure. A number of rectangular spaces (in this case two in each direction) are first marked out by drawing lines at the proper distances apart to give the required size of repeat. A vertical wavy line is used as the basis of construction in the example, and as this naturally divides the design into two similar parts, each repeat is bisected by drawing vertical and horizon-

tal lines through the centre. The waved line is then drawn in, as shown at A, and repeated in every repeat of the sketch. The chief feature of the ornament, or the "mass," is next introduced, as shown at B, and here great care is necessary. The lines that bisect the repeats enable the position of each mass to be correctly judged, so that approximately equal spaces, in every direction, between the masses, are obtained. When the masses have been traced into each repeat their relative

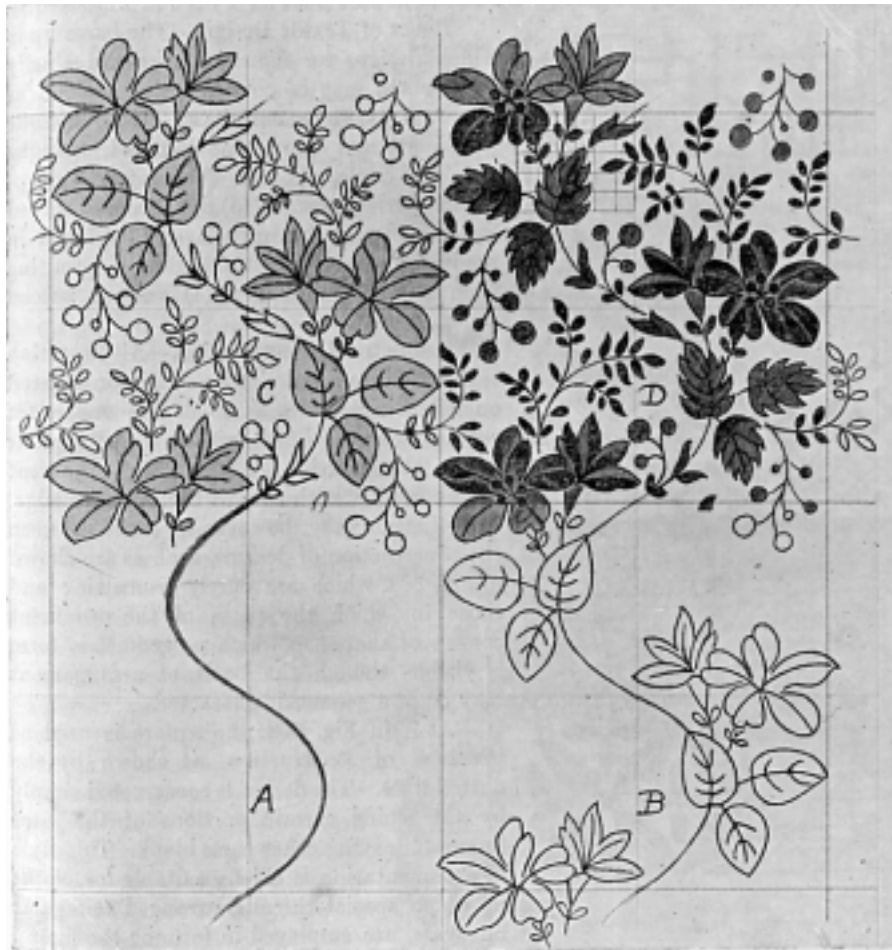
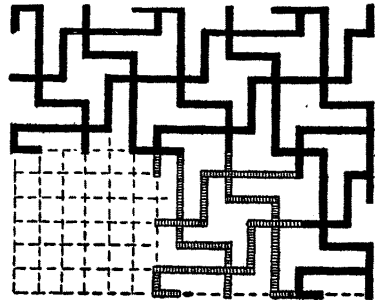


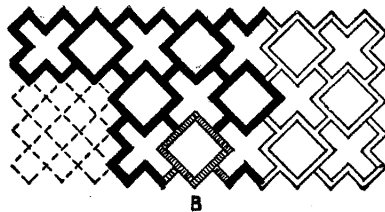
Fig. 307.

positions can be still more accurately observed, and any imperfection of balance remedied. The next process is the introduction of the detail, as shown as C, and this should be less pronounced in character than the main object, in order that the prominence of the latter will not be detracted from. The detail should be added and copied into each repeat by degrees until the design is complete, care being taken that the different parts balance each other and produce a regular distribution of figure in any given straight line of the sketch.

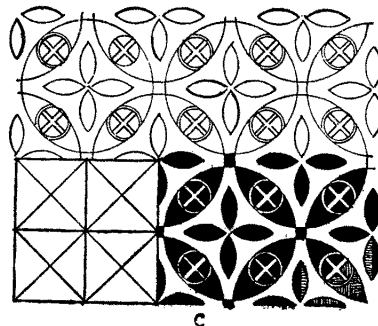
After a rough drawing of the complete effect has been made over the given number of repeats, it is only necessary for the outline in one repeat to be filled in, as shown at D, for the purpose of indicating how the design should be developed on the point-paper. The last process is necessary only when the sketch is required to be exhibited for approval, as the necessary development can be indicated upon the figure in painting out the design on the point-paper. In the portion D of Fig. 307 the places where the figure may be developed in bold float have been accentuated.



A



B



C

Fig. 308.

A similar design to A is given in Fig. 239 (p. 201), while such designs as those shown in Figs. 236, 238, and 242 are readily constructed on the square basis to fit a given order of warping and wefting.

B in Fig. 308 shows a simple geometrical design constructed upon a diamond basis, the lines of which are thickened and left blank in the same manner as in A. The design given in Fig. 309 shows sketch B drafted to a small scale, the solid black figure corresponding with the lines of the sketch, while the grey marks illustrate a method of filling in the ground spaces to give variety to the effect at the same time that firmness of interlacing is produced. By

Bases of Textile Design.—The bases upon which designs for figured fabrics are chiefly constructed may be conveniently classified as follows:—(1) Geometric bases, which include the square and oblong, the diamond, triangle, hexagon, circle, etc.; (2) the drop and drop-reverse arrangements; (3) the ogee and waved line, which may be respectively employed in producing effects similar to those resulting from the second class; (4) various sateen arrangements.

Geometric Ornamentation.—All repeating textile designs require to be so far constructed on geometrical lines as to enable one exact repeat to be enclosed within a rectangular space, at one edge of which the ornament joins correctly with that at the opposite edge. A distinction may, however, be made between the construction of designs, such as are shown in Fig. 308, which are purely geometric; and those in which the parts of the ornament consist of shapes in which no geometric form is visible, though the basis of arrangement may be of a geometric character.

At A in Fig. 308, the square is used as the base of construction, as shown by the dotted lines. The design is constructed simply by thickening certain portions of the base lines and leaving other parts blank. This style of ornamentation is chiefly suitable for cloths in which special threads, arranged at regular intervals, are employed in forming the figure.

turning A and B in Fig. 308 round 45° the former shows a design constructed on the diamond base, and the latter on the square base.

C in Fig. 308 shows in the bottom left-hand corner, a repeat divided into rectangles, diamonds, and triangles, which, in most cases, is sufficient to enable very elaborate geometric designs to be made. The design C is constructed by describing circles and arcs of circles, with the intersecting points of the lines taken as centres.

The base lines of the design given in Fig. 310 correspond with the vertical, horizontal, and diagonal lines shown in the bottom left-hand corner of C in Fig. 308. This example illustrates the "counter-change" principle of construction—the weft float in one diamond space corresponding with the warp float in the other.

Fig. 311 shows a suitable method of drafting the design given at C in Fig. 308 to a small scale. The design of a bordered fabric, shown in Fig. 264 (p. 236), and also the design given in Fig. 268 (p. 241), are constructed upon vertical, horizontal, diagonal, and circular base lines, similar to those shown at C in Fig. 308.

The use of any form of squared paper, and, particularly, point paper, is very convenient in designing purely geometric forms, as the small spaces provide a ready means of dividing up a given size of repeat with any number of vertical, horizontal, diagonal, and circular lines, which may then be employed as the framework upon which the pattern is constructed. When design paper is used, in order to avoid having two consecutive threads working alike, the centre of a small space should be taken as the turning point where the figure reverses, as shown in Figs. 309, 310, and 311.

Unit and Repeat Compared.—The difference between the unit and the repeat

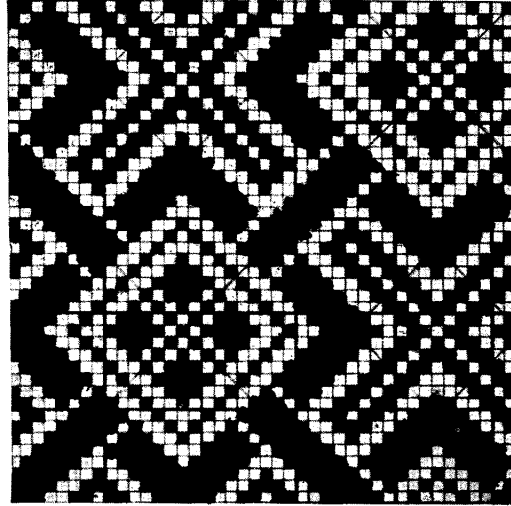


Fig. 309.

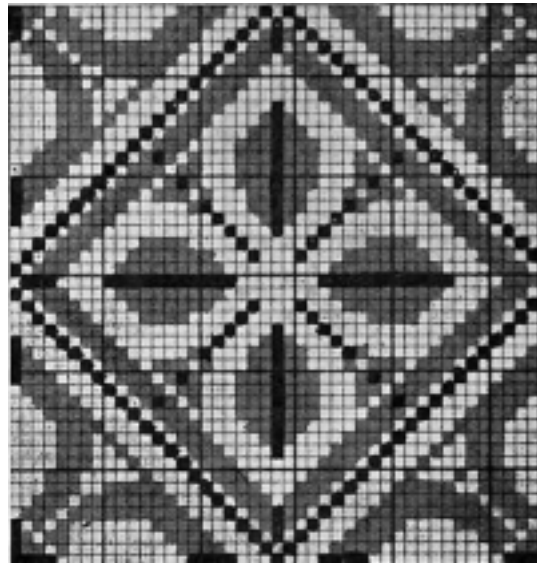


Fig. 310.

of a design should be clearly understood. In some designs, in which the form is different in every part, the repeat is formed of one unit. This class of design is illustrated by the example given at A in Fig. 308, in which the unit, forming one complete repeat, is shown shaded. In the same manner, in the design given in Fig. 265 (p. 238), the unit and the repeat are the same.

When a portion of figure is used two or more times in producing a complete design, the unit forms only part of the repeat. Thus, in B, Fig. 308, the portion shown shaded may be taken as the unit, which is used twice in the repeat. Also the unit forms half of the repeat of the design shown in Fig. 294 (p. 261). In C, Fig. 308, the unit, which is again shown shaded, is used eight times in the repeat of the design, and in Fig. 331 a design is shown on point paper which contains the unit

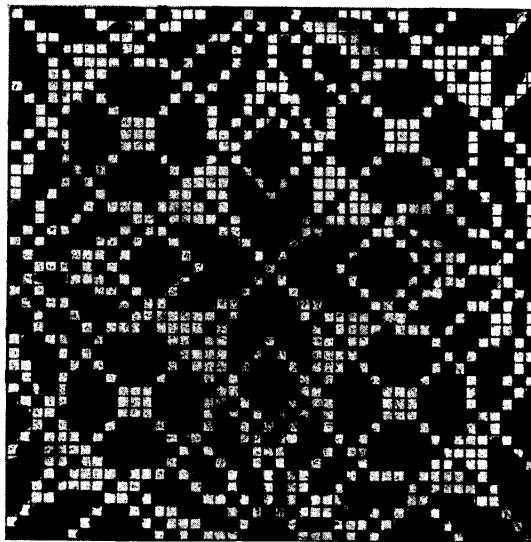


Fig. 311.

eight times in the repeat. A unit figure may thus be used practically any number of times in forming a design, and it may be of any shape, but if it is not rectangular in shape it must be so arranged that the complete repeat of the design is rectangular.

CONSTRUCTION OF SYMMETRICAL FIGURES

Symmetrical ornament may be arranged to form independent figures, or stripe patterns, or, as shown by the geometrical designs given at B and C in Fig. 308, as continuous all-over effects. A given unit, which is used two or more times in forming a complete figure, is either reversed on opposite sides of a centre line, or is turned upon a central point. The most common arrangement is the "bi-symmetrical" or ordinary "turn-over" figure, the construction of which is illustrated in Fig. 312. Two lines are drawn at right angles to each other, and the unit of the figure is built up on one side of the vertical line, as shown by the portion hatched in. As the second half of the figure requires to be exactly like the first half turned over, it can be obtained by copying the unit and the vertical and horizontal lines in pencil upon transparent tracing paper, which is then turned over and placed with the lines upon it coinciding with those of the sketch. By "rubbing" the tracing paper (with a

finger-nail or the back of a knife blade) the outline of the figure is transferred to the sketch. In another method the sketch is doubled inwards along the vertical line

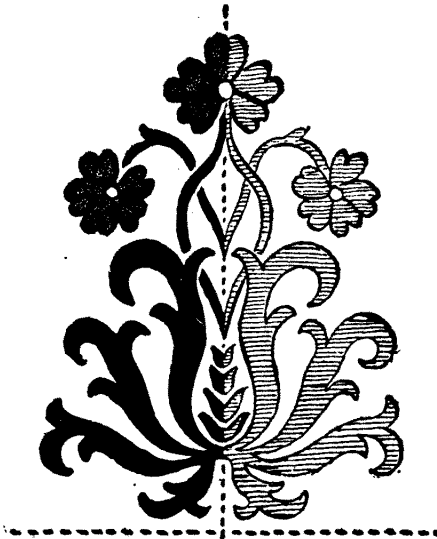


Fig. 312.

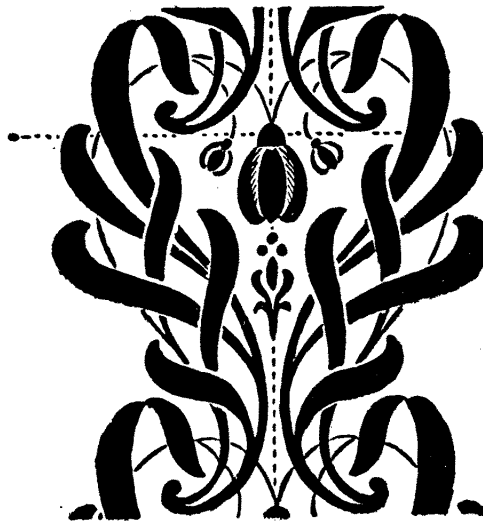


Fig. 313.

and rubbed. The appearance of the figure can be judged, before the second half is copied, by placing a piece of mirror glass vertically with its lower edge along the vertical line. The arrangement of an independent bi-symmetrical figure, as a complete design, is illustrated in Fig. 335.

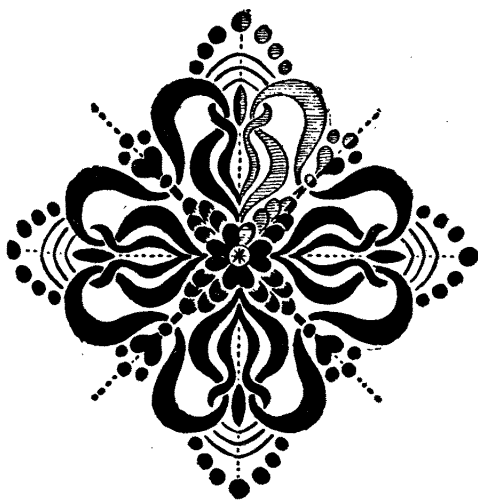


Fig. 314.

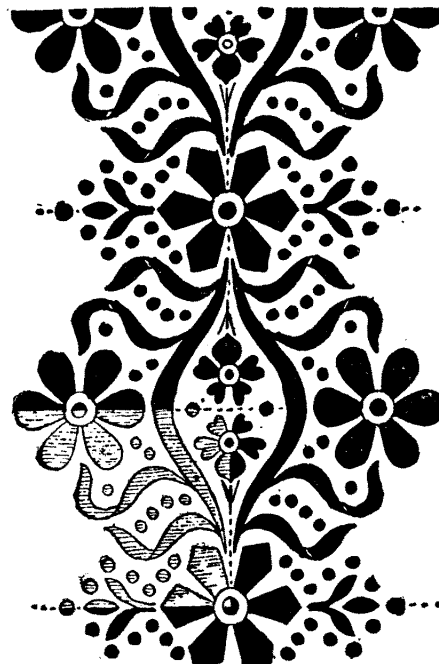


Fig. 315.

The basis of construction of Fig. 313 is the same as that of Fig. 312, but in the former the leaves overlap and interlace with each other in such a manner that the figure forms a continuous stripe. The repeat of the figure from the bottom is indicated by the dotted horizontal line.

A multi-symmetrical figure is shown in Fig. 314, which results from reversing a unit figure, vertically, obliquely, and horizontally. In constructing the style two base lines are drawn crossing each other at right angles, and a second pair crossing the first pair at 45° angle. The unit, shown by the portion hatched in, is sketched in the space of 45° , and thus forms one-eighth of the complete figure. The point where the construction lines cross one another is used as the axis upon which the unit is turned in transferring it to the various sections.



Fig. 316.



Fig. 317.

Fig. 316 shows the application of the symmetrical principle of construction to a bordered fabric. The narrow border is produced by quadruple reversing in the manner illustrated in Fig. 315, while the broad border is constructed bi-symmetrically, as shown in Figs. 312 and 313.

In Fig. 317 the unit is not turned over, but is simply turned round. Three base lines are drawn which cross each other at 60° angle, as shown by the dotted lines. The point where the lines intersect is used as the axis upon which the unit is turned, and forms the centre of the figure. The central figure and the curved lines are the

same in each space of 60° , but between the curved lines the design is varied by the introduction of a leaf and a flower alternately. The complete unit of the figure thus occupies the angle of 120° , and is turned in three positions.

In the design shown in Fig. 318, which is suitable for the corner of a fabric with a border all round, the unit of the figure is drawn from the corner of the square towards the centre, and is then turned round 90° , and copied in the same relative position from the remaining three corners.



Fig. 318.

In Fig. 319 a simple illustration is given which shows how the unit of a figure may be repeated on point-paper. In this case the unit comprises one half of the complete figure, the second half being obtained by turning the unit round 180° . The centre of the figure is indicated by the crosses, and from this point the second half is copied square by square from the first half.

In constructing such styles as the foregoing, in order that the parts will fit

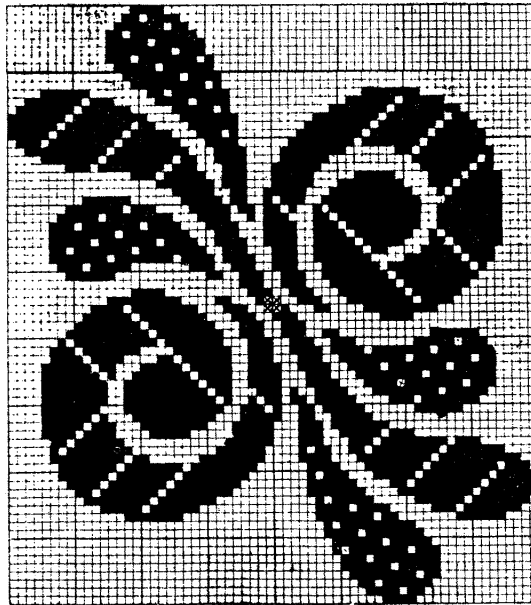


Fig. 319.

correctly in the complete figure, it is generally necessary for the unit to be built up and copied in stages. Bi-symmetrical figures are specially suitable for hanging

fabrics, while multi-symmetrical designs are useful for textures which are viewed from every direction, as in the case of table-cloths and carpets.

REVERSING INCLINED FIGURES

When an inclined figure is used two or more times in a repeat it is customary to turn it in different ways in order to prevent it from forming twill lines, and to impart a more varied appearance to the design.

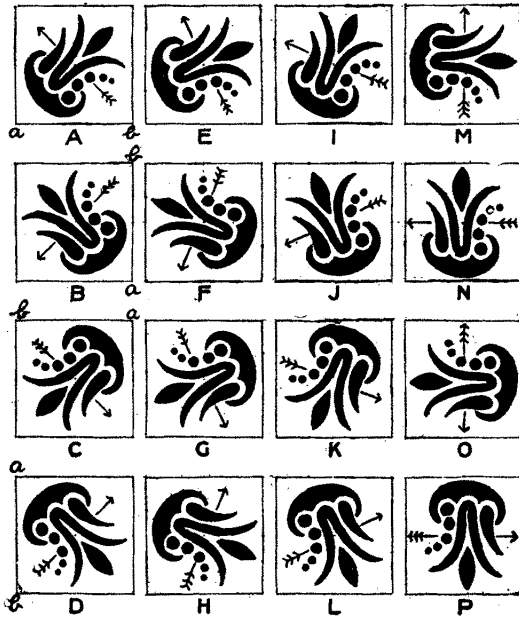


Fig. 320.

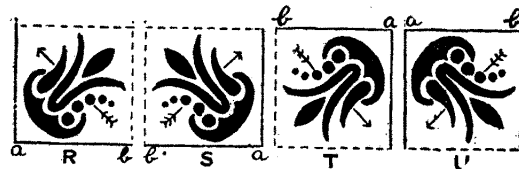


Fig. 321.

Fig. 320 illustrates a method of placing a figure in different positions simply by turning it round, its centre being used as the axis; or, what is the same thing, by placing it each time as centrally as possible within a rectangular space. At A, B, C, and D the figure is inclined at 45° angle; at E, F, G, and H at $22\frac{1}{2}^\circ$; at I, J, K, and L at $67\frac{1}{2}^\circ$; and at M, N, O, and P at 90° .

In single-make fabrics, in which the figure is formed by interweaving the threads more loosely than in the ground of the texture, the angle of inclination has an effect upon the firmness of the cloth. The nearer the lines of figure approach the vertical or horizontal, the greater is the liability of the threads slipping or fraying when subjected to friction, while the nearer they approach the angle of 45° the firmer is the cloth structure. Of the examples given in Fig. 320, A, B, C, and D, therefore, show the best positions, and M, N, O, and P the most defective. From an examination of A, B, C, and D, however, it will be seen that although the inclination of

the figure as a whole is kept the same by turning the tracing round in each case a distance equal to 90° , the inclination of the parts of the figure is not the same in A and C as in B and D. Thus, in A and C the line formed by the small spots approaches the horizontal, and in B and D the vertical. The difference is due to the figure having been simply turned round on its centre, the line *a b* being placed in a horizontal and in a vertical direction alternately. This does not give a proper reversal of the figure.

A method of reversing is illustrated at R, S, T, and U in Fig. 321, by which the same angle of inclination is obtained not only for the whole, but also for the

parts of the figure. It will be seen that R and T are similar to A and C respectively in Fig. 320, in which, however, no figure is placed the same as S and U. In this method S is obtained from R by turning the tracing of the figure over horizontally. T is obtained from S by turning the tracing over vertically, or from R by turning the tracing round 180°. U is obtained from T by turning the tracing over horizontally, or from S by turning it round 180°, or from R by turning it over vertically. In each position the line *a b* is in a horizontal direction and parallel with the weft threads, therefore the parts of the figure are always in exactly the same relation to the ends and picks in the cloth. When the same figure is used a number of times in the repeat of a design, this method has the advantage that if the first figure is inclined at the most suitable angle, the remaining figures are equally correct. Also in most arrangements, the figures can be distributed over the given surface with less liability of producing lines or bars in the cloth. However, in some cases, a design appears less stiff and formal if the figure is placed in a multiplicity of different positions. For example, if there are six figures in the repeat four may be placed in different positions at 45° angle, and two at 60°; while with eight figures if four at an angle of 45° alternate with four at 30°, no two figures are placed the same.

R, S, T, and U in Fig. 322, which correspond as to the angle of inclination of the figure with R, S, T, and U in Fig. 321, show how a figure may be reversed on point-paper by copying square by square from the first figure. For small effects this is probably the readiest method. In each case the approximate centre of the figure is indicated by the cross on the twentieth end and sixteenth pick, and a few dots are inserted diagonally from the cross to indicate the direction in which the figure is required to be inclined. The figure is reversed from the cross, the diagonal row of dots enabling the required direction to be readily obtained.

B and D in Fig. 322 are obtained by copying square by square from R, but in this case the figure is turned, as shown respectively at B and D in Fig. 320. On

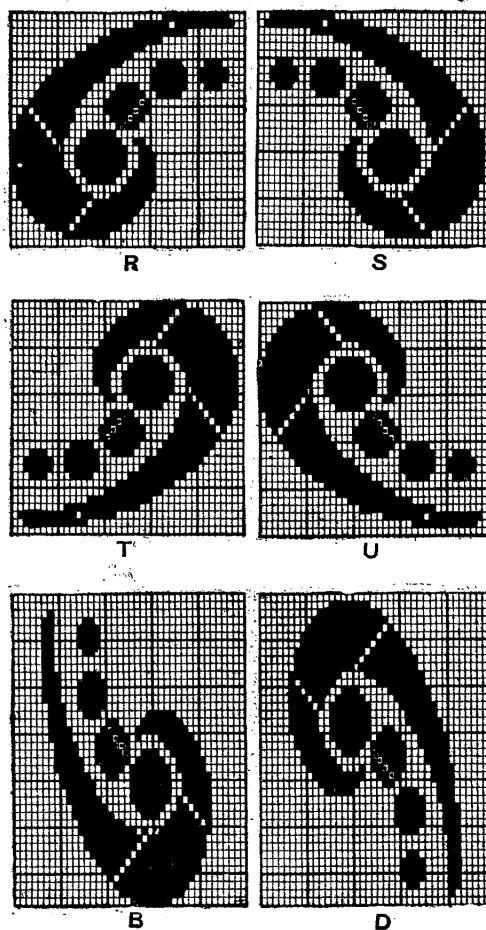


Fig. 322.

square design paper the only disadvantage of thus turning the figure is that a horizontal line is changed to a vertical line, and *vice versa*.

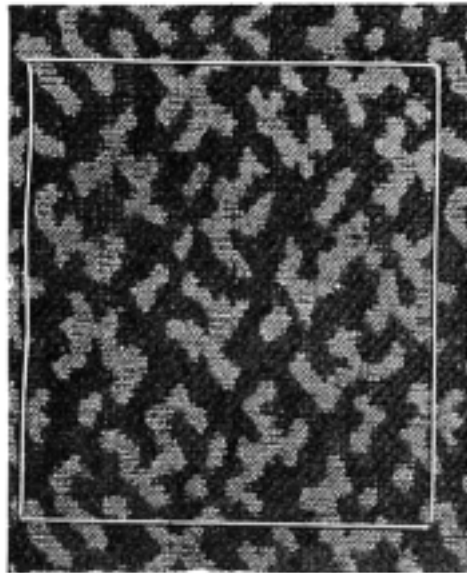


Fig. 323.

If, however, the cloth is not built on the square (8-by-6 paper is used in the example), this method of copying throws the figure out of its original shape, as will be seen by comparing the illustrations in Fig. 322. Therefore, in changing the direction of a figure upon paper that is not square, it is necessary for the outline to be drawn or traced each time.

Unit - Repeating Designs

The term unit-repeating is applied to designs in which the unit figure and the repeat are the same. They may be constructed upon definite bases, as shown in certain of the preceding and following examples, but frequently the designs consist of combinations of different forms that are grouped together upon no particular principle, except that they fit satisfactorily together within the repeat area, and join correctly when repeated. With care, variety of effect can be produced which is free from the stiffness that sometimes characterises designs constructed upon defined bases. Fig. 282 (p. 252) is illustrative of a well-balanced, all-over, unit-repeating design, in which it will be noted that the largest form is comparatively small in relation to the size of the repeat, while the various parts of the ornament are about equally conspicuous.



Fig. 324.

If one feature of a unit-repeating design shows more prominently than the rest, the repetition of the pattern, from side to side and from end to end of the cloth, is liable to cause the leading feature to form lines in one or both directions. As a rule, when a design contains a distinct object, one or more similar objects should be used in addition, arranged according to a definite base. Such an arrangement may still be unit-repeating, as in the examples given in Figs. 368, 376, and 387.

The unit-repeating principle of arrangement is very suitable for a formal type

of ornament, such as is shown in Fig. 323 and Fig. 407 (p. 345) as the indefinite system, upon which a variety of equally-prominent shapes is introduced, tends to reduce the stiffness of the design. In sketching this type of design a portion of the figure should be drawn in and traced into corresponding positions in the repeat alongside and above the first repeat. Then, by repeating the process carefully and building up the design in stages the various parts can be made to fit correctly together at the edges of the repeat, at the same time that the formation of bars or stripes is avoided.

In the construction of designs for cloths in which a special order of introducing the warp and weft threads is employed, the unit-repeating principle is particularly applicable, as shown in Fig. 324, as it enables the figure to be placed in conformity with the arrangement of the threads.

CHAPTER XVII

HALF-DROP DESIGNS

Half-Drop Bases—The Diamond Base—The Ogee Base—The Diagonal Waved Line Base—The Rectangular Base—Drafting Half-Drop Designs—Half-Drop Stripe Designs—One-third and One-quarter Drop Designs—Defective Half-Drop Designs.

IN true half-drop designs the figure in one-half of the complete repeat is exactly the same as that in the other half, and if the repeat is divided into four equal parts by bisecting it in both directions the ornament in alternate sections is exactly the same. This is illustrated in Fig. 325, in which a half-drop design is shown with the four equal-sized sections detached from each other. It will be seen that the unit-figure comprises one half of the complete design, taken either vertically or horizontally, and that one half of the repeat can be produced from the other half by "half-dropping" the unit longitudinally, or, what is the same thing, by moving the unit one half the width of the repeat.

The half-drop principle of construction is specially useful in designs for carpet fabrics, two or more lengths of which are sewn together at the sides to form a given size of carpet, as the width of the fabric during weaving may be arranged to contain only half the full width of the design. In sewing the lengths together they are adjusted so that each part of the ornament in one length is half the repeat distant from its position in adjacent lengths. The design extends over two widths of the carpet, and is equal in size of repeat to twice the capacity of the jacquard used. The arrangement also has the advantage that in cutting the carpet the amount of waste is sometimes reduced when the length of the repeat of a design is not a measure of the required length of each strip.

Half-Drop Bases.—The chief bases upon which the half-drop principle is applied are the diamond, the ogee, the diagonal waved line, and the rectangle, which are respectively indicated at A, B, C, and D in Fig. 326. The diamond shape is obtained by bisecting the boundary lines of the repeat and drawing lines to connect the points, in the manner shown at A.

The ogee base, represented at B, may be obtained as follows :—The repeat is bisected in both directions, as shown by the dotted lines, and a line E F, which is drawn diagonally from corner to corner of one of the rectangles, is bisected

at G. Lines are then drawn at right-angles to E F, passing through the centres of the lines E G and F G respectively, and cutting the horizontal lines at points H and K. These points form the centres from which the curves are drawn. As a rule, by using tracing paper, the ogee base lines can be drawn with sufficient accuracy freehand.

The waved line, shown at C in Fig. 326, is constructed in a similar manner to



Fig. 325.

the ogee. In this case, however, instead of the line being turned back in order that it will join with itself in a vertical direction, it is continued in the opposite corner of the repeat, and is joined with itself diagonally.

The square or rectangular plan given at D, is obtained by drawing vertical and horizontal lines through the centre of the repeat. One half of the design is contained within a shaded and a blank section.

The Diamond Base.—The diamond base may be employed in the construction of any form of half-drop design, but it is chiefly serviceable in the arrangement of figures that are more or less diamond-shaped. As shown in the example given in Fig. 327, the leading feature, or the mass of the design is drawn within the diamond space, which is indicated by dotted lines. The four triangular spaces at the corners of the repeat, when united form a second diamond-shaped space equal in size to the first, and the figure is traced into this space in exactly the same relative position as in the first diamond. The correct position of the second figure is obtained

by marking the corners of the first diamond on the tracing paper, and then placing the paper so that the marks coincide with the corresponding corners of the second diamond. This ensures that if a line in the first diamond is crossed by a portion of the first figure the corresponding line in the second diamond will be crossed by a similar portion of the second figure in exactly the same relative position. Two

or more repeats should be traced in each direction in order that it may be conveniently seen where bare places require to be filled in, or parts curtailed where the figures encroach on each other.

The Ogee Base.—In addition to the form of ogee, illustrated at B in Fig. 326, in which the base lines touch, the lines may be open, as shown at E in Fig. 328 ; or

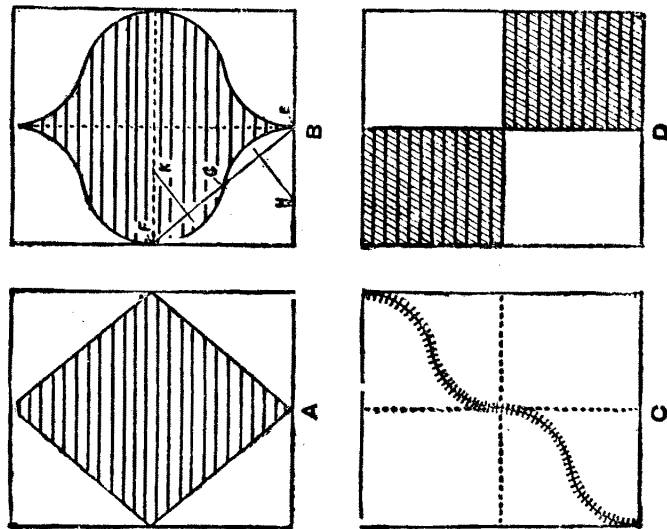


Fig. 326.

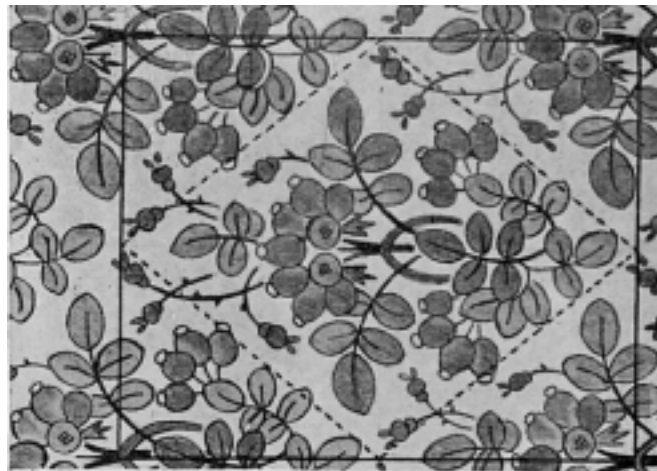


Fig. 327.

interlacing, as indicated at F ; while closed and open lines may be used in combination, as represented at G ; or interlacing and open lines in combination, as shown at H.

Fig. 329 shows the application of a design to the base given at B in Fig. 326. This form of ogee is merely a variation of the diamond base, the ogee lines similarly dividing the repeat into two sections, which are of the same shape and size. A similar method of constructing the sketch may therefore be employed, the figure

which is placed in one space being traced into the other space in exactly the same relative position. The curved lines of the ogee are, however, better adapted than the straight lines of the diamond base for the construction of designs of a graceful flowing character. Designs based on the ogee are specially suitable for hanging fabrics on account of the effective manner in which the lines of the figure play in and

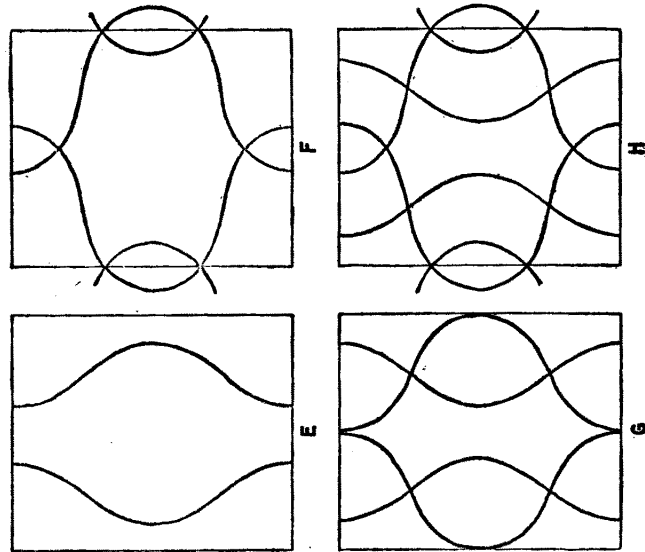


Fig. 328



Fig. 329.

out of the folds of the textures. In Fig. 329 the large leaves distinctly follow the base lines, and as the latter are in contact the design has a pronounced ogee appearance with the central figures closed in.

A design is given in Fig. 330, which has been constructed upon an open ogee base, similar to that shown at E in Fig. 328. The ogee character is not so pronounced

in this design as in Fig. 329, as the base lines have been used chiefly as a foundation upon which to arrange and connect the parts of the figure.

A design which corresponds with the basis given at G in Fig. 328, is illustrated upon point-paper in Fig. 331, in which a double pair of open lines are shown inter-



Fig. 330.

lacing with a closed pair. The ogee base is naturally adapted to the construction of drop designs of a symmetrical character, and this example illustrates a convenient method of working out such a design directly upon point-paper. The centres from which the lines are turned or reversed are found by dividing the repeat into four equal parts, as indicated by the crosses on the 1st, 17th, 33rd, and 49th squares. The unit

of the figure, indicated by the diagonal marks, is drawn in and painted, and from it the complete figure is obtained by copying square by square.

Fig. 332 illustrates a method of varying the form of ogee lines. There are three pairs of lines in the repeat, and a pair of open lines intersects a pair of lines

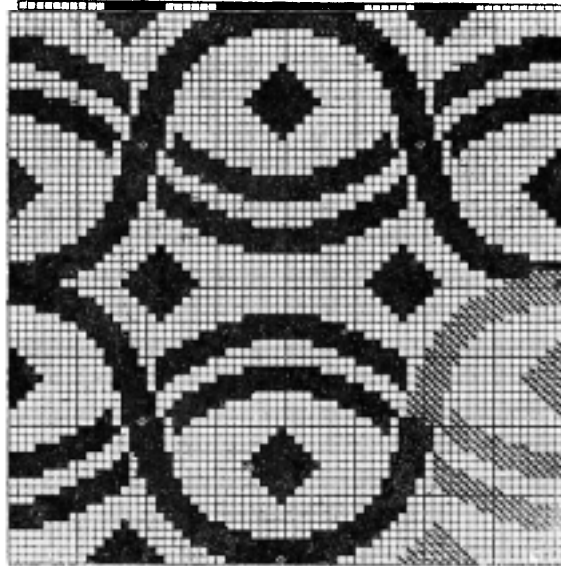


Fig. 331.



Fig. 332.

that interlace with each other. The "drop" character of the design is readily seen in the example.

The Diagonal Waved Line Base.—This base is particularly applicable to the arrangement of figures which are required to run in a diagonal direction, as shown in the design given in Fig. 333. In constructing the style, the length of diagonal repeat

is indicated, and the waved line drawn in. The ornament may then be built upon the waved line before the boundary lines are indicated, because the angle of inclination of the line may be varied, within limits, to suit the form of the figure, and to fit the width of repeat that a given jacquard will give. Thus, assuming that the figure shown in Fig. 333 had to be inclined at a steeper angle, the repeat would be increased



Fig. 333.



Fig. 334.

in length, and reduced in width, while by making the figure run at a flatter angle the length of the repeat would be reduced, and the width increased. After the boundary lines have been inserted on the sketch the parts of the figure require to be joined at the edges, and details may be added to the design, if necessary. In Fig. 333 one complete repeat, and its division into four equal parts, are indicated

by the dotted lines, which enable the half-drop principle of arrangement to be observed.

The diagonal basis, although chiefly suitable for the diagonal arrangement of figures, can be employed in the construction of drop designs of an all-over character. An example is given in Fig. 334, in which the waved foundation line is indicated in

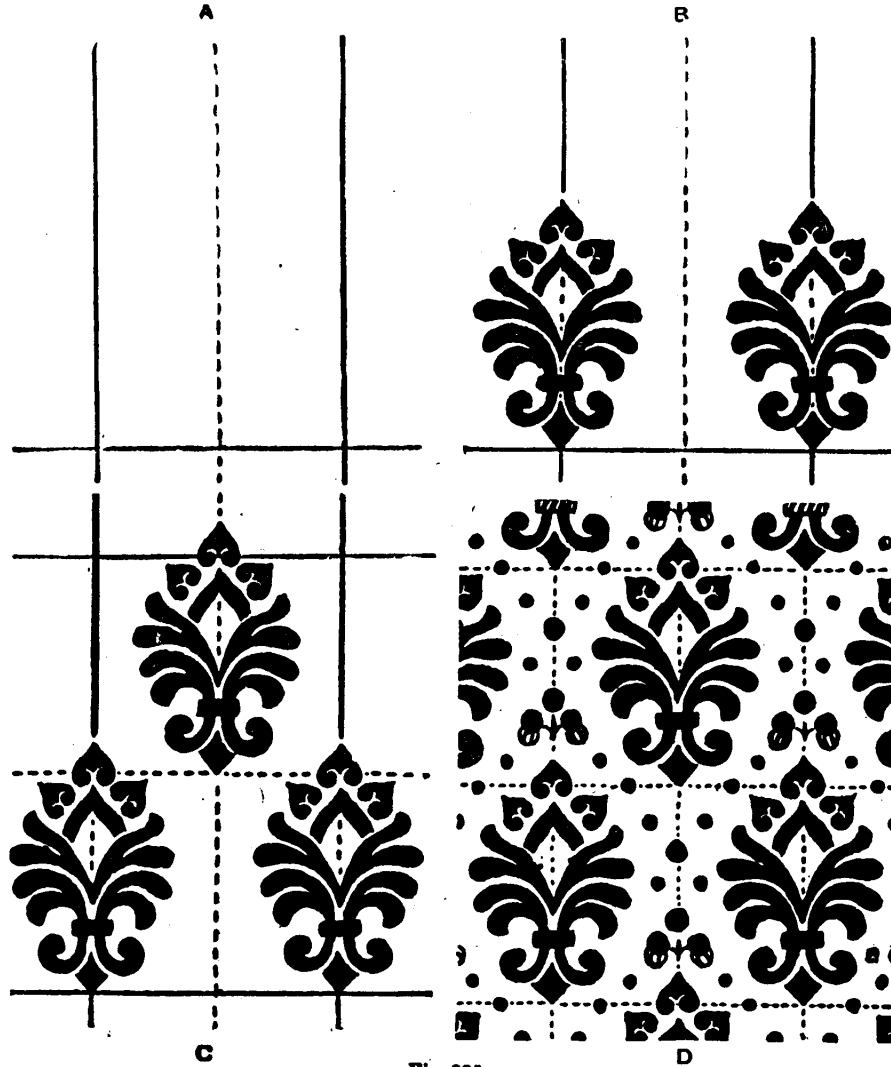


Fig. 335.

the upper right-hand section. It will be noted that a portion of the ornament is inclined in the opposite direction to the base line, and thus counteracts the influence of the latter. There is always a tendency, however, for the diagonal line to assert itself, which prevents its use as a base, except for special styles.

The Rectangular Base.—In the arrangement of given masses or detached

figures upon the half-drop principle, the rectangular base, illustrated at D in Fig. 326, frequently possesses distinct advantages, and except in special cases (as for example,

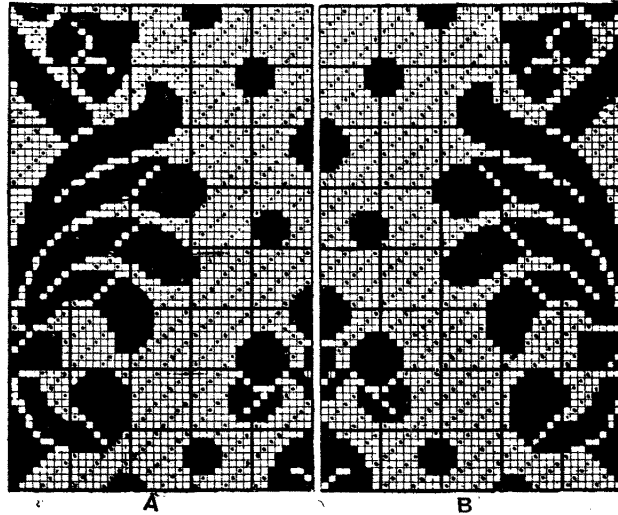


Fig. 336

when the ornament is required to definitely follow certain base lines) may be used with greater facility than the other bases. The chief reason for this is that in using a base such as the diamond or ogee it is necessary to indicate both the width and the

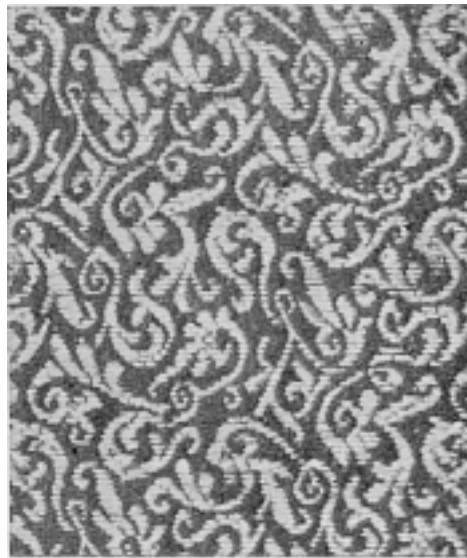


Fig. 337.

length of the repeat when the sketch is commenced. With the rectangular basis, however, the length of the repeat can be varied, during the construction of the sketch,

to suit the required size of mass and amount of ground space, at the same time that the width of the repeat is made to coincide with that of a given jacquard. Fig. 325 shows a typical example of a design which can be arranged most satisfactorily on the rectangular plan. The mass is large in proportion to the width of the repeat, therefore, in order to secure proper balance of figure and ground the length of the repeat has had to be made much greater than the width.

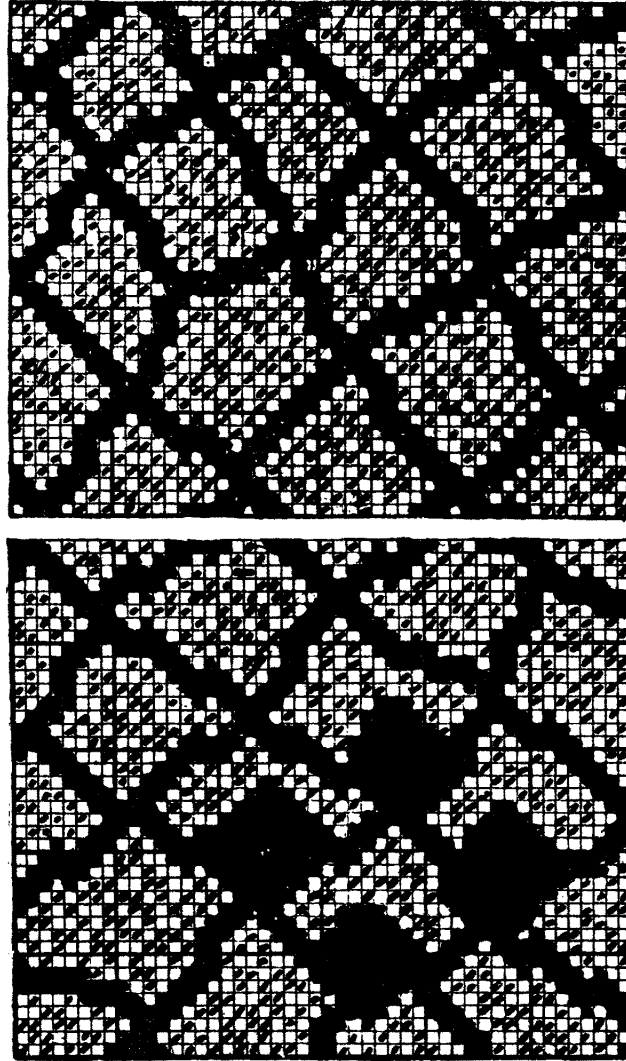


Fig. 336.

The method of constructing a drop design on the rectangular basis to fit a given width of repeat is shown in stages at A, B, C, and D in Fig. 335. First, as shown at A, a horizontal line is drawn on the sheet of paper, and three vertical lines, the two outer lines having a space between them equal to the width of the repeat, while

the third, which is shown dotted, divides the repeat into two equal parts. The lines should be drawn in lightly and of unlimited length.

Second, as shown at B, a tracing of the figure is made in a suitable position relative to the base line and the first vertical line. In this case, as the figure is bi symmetrical, it is conveniently placed with the vertical line passing through its centre. The positions of this line and the horizontal line should be indicated on the tracing paper before the latter is removed, to enable the figure to be again traced in the same relative position to the other lines. A second tracing of the figure is made with the lines on the tracing paper coinciding with the horizontal line and the vertical line on the right. This ensures that the distance from one figure to the other is equal to the width of the repeat, and that the parts of the figure join correctly at the sides.

In the third stage, shown at C in Fig. 335, the position of the intermediate figure is found, and the length of the repeat determined. The tracing paper, placed with

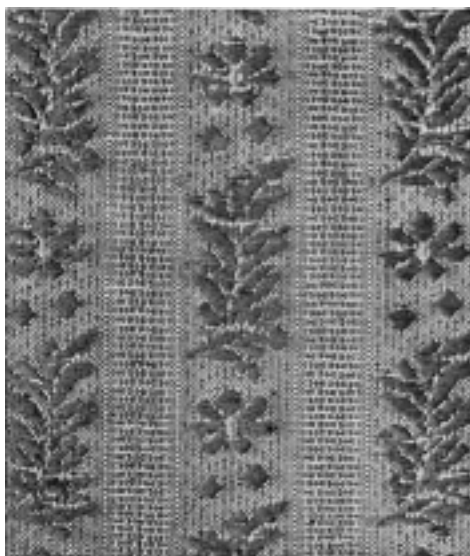


Fig. 339.

the vertical line coinciding with the dotted vertical line of the sketch, is moved in a vertical direction until it is judged that the figure occupies a suitable position in relation to the figures which have already been traced. If placed correctly the horizontal line on the tracing paper will be parallel with the base line of the sketch, and the distance between the two lines will be equal to half the repeat in length. A third tracing of the figure is made and the second horizontal line is drawn in, as shown by the dotted line; then by doubling the distance between the two horizontal lines, the position of the third horizontal line is found. When this is drawn in, the space occupied by one repeat is obtained divided into four equal rectangles.

D in Fig. 335 shows the completion of the sketch. Portions of the figure are traced at the top and bottom, and at the sides, and details of the design are added and traced in stages. By placing the vertical and horizontal lines on the tracing paper to coincide with the corresponding lines of the sketch the additional figure in alternate

sections is readily made the same, and a correct junction formed of the parts of the figure at the edges of the repeat.

Drafting Half-Drop Designs.—In drafting a true half-drop design upon point-paper considerable time and labour can be saved by adopting a system which corres-

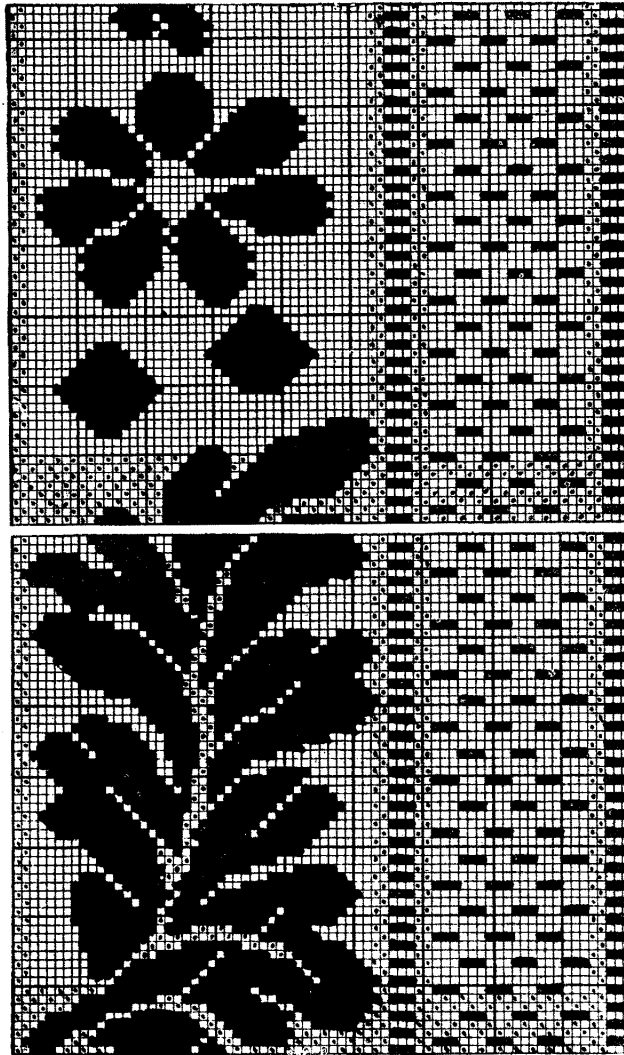


Fig. 340.

ponds with the principle of construction of the design. The method is illustrated in Fig. 336, which shows the lower half, or the unit, of the design given in Fig. 335 worked out in two sections lettered A and B. Each section is equal to one-fourth of the complete repeat, and they are placed alongside each other, as shown in Fig. 336,

while the first half of the cards is cut. Then, to enable the cards for the second half of the design to be cut, the two sections are reversed in position, A being placed on the right and B on the left. Only one half of the complete design thus needs to be painted out on the point-paper, but care has necessarily to be taken that the ground weave and the figure at the top of A and B, join correctly with the bottom of B and A respectively.

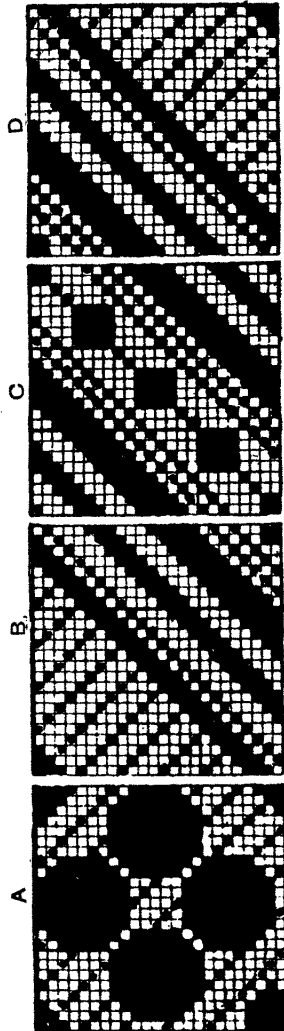


Fig. 341

In the construction of all-over designs, in which the figure is rather indefinite in character, the half-drop system is very useful, and an illustration of a design thus arranged is given in Fig. 337. The designer can readily judge the balance of the figure, and the parts can be made to fit correctly together with little difficulty; while in most cases the point-paper work is reduced by about one-half, as compared with a unit-repeating design.

Designs of a formal character, such as the example given in Fig. 338, are frequently drafted directly on the point-paper without the aid of a sketch, and for this class the half-drop system of construction is very convenient, because of the saving in time and labour that can be effected. In drawing and painting in the figure and ground, two sections of point-paper are used, which together comprise one half of the complete repeat, and these are moved about, being placed alongside, and then one above the other, while the parts of the design are made to join up correctly.

Half-Drop Stripe Designs.—In stripe designs the figure is mostly placed at a different level in adjacent stripes, as shown in Fig. 339, in order to prevent the masses from falling into line with each other horizontally. Therefore, although the same ornament is used in each figured stripe, a complete design extends over the width of two or more stripes. In Fig. 339 the different positions of the figure in succeeding stripes is due to dropping it one-half the length of the repeat. In sketching a stripe design, after the figure in the first stripe has been drawn in, its correct position in the second stripe is readily found on the rectangular principle by dividing the repeat horizontally into two equal parts.

In drafting a half-drop stripe design, it is generally only necessary to fully paint out one stripe, as shown in Fig. 340, which corresponds with the example given in Fig. 339. The cards for the first half of the design may be cut with the upper section of Fig. 340 on the right, and for the second half, on the left of the lower section.

One-third and One quarter-Drop Designs.—A unit figure may be dropped each

time a distance equal to one-third or one-fourth of the length of a repeat, and be used three or four times respectively in the complete design. The method, however, throws the masses into twill lines, and is therefore only applicable to styles in which a diagonal effect is not objectionable. A simple illustration is given in Fig. 341, which shows how a diagonal figure may be readily designed upon point-paper. The figure is intended to be dropped one-fourth, that is, to repeat diagonally four times, upon 96 ends and 96 picks. One-fourth of the design is painted out and divided into four sections, as shown by the portions lettered A, B, C, and D in Fig. 341. Then in



Fig. 342.

cutting the cards the sections are arranged as follows :—First, A, B, C, D ; second, D, A, B, C ; third, C, D, A, B ; fourth, B, C, D, A.

Defective Half-Drop Designs.—Fig. 342 illustrates the defective appearance of a design in which an inclined figure is arranged on the half-drop principle. The design not only has a monotonous appearance, but the arrangement causes twill lines of figure to show in the cloth. Unless a diagonal effect is desired, only symmetrical, or well balanced figures are suitable for the half-drop system of construction. An inclined figure requires to be turned or reversed in the intermediate position.

The half-drop principle may be employed in the arrangement of two figures which are not alike, and an illustration of the style is given in Fig. 265 (p. 238). Such a design does not possess the distinctive features of a true half-drop arrangement, and it is necessary to draft it in the same manner as a unit-repeating figure.

CHAPTER XVIII

DROP-REVERSE DESIGNS

Half-Drop and Drop-Reverse Designs Compared—Drop-Reverse Bases—Diamond and Ogee Bases—The Vertical Waved Line Base—The Rectangular Base—Systems of Drafting Drop-Reverse Designs—Drop-Reverse Stripe Designs—Vertical Reversing of Figures—Combination of Half-Drop and Drop-Reverse Systems.

Half-Drop and Drop-Reverse Designs Compared.—The pure drop-reverse arrangement is similar to the pure half-drop in the respect that the unit of the design is contained twice in the repeat, the ornament in one half, in each case, being the same as that in the other half. The essential difference between the two systems



Fig. 343

is that in the half-drop the figure in both halves is turned the same way, whereas in the drop-reverse the figure in one half is reversed or turned in the opposite direction to that in the other half. The latter feature is illustrated in Fig. 343, which shows the repeat of a drop-reverse design bisected in both directions. In marking the boundary lines of the repeat in Fig. 343 the vertical lines have purposely been drawn in such positions that they pass through corresponding parts of the figure in the upper and lower halves. Each vertical line thus indicates a position where the figure reverses, and an examination will show that the ornament in alternate sections of the design is the same, but turned the opposite way. It will also be seen that if the lower half

of Fig. 343 be turned over from side to side and placed above the upper half with the vertical and horizontal lines coinciding, the ornament in the two halves will also coincide.

Drop-Reverse Bases.—The chief bases upon which drop-reverse designs are constructed are the diamond, ogee, vertical waved line, and rectangle, which

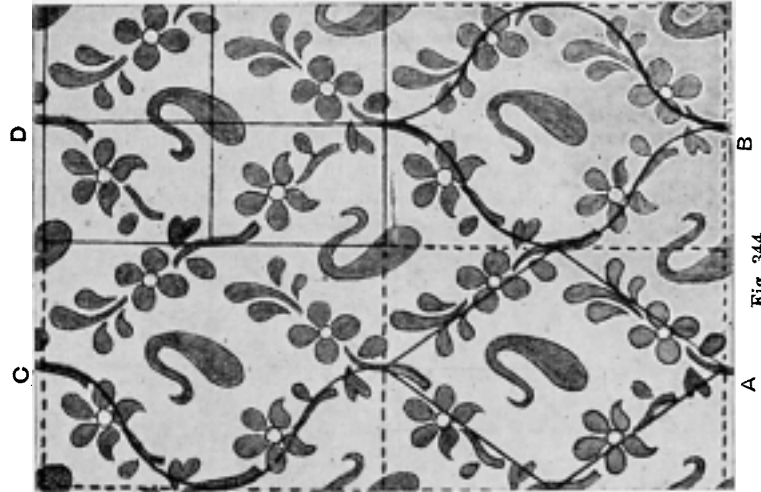


Fig. 344.



Fig. 345.

are indicated, in conjunction with a design, at A, B, C, and D, respectively in Fig. 344.

Diamond and Ogee Bases.—In using the diamond or ogee base the figure which is drawn in the one section is placed in the other section in exactly the same relative position to the base lines, but with the tracing turned over. Thus, in Fig. 344, it will

be seen that the unit figure occupies corresponding positions in the diamond spaces of A, and in the ogee spaces of B, a portion of figure that overlaps one space similarly overlapping the other space, but turned over from side to side.

The diamond and ogee shapes are naturally best adapted to the construction of designs in which the lines of the figure follow the base lines. An illustration is given in Fig. 345, in which the large and small central masses are reversed, but the other parts of the figure are bi-symmetrical, and the example shows—in comparison with a style which is entirely bi-symmetrical—how the reversing method tends to reduce the stiffness of a design. Fig. 268 (p. 241) is illustrative of a drop-reverse design which is constructed upon a diamond base.

The Vertical Waved Line Base.—This is a particularly suitable basis to use in the construction of designs of a graceful flowing character. From an examination of C in Fig. 344 it will be seen that the figure is the same on opposite sides of the line, but reversed. The principle of the arrangement is also illustrated by the example given in Fig. 307 (p. 271).



Fig. 346.

The base can also be used with advantage in the construction of designs in which the figure runs continuously in stripe form, as shown in the example given in Fig. 346. The base lines not only afford a suitable foundation upon which to arrange the parts of the ornament, but the addition of the figure, in the same relationship to each half of the line, enables a well-balanced design to be readily produced.

The Rectangular Base.—The relation of the rectangular basis to the diamond, ogee, and vertical waved line will be understood by comparing A, B, C, and D in Fig. 344, in each of which the base lines pass through corresponding parts of the figure. By examination it will be seen that the bases A, B, and C could be similarly indicated upon the design given in Fig. 343 in addition to the rectangular base which is shown. Further, it will be observed that Fig. 343 is arranged similar to D in Fig. 344, except that in the former the sections which contain corresponding parts of the figure are placed alternately, while in the latter they are situated one above another. In both cases, however, the figure in the upper half exactly corresponds with that in the lower half. No matter where the boundary lines of the repeat are

drawn this is a distinct feature of all true drop-reverse designs in which the unit is turned over from side to side. Because of this, and for the reason stated in reference to half-drop designs (p. 289), the rectangular system of arranging a unit figure in the drop-reverse order is frequently preferable to the other bases. Particularly is this the case when the principal figure is not well balanced, or when it is very large in comparison with the width of the repeat. In illustration of the latter point, a design is represented in Fig. 412, in which the figure extends nearly the width of the



Fig. 347.

repeat, while the length (only rather more than one-half is shown) is nearly three times the width. When a very large figure is arranged in a narrow repeat, as shown in Fig. 412, an appearance is given to the design of having been woven in a larger capacity of jacquard, and thus has cost more to produce than has actually been the case. By properly adjusting the length of the repeat, practically any size of figure, so long as it does not encroach on itself when repeated, can be arranged on the rectangular drop-reverse principle.

The method of arranging a figure (the figure given in Fig. 347 is used) to fit a given width of repeat, is illustrated at A and B in Fig. 348. As shown at A, a horizontal base line EF, and two vertical lines EG and FH, are drawn of unlimited length; the distance between the latter being equal to the width of the repeat. The figure is inclined at a suitable angle, and a tracing is made, as shown at 1, and the relative positions of the base lines to the figure are indicated on the tracing paper. The figure is then copied.

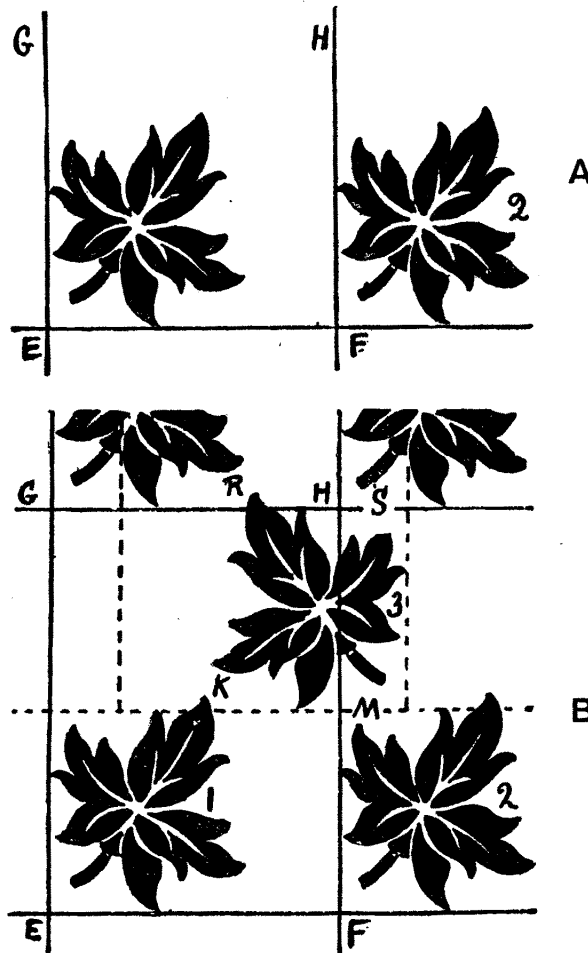


Fig. 348.

as shown at 2, one repeat distant from the first tracing, in a similar position relative to the vertical and horizontal lines.

B in Fig. 348 shows how the position of the intermediate figure is found. The tracing of the figure is turned over from side to side, and is moved about (the base lines of the sketch and tracing being kept parallel) until it is judged that the reversed figure is in the most suitable position in relation to the figures 1 and 2. Then a third tracing is made, as shown at 3, and the positions of the base lines are transferred lightly to the sketch, as indicated by the dotted lines in C. The reversed figure is usually in the best position when there is an approximately equal space between the figures at K and M; a smaller overlap, if necessary, being allowed on one side than on the other in order to counteract one side of the figure being heavier than the other side. The position of the third horizontal line G H is found by doubling



Fig. 349.

the distance between E F and the dotted horizontal line, and when this is drawn in one complete repeat is enclosed within the rectangle E G H F. The main feature is again copied above the repeat, as shown, then, if correctly placed, the figures are in exactly the same relation to each other at R as at K, and at S as at M.

As shown in Fig. 349, the sketch is completed by adding the details of the design in one half, and reversing them in the same relative position in the other half. A distinct advantage of this method of arrangement is that, if a proper balance of the ornament is obtained in one half of the design, a similar balance is ensured in the other half.

Systems of Drafting Drop-Reverse Designs.—Different methods of constructing the point-paper design of a true drop-reverse figure may be employed either in working from a sketch or a woven pattern. One method consists of drawing the

complete outline of the figure on the design paper in the same manner as in drafting

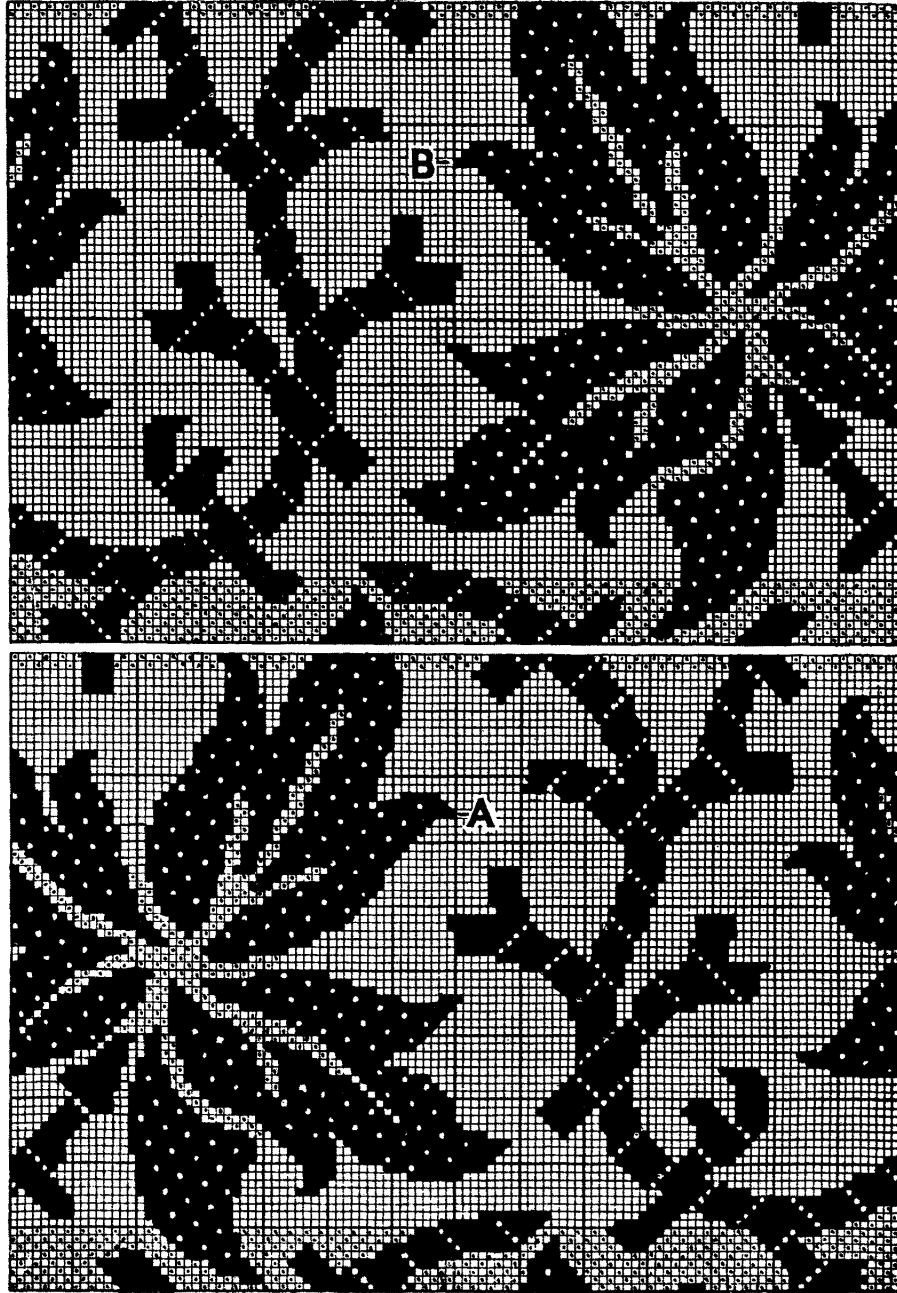


Fig. 350.

a unit-repeating design. In another method one half of the design (the unit) is drawn and painted on the design paper; then a starting point of the second half is found, and the figure is copied in the reverse direction, square by square, from the first half. Thus, in Fig. 350, which shows the design given in Fig. 349 worked out

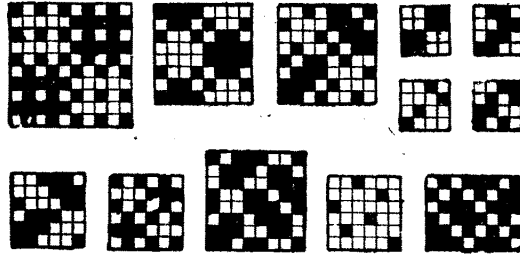


Fig. 351.

upon 96 ends and 118 picks, the position lettered A corresponds with that lettered B. The latter, therefore, shows a suitable place to commence the copy of the figure in the reversed position and it will be seen that the number of picks from A to B is half of the total number of picks in the repeat. In a third method the first half of the design is drawn on the point-paper, and a copy is made upon tracing paper.



Fig. 352.

Then the tracing is turned over from side to side, placed in the proper position on the design paper, and a reversed copy of the figure made by following the outline with a pencil, or by rubbing. In each of the foregoing methods the boundary lines of the repeat may be drawn in any position in relation to the figure.

A fourth method is illustrated by Figs. 349 and 350, in which the special features of the drop-reverse arrangement—described in reference to Fig. 343 (p. 295)—are

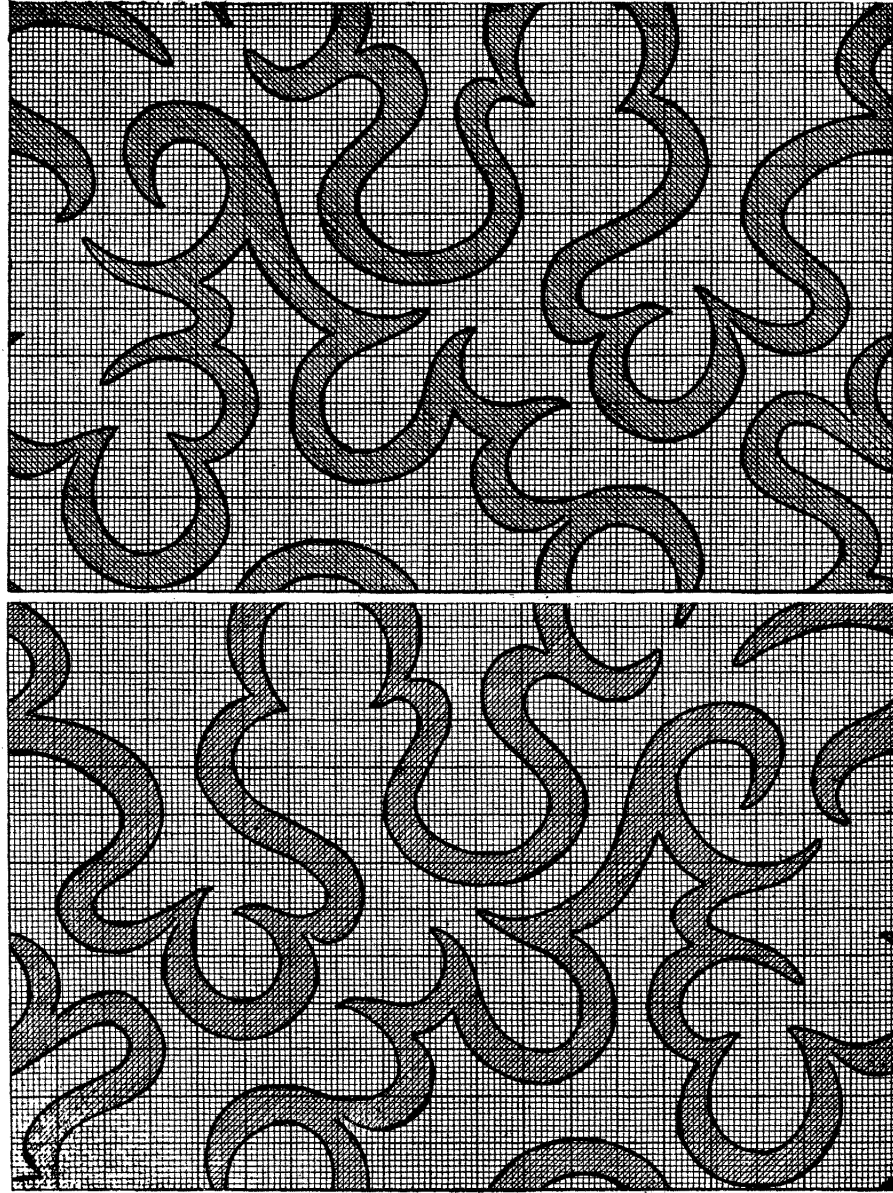


Fig. 353.

taken advantage of to reduce the amount of work in drafting a design. The first vertical boundary line of the repeat is drawn in such a position that the figure is cut in the same relative position in each half, as shown by the line T W in Fig. 349.

(The position of the line T W is exactly between the line E G and the first dotted line in B, Fig. 348.) The lower half of the repeat, taken from left to right, is thus made to exactly coincide with the upper half, taken from right to left. In Fig. 350 the two halves of the design, which are shown detached from each other, correspond with the arrangement of the repeat shown in Fig. 349, and it will be seen, by comparing the picks in succession, that the marks and blanks in the lower half, read from left to right, are the same as in the upper half, read from right to left. It will therefore be clear that it is quite possible to cut all the cards from one half of a plan such as that given in Fig. 350. Sometimes the half-repeat is worked out on transparent design paper, which enables the cards for the second half of the design to be cut by turning the paper over, but ordinary design paper can be used quite conveniently. Further, if the figuring rows of the jacquard are arranged the same from each side



Fig. 354.

(see Fig. 252, p. 221, and the accompanying description) a saving of time can be effected in the card-cutting, as after the first half of the cards have been cut from the design, the second half can be cut from them in a repeating machine. The repeated cards are then turned round (not over) separately, and all the cards are laced together in proper rotation to form the complete set.

The foregoing system is only applicable to designs in which the ground weave can be arranged to read the same from each side, and it is necessary to make the design upon a number of picks which is suitable for the reversing of the ground weave. Thus, in Fig. 350 each half of the repeat is made with an odd number of picks in

order to fit with plain ground. A number of examples are given in Fig. 351, which will reverse properly at the half-repeat if the design contains an odd number of repeats of the ground weave in each case.

The preceding method is quite as applicable in constructing the design from a

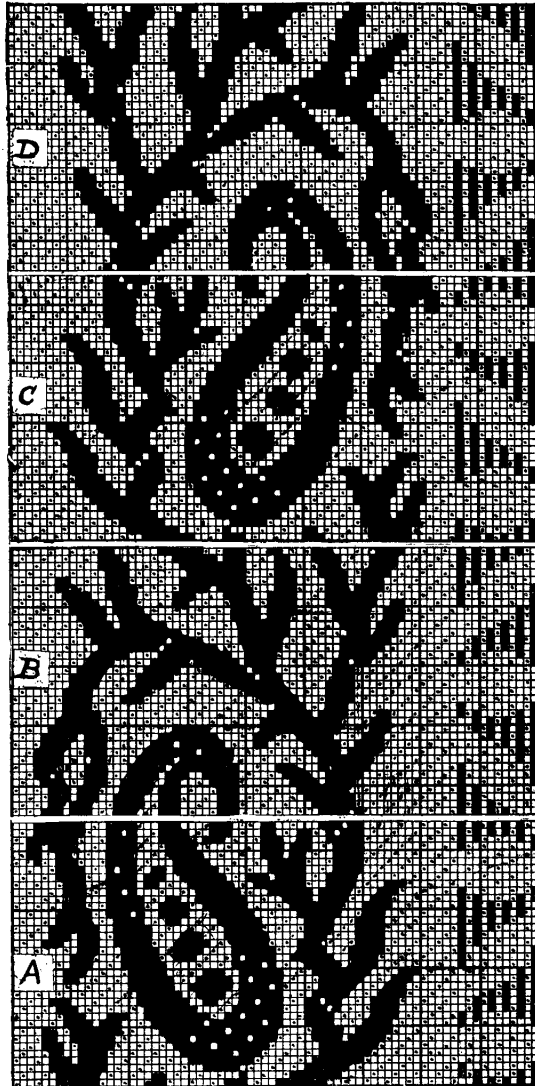


Fig. 355.

woven sample as from a sketch. If a thread arrangement is used in dividing up the design (see Fig. 271, p. 243), the sample is adjusted, as shown in Fig. 352, so that a vertical thread cuts the figure in the same relative position in both halves of the repeat, this thread being taken as the commencement of the point-paper plan.

When the ground weave does not reverse it is necessary for the complete design to be made, and a method is illustrated in Figs. 352 and 353, which enables the outline of the figure to be drawn in very readily. The example is a pure drop-reverse, and in Fig. 352 the figure reverses from the vertical line A B; that is, the figure in the lower half of the repeat is in the same relative position to the line as the figure in the upper half, but on opposite sides. The line AB corresponds with the first end of Fig. 353, and the line C D with the first pick, the position of the latter line,



Fig. 356.

however, being immaterial. The design is divided into spaces (as previously explained in reference to Figs. 265 and 271) commencing with the lines A B and C D. Two sheets of design paper are used, each containing one-half, or rather more than one-half, of the number of picks in the full repeat, and one sheet is turned over horizontally and placed below the other sheet so that the ruled surfaces are on the outside. (By pricking two holes in corresponding positions in each sheet, which are made to coincide when the sheets are put together the

squares of the lower sheet can be placed directly below the squares of the upper sheet.) The sheets are secured by pins, and black carbon paper is placed below them

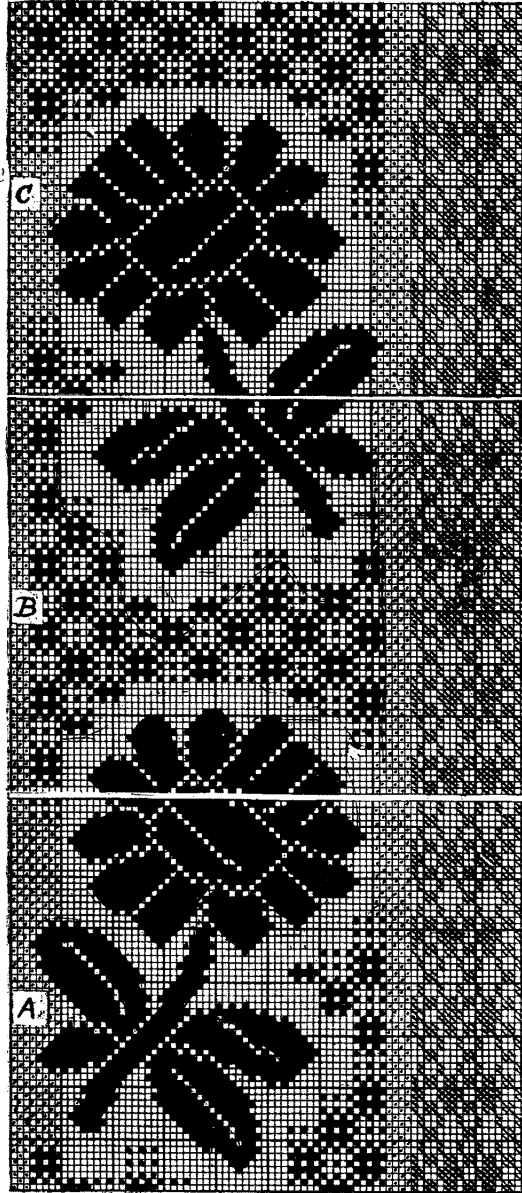


Fig. 357.

with the carbon side upward. As the outline of the figure in the first half of the design is drawn on the upper sheet of point-paper, an exact copy is produced at the same time on the under side of the lower sheet by the pressure on the carbon paper.

Then, as shown at Fig. 353, when the lower sheet is turned over, the figure upon it is reversed, as in the second half of the design, and is approximately in the correct position in relation to the figure in the first half when the sheets are placed together. Some little adjustment of the outline may be necessary where the sheets join.

Drop-Reverse Stripe Designs.—In each stripe of the design given in Fig. 354 the figure is dropped one-half of the repeat, and turned over from side to side. Also, the ornament in the second stripe is dropped one-fourth of the repeat from its position in the first stripe, the complete repeat in width thus extending over two stripes. The mass in one stripe is brought opposite the space between the masses in the other stripe, and the barriness, which would have resulted if the figure in both



Fig. 356.

stripes had been placed on the same level, is avoided. The dotted horizontal lines, which divide the repeat of Fig. 354 into four equal parts, show how correct distribution of the figure is secured.

A ready method of drafting the style of design illustrated in Fig. 354 is indicated in Fig. 355, which shows the design worked out as a weft figure upon 2-and-1 twill ground, with the narrow stripe developed as an extra warp effect. The complete design of one stripe only is made, but the sheet of point-paper is divided into four equal parts, as shown at A, B, C, and D in Fig. 355. The full design is produced by cutting the cards with the parts placed alongside each other as follows:—First, A and B; second, B and C; third, C and D; and fourth, D and A.

The figure in each stripe of the fabric represented in Fig. 356 is also dropped one-half of the repeat in length and reversed, but in this case the repeat in width

extends over three stripes. In order, therefore, to get a proper balance of the ornament, the figure in the second stripe is dropped one-third from its position in the first, and in the third stripe, one-third from its position in the second.

The point-paper design of one stripe of Fig. 356 is given in Fig. 357, which, in order to enable the full design to be cut from it, is divided into three equal parts, A, B, and C. In cutting the cards the parts are arranged alongside each other: First, A, B, C; second, B, C, A; and third, C, A, B. The fabric represented in Fig. 356 is composed of silk warp and cotton weft, and the figure is formed in warp float. The figure is surrounded by plain weave, and, as shown in Fig. 357,

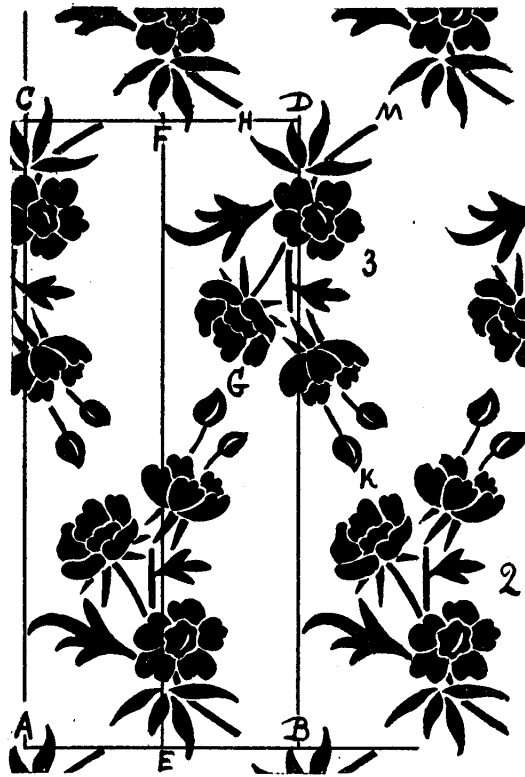


Fig. 359.

a 5×5 imitation gauze weave is introduced in the ground of the figured stripe, while between the stripes a proper gauze structure is formed.

Vertical Reversing of Figures.—The style of figure illustrated in Fig. 358, which is much heavier on one side than the other, is frequently very difficult to arrange on the drop-reverse principle by turning it over from side to side. It is impossible to get a proper balance of the ornament, on account of the heavy sides coming together in one line, and the light sides in another line. In Fig. 358 the figure has been thus arranged in order to make it fit in the space between the vertical waved lines, which are developed in a simple weave. The presence of the waved lines makes the uneven balance of the design less noticeable than it otherwise would be.

The difficulty of arranging such a style can frequently be got over by turning the figure over from top to bottom in the second position, as shown in Fig. 359. The correct position of the second figure, and the length of repeat which is suitable, may be obtained as follows:—A horizontal base line A B, two vertical lines A C and B D (the distance between the latter being equal to the width of the repeat), and a third vertical line E F, equidistant between A C and B D, are drawn of unlimited length. The figure is traced in a suitable position in relation to the lines A C and A B, and copied, as shown at 2, in the manner described in reference to Fig. 348, care being taken that the positions of the lines A B and A C are correctly indicated on the tracing paper. The tracing is then turned over from top to bottom, and placed with the vertical line upon it coinciding with the line E F. It is moved in a vertical

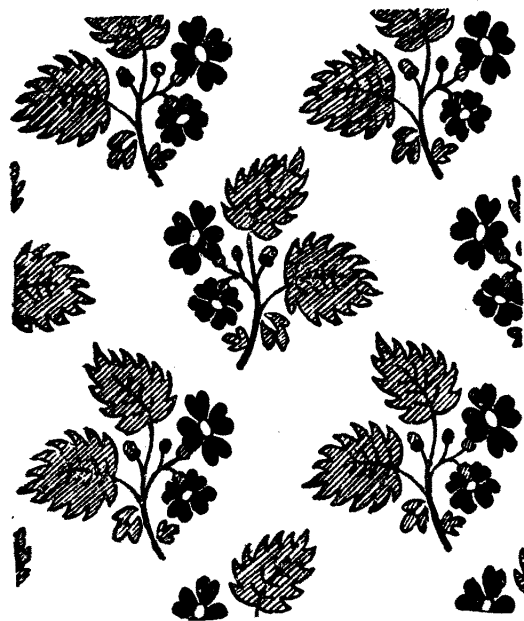


Fig. 360.

direction until it is judged that the reversed figure is in the best position in relation to the first two figures; and a third tracing is made, as shown at 3. The size of the repeat in length is found by turning the tracing back again, and placing it with the vertical line coinciding with the line A C extended, in such a position that there is approximately the same space between the figures at H as at G. Portions of the figure are then traced at the top, bottom, and sides, in order to show the repeat, and additional detail is added, if necessary. If the sketch is correctly constructed there will be exactly the same space between the figures at K as at G, and at M as at H.

The foregoing system is useful in cases where the figure is required to appear the same way up, when viewed from either end of the cloth. It may also be advantageously used when some distinct shape of flowers or leaves occurs at one side of the figure, as will be seen from a comparison of the sketches given in Figs. 360 and 361. In Fig. 360 the figure is alternately turned over from side to side in the ordinary manner, with the result that the flowers form a pronounced line length-

wise of the design, and the leaves another line. By turning the intermediate figure over from top to bottom, as shown in Fig. 361, the second figure is moved one-half the width of the repeat from the first figure, and the striped appearance is avoided. It will be noted, however, that the stems of the figure come together and form a line across the sketch, while a similar effect is produced by the tops of the leaves falling into a line. The defect, however, is less noticeable than the distinct stripe produced by the arrangement shown at Fig. 360.

From this and the foregoing examples it will be understood that in using a given figure it is necessary to select a system of arrangement which is most suitable for it; while, with a given system of arrangement, the parts of the figure require to be so distributed that an evenly balanced design will result. Thus, Fig. 362

shows how the flowers and leaves might be re-distributed in order to render the figure suitable for arranging on the principle illustrated in Fig. 360.

In order to show the distinctive features of the design given in Fig. 361, and to illustrate a convenient method of drafting the effect on point-paper, one

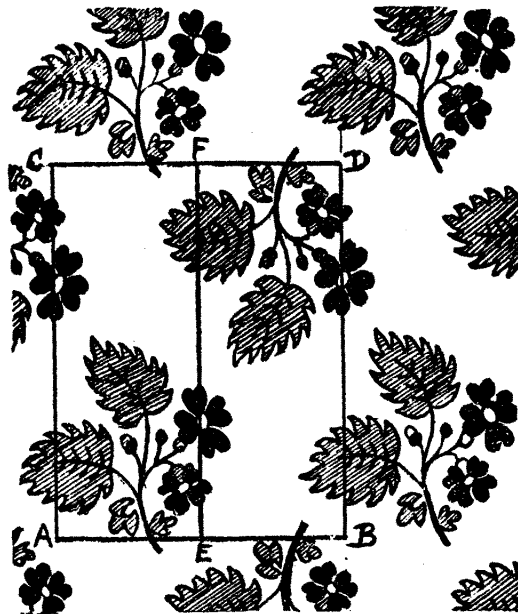


Fig. 361.

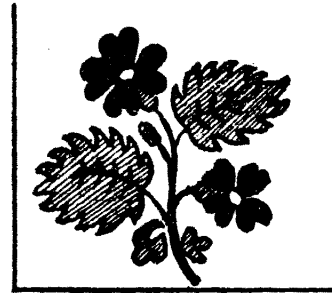


Fig. 362.

complete repeat of the design is enclosed within the rectangle $A B D C$, which is bisected by the vertical line $E F$. The horizontal boundary lines $A B$ and $C D$ cut the figure in the same relative position in each vertical half; therefore, the figure in one half of the design is exactly like that in the other half, except that it is turned over vertically. Hence, if the line $A B$ be used as the commencement of the design, the complete outline of the figure may be obtained on the point-paper in a similar manner to that illustrated in Fig. 353 (p. 302). In this case the sheet of point-paper is cut vertically into two equal portions, which are placed one above the other, the lower portion being turned over from top to bottom. Thus, in Fig. 363, which shows the complete plan of the design, given in Fig. 361, the two portions are shown detached from each other, and it will be seen that the figure in one half, followed from the bottom, exactly corresponds with that in the other half taken from the top.

Combination of Half-Drop and Drop-Reverse Systems.—Fig. 364 illustrates

a system of arrangement which is particularly useful in securing even distribution of the ornament when the figure is badly balanced. In the example the figure is not only heavier on one side than the other but a distinct floral shape occurs on one

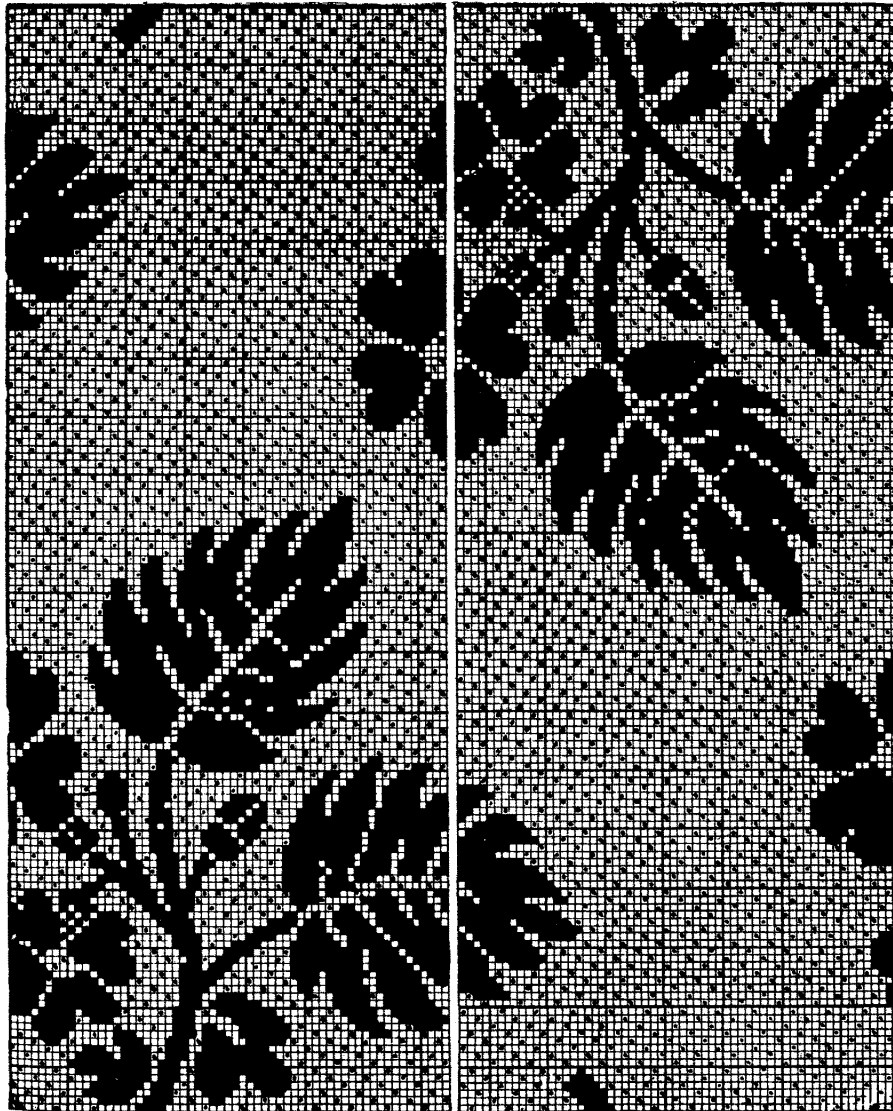


Fig. 363

side at the top. The figure is used eight times in the repeat, and is turned in four directions, and the complete design is a combination of the half-drop and the drop-reverse arrangements. The multiple reversing of the figure prevents the flowers from falling into lines, either horizontally or vertically, while the inclusion of eight

figures in the repeat makes the design less stiff and formal than is the case when only two figures are used. Compared with a two-figure arrangement the chief disadvantages are that twice as many cards are required, and such large figures cannot be woven because the figuring capacity of the jacquard is practically reduced by one half. It will frequently be found, however, that the system can be employed for



Fig. 364.

figures which are too large to arrange in sateen order, while it possesses many of the advantages of the sateen distribution.

The repeat of Fig. 364 is shown bisected by dotted lines, and it will be seen that the ornament in alternate sections is the same. In drafting the design upon point-paper, it may therefore be treated as a half-drop arrangement, so that only one-half of the effect needs to be worked out, the complete set of cards being cut from the half-repeat in the manner described in reference to Fig. 336 (p. 289).

CHAPTER XIX

SATEEN SYSTEMS OF ARRANGEMENT

Regular and Irregular Sateen Arrangements Compared—Advantages of Sateen Bases. *Regular Sateen Arrangements*—Methods of Distributing the Figures—Methods of Reversing the Figures—Size of Repeat—Methods of Drafting Sateen Arrangements. *Irregular Sateen Bases*—Four-Sateen Arrangements—Six-Sateen Arrangements—Irregular Eight-Sateen Arrangements.

Regular and Irregular Sateen Arrangements Compared.—One of the most important functions of sateen weaves (the construction of which is described and

illustrated in pp. 16 to 20) is their use as bases in the distribution of figures. The most commonly used sateens are illustrated in Fig. 365, in which the examples A to G are regular, and H to M, irregular sateens.

In Fig. 366 examples of designs are given which illustrate the comparative effects produced by using the two kinds of sateens as the bases of distribution. In the upper design the spots are arranged in the order of the 8-thread regular sateen, shown at B in Fig. 365, and it will be noted that continuous diagonal lines of figure are formed. This tendency of the primary masses to fall into twill lines is frequently an objectionable feature of the regular sateen orders of distribution. In the lower design the figures are arranged in the order of the 6-thread irregular sateen given at I in Fig. 365. In this case the spots tend to run in threes, the direction of one line opposing that of another, so that there is no possibility of the figures falling into twill lines. A feature of the broken arrangements is the tendency of the figures to group in twos, threes, or fours.

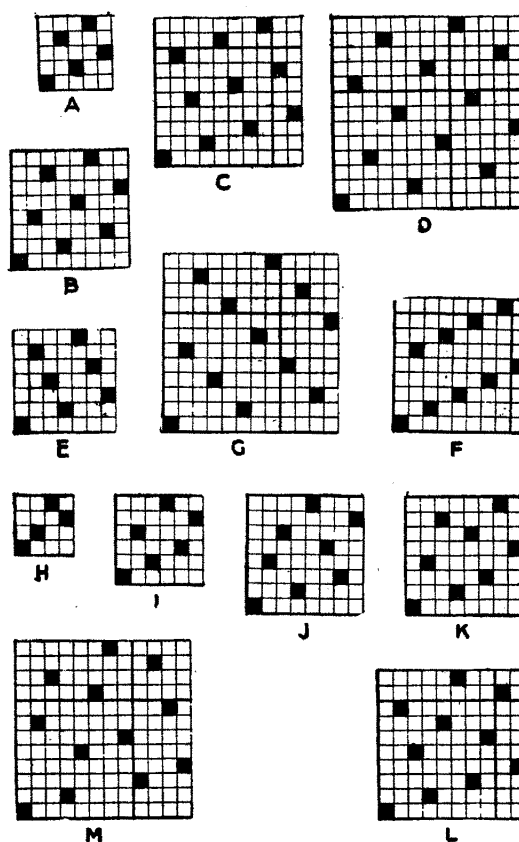


Fig. 365.

Advantages of Sateen Bases.—Compared with the ordinary half-drop and drop-reverse systems, the best sateen arrangements possess the following advantages:—(1) There is less liability of stripes or bars occurring in the cloth, as uniform distribution of the primary masses is more readily secured; (2) a design is more effective because the main feature can be turned and reversed in diverse ways, which enables stiffness and sameness of appearance to be more readily avoided; (3) the repetition of the pattern is better concealed. The chief disadvantages are that with the same

size of repeat smaller masses are necessary, or, on the other hand, with the same size of mass the capacity of the jacquard must be larger, while there is usually greater expense in cards.

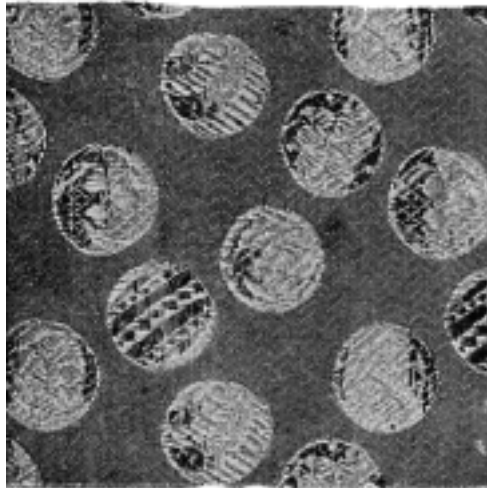
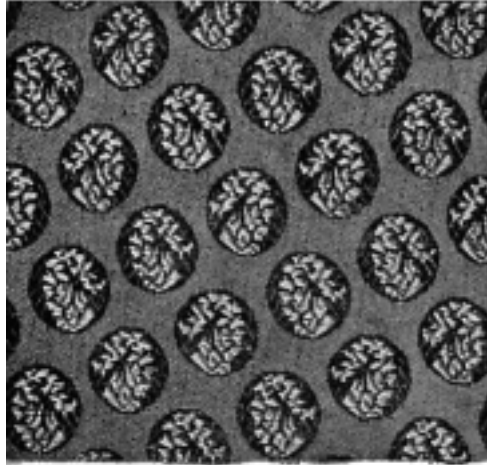


Fig. 366.

REGULAR SATEEN ARRANGEMENTS

In using the regular sateens as bases it is important that the figures or masses are placed at approximately uniform distances apart. Under ordinary circumstances this condition is secured by selecting a base weave in which there is a similar distance between the marks when viewed from different directions, as in the plans A, B, C, and D, in Fig. 365. These are four of the best regular sateen bases, the suitability of each being due to the feature that a twill line of dots in one direction is crossed by another line about equally prominent in the other direction. Such bases as E, F, and G in Fig. 365, in which the marks form a more prominent diagonal line in one direction than the other, are usually unsuitable. The applicableness of the different sateens will be seen by comparing the examples given in Fig. 367. In each design A, B, C, and D in Fig. 367, the bases of which respec-

tively correspond with the plans similarly lettered in Fig. 365, there is an approximately equal space between the figures, while the twill lines, into which the figures fall, are about as prominent in one direction as another. On the other hand, designs E and F in Fig. 367, the bases of which respectively correspond with E

and F in Fig. 365, are defective, because the spaces between the figures are unequal, and the figures form a more pronounced line in one direction than in the other. Circumstances sometimes arise, however, which render such a base as E or F necessary in order to obtain uniform distribution; as for instance, when the figure is longer in one direction than another, or when there is a considerable difference between the width and length of the repeat.

Methods of Distributing the Figures.—In sketching designs in which the figures are arranged in sateen order, either of the two methods of dividing up the repeat

illustrated in Fig. 367, may be employed. In the first method the repeat is divided each way into as many parts as there are figures, as shown by the dotted lines. The number of rectangular spaces in the repeat area is equal to the square of the number of figures, and corresponds with the number of small spaces in the repeat of the sateen base weave. The correct positions of the figure are found by marking the spaces in the order of the sateen base, or by similarly marking the places where the lines intersect. B in Fig. 367 shows the figure placed each time as centrally as possible upon the allotted space; whereas in C the figure is placed each time with its centre as near as possible to the selected place where a vertical and a horizontal line intersect.

In the second method, as shown by the solid lines in Fig. 367, the repeat area is divided into the same number of spaces of uniform size and shape as there are figures. The spaces, in this case, indicate the relative

positions of the figure which is traced as centrally as possible within each space. The method in which the positions of the intersecting diagonal lines are obtained will be readily understood by comparing the sketches with the corresponding sateen bases given in Fig. 365. In each base the sateen marks form lines with each other in opposite directions, flat lines being crossed by steeper lines. By drawing lines to connect the weave marks each boundary line of the repeat is divided into a number of equal parts. Thus, to correspond with the sateen bases, in the design A in Fig. 367, the points of connection are found by dividing

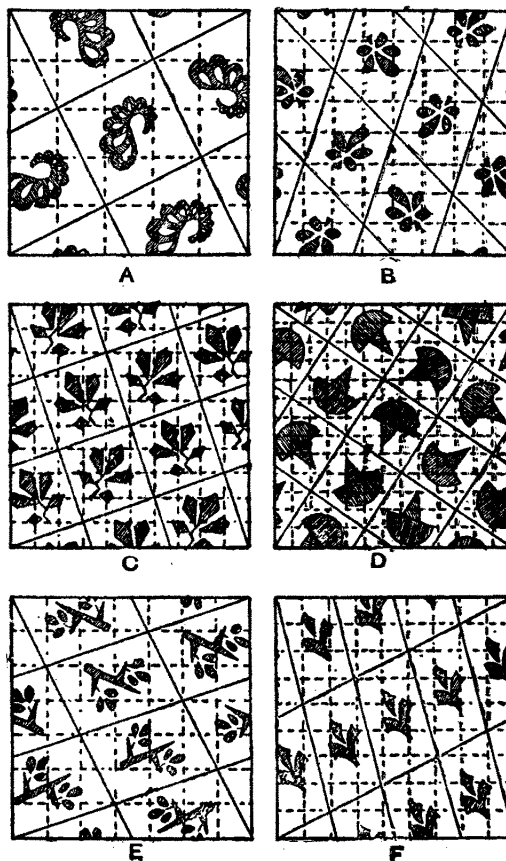


Fig. 367.

the boundary lines of the repeat into two equal parts; in B by dividing the horizontal lines into three parts, and the vertical lines into two parts; while in D the boundary lines are divided into two and also three equal parts. On account of the designs in Fig. 367 having been arranged to fit the two methods of dividing up the repeat, the figures do not coincide in position with the marks in the corresponding weave bases given in Fig. 365. Thus, the first horizontal series of spaces in the design A corresponds with the fifth pick of weave A, and in the design B, with the fourth pick of weave B.

Methods of Reversing the Figures.—The manner in which a figure is turned over or reversed in a sateen distribution has a considerable influence upon the



Fig. 368.

appearance of the design. A in Fig. 367 shows the figure inclined at a different angle in each position—a system which is chiefly suitable for such textures as carpets and table-cloths, in which the design is required to appear similar from any point of view. B in Fig. 367 illustrates a good system of reversing a figure in the 8-sateen order of arrangement, four positions being shown, each of which is repeated. The object is always inclined at the same angle, and is therefore retained in the same relation to the threads in the cloth. Two consecutive figures are inclined to the left and two to the right, in either the steep or the flat twill line; and the same feature will be observed in the corresponding arrangement represented in Fig. 366, in which however the figure is only turned in two directions. If the figure is inclined alternately to right and left in the 8-sateen regular distribution, cross twill lines of

figure are formed, in each of which all the figures are inclined in the same direction, and the design is defective. In the 10-sateen arrangement, shown at C in Fig. 367, the figure is turned in two ways, and in both the steep and the flat twill line the angle of inclination is to the left and right alternately. In the 13-sateen arrangement, given at D in Fig. 367, no two figures are turned the same, which is a particularly suitable method for such a stiff figure in preventing sameness of appearance. In the design E, the figure is turned in four positions, but in F all the figures are placed the same, which not only causes the design to appear uninteresting, but the twill-line effect, due to the unsuitable base, is accentuated.

In addition to turning the same figure in different directions in order to make a design more effective, every figure in the repeat may be different in form, as shown in the example given in Fig. 368. In this design, massive figures turned in diverse ways, are arranged in 5-sateen order. All the figures possess the same characteristics but the difference in shape makes the design appear freer and more attractive.

Size of Repeat.—A convenient method of finding the size of repeat which is suitable for a given figure in a proposed system of arrangement is illustrated in Fig. 369. The size occupied by two figures (roughly sketched in alternate order), with the necessary amount of ground space, is first found, as shown

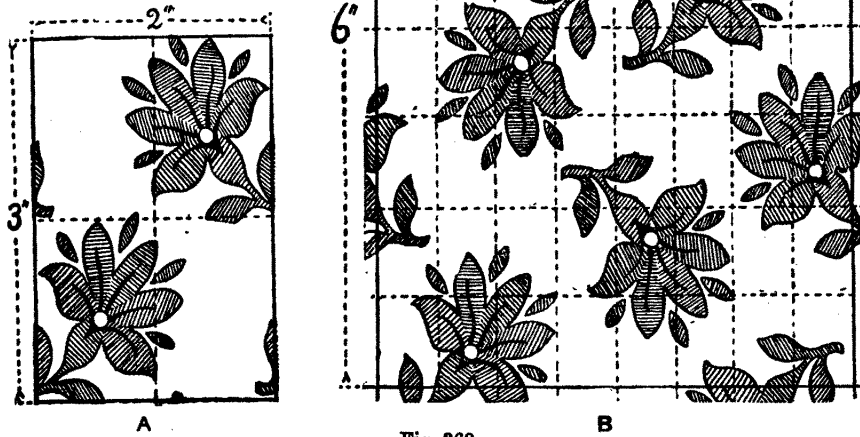


Fig. 369

at A. Then the corresponding width and length of repeat for the sateen distribution are obtained by multiplying the ascertained dimensions by—

$$\sqrt{\frac{\text{number of figures required.}}{\text{number of figures given.}}}$$

This formula is applicable to all calculations on changing the number of figures while retaining the same proportion of ground space (see also p. 72). For example, taking the repeat of A in Fig. 369 to be 2 in. wide by 3 in. long, the repeat for the 8-sateen distribution shown at B =

$$2 \text{ in.} \times \sqrt{\frac{8 \text{ figures}}{2 \text{ figures}}} = 4 \text{ in. wide.}$$

$$3 \text{ in.} \times \sqrt{\frac{8 \text{ figures}}{2 \text{ figures}}} = 6 \text{ in. long.}$$

It may be necessary for the repeat in width to be changed to fit the capacity of a given jacquard. Thus, assuming that it is necessary for the design B to repeat



Fig. 370.

on $3\frac{1}{2}$ in., the length of repeat, which will give the same proportion of ground space, will be found as follows—

$$\frac{4 \text{ in. wide} \times 6 \text{ in. long}}{3\frac{1}{2} \text{ in. wide}} = 6\frac{2}{5} \text{ in.}$$

Changing the relative width and length of the repeat in the foregoing manner is not always practicable, however, because the twill line of figures is liable to be accentuated

in one direction, while it is possible that the change will cause the figures to encroach on each other.

Methods of Drafting Sateen Arrangements.—The following methods of drafting a sateen arrangement of figures from a sketch design or a woven sample can be employed: (1) The full repeat is squared out and all the figures are drawn and painted in independently upon the design paper. (2) One figure is drawn and painted on the design paper, and the remainder are copied square by square from it. (3) One figure is drawn on the design paper and the outline copied upon transparent tracing paper by means of which the remaining figures are traced. The second and third methods are illustrated in Fig. 71 (p. 69), which also shows how the figures are placed in correct relative position to each other on the point-paper.

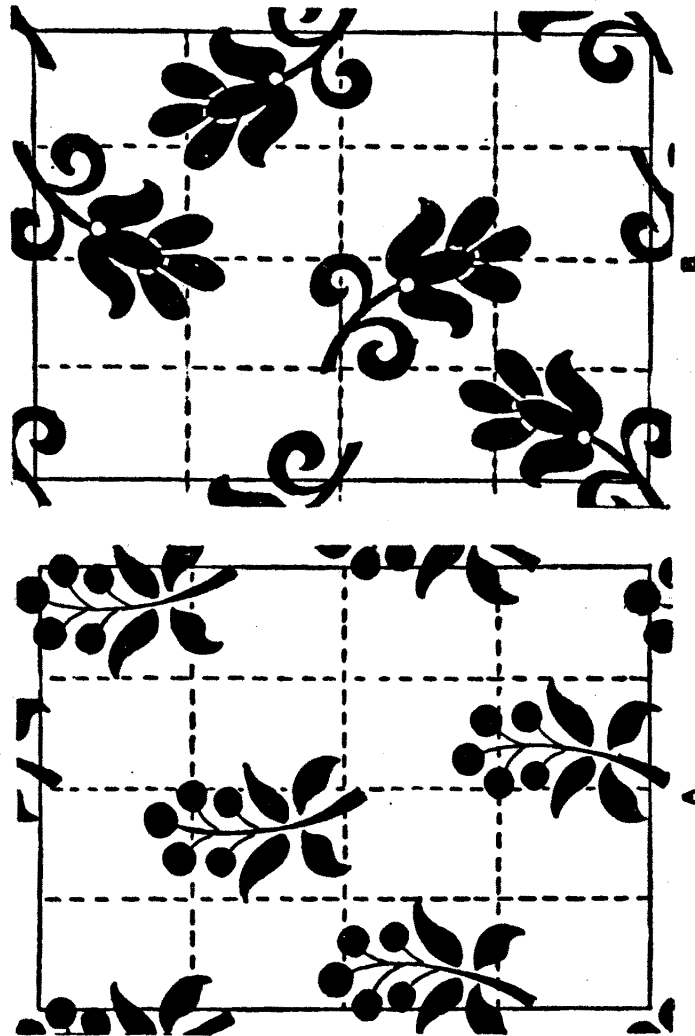


Fig. 371.

Certain of the sateen arrangements enable abbreviated methods of drafting to be employed, as shown in subsequent examples.

The 8-thread regular sateen base is one of the most convenient to use, not only because even distribution of the figures is readily secured, but on account of the expeditious manner in which the arrangement can be drafted. This will be understood by comparing the design shown at B in Fig. 369 with the corresponding point-paper plan given in Fig. 370. By analysis, it will be seen that the design B in Fig. 369 possesses two distinct features: (1) If the repeat be bisected in both directions, the figure in alternate sections is exactly the same; (2) the boundary lines of the repeat are drawn in such positions that they pass through the figure in the same way at the top and bottom, and at the sides; hence, the design appears exactly the same, whether viewed from the top or the bottom. Either feature may be taken advantage

of to reduce the point-paper work by one half. For example, although only half of the complete repeat is given in Fig. 370, the second half of the cards can be cut from it: (a) by dividing the plan vertically into two parts, and reversing the sections; or (b) by turning the plan round. The former method can be employed for an 8-sateen arrangement whether the figure is turned in two or four directions, but the



latter only when it is in four positions. Another point worthy of notice, in the latter method, is that if the rows are arranged the same from either end of the cards, both halves of the set of cards can be obtained at the same time, by cutting two cards alike from each horizontal space of the design. Thus, the half-repeat shown in Fig. 370, contains 96 cards, and numbers 1 to 96, when turned round, are successively the same as numbers 192 to 97 in the full repeat. In further illustration of

this, it will be seen by comparison that the upper half of the repeat of Fig. 369 exactly corresponds with Fig. 370 when the latter is turned round 180°. It is necessary, of course, for the ground weave to be commenced in such a manner that it will be continuous throughout, but as the direction of a twill line is not reversed, by thus

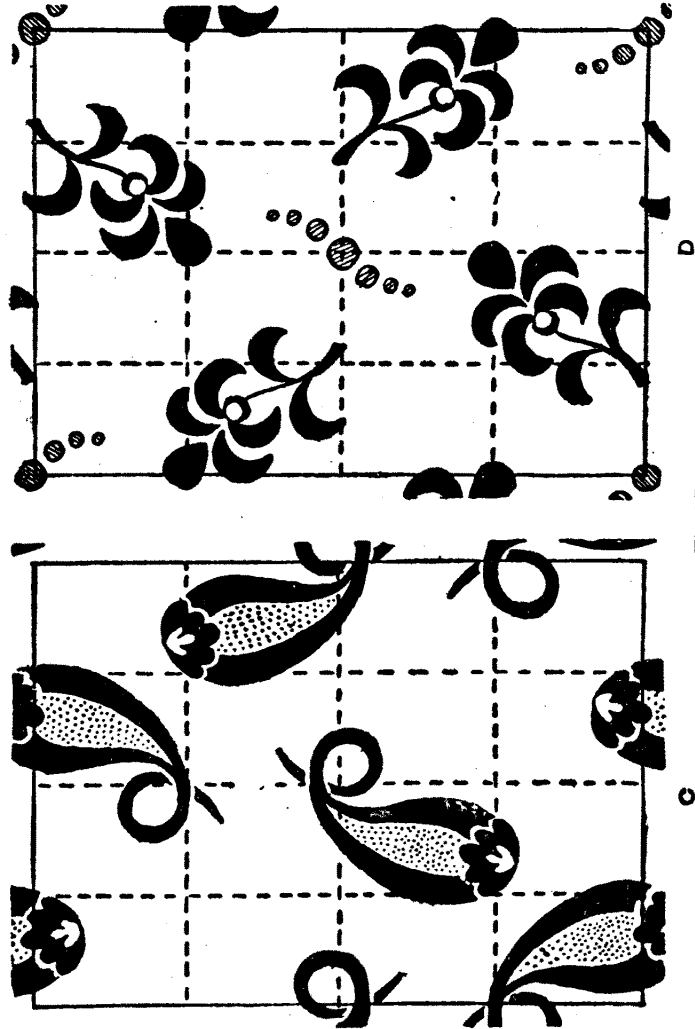


Fig. 373.

turning the cards, it will be found that the majority of twill and sateen weaves offers no obstacle to the method.

IRREGULAR SATEEN BASES

Four-Sateen Arrangements.—Different methods of arranging figures in 4-sateen order are illustrated in Figs. 371, 372, and 373. The figure in the first example is bi-symmetrical, and it is therefore placed the same in each position. In Figs. 372 and

373 inclined figures are used which are turned in different directions ; A in Fig. 372 showing the figure turned in two ways, and B in four ways. In both C and D in Fig. 373 the figure is also turned in four ways, but the system of reversing is different in each case. The method of reversing which is most suitable is decided by the

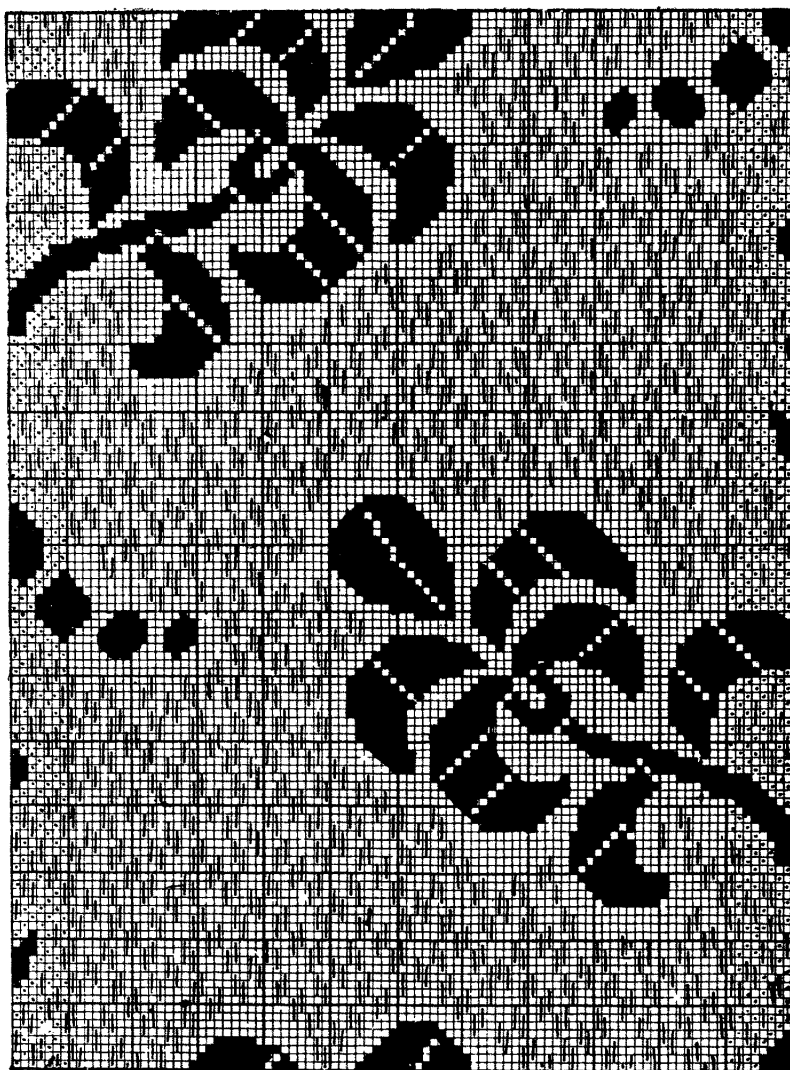


Fig. 374.

shape of the figure and its size, as compared with the size of the repeat. A method which is convenient for one figure might produce a defective design if employed for another of different shape. It will be noted in each design B, C, and D, that corresponding parts of the figures are in line with each other, and there is thus a liability

of lines showing in the cloth; but frequently this feature can be made use of to give additional interest to the grouping of the masses.

The positions of the figures are obtained by dividing the repeat each way into four equal parts, and marking the spaces in the order of the 4-sateen weave. If each object is placed centrally on its allotted space the grouping of the figures in pairs is very noticeable, as shown in Fig. 371. It is, therefore, usually better for each object



Fig. 375.

to be slightly moved horizontally and vertically away from the centre of its space, in the manner illustrated by the examples given in Figs. 372 and 373. The distance between the figures of each pair is thereby increased, while that between the pairs is reduced, which not only gives the design a better all-over appearance, on account of the masses being more evenly distributed, but figures can be employed which would otherwise encroach on each other.

The working out of the designs on point-paper can frequently be materially simplified if the basis of construction is taken into consideration. For example, if A and B in Fig. 372 are examined it will be seen that in each design the boundary lines are in such positions that the ornament in the lower half, taken from left to right, is exactly like that in the upper half taken from right to left. The designs thus possess the distinctive features of a pure drop-reverse arrangement, and a corresponding method of drafting can be employed (see p. 299).

In the same manner the design C in Fig. 373 coincides in arrangement with the examples given in Figs. 359 and 361, in which the second half is like the first half turned over vertically.



Fig. 376.

From an examination of D in Fig. 373 it will be seen that the method of construction causes the design to appear the same, whether viewed from the top or the bottom. It is therefore possible, with certain ground weaves, for the complete set of cards to be cut by drafting the half repeat of the design, as shown in Fig. 374, which corresponds with the lower half of D in Fig. 373. The picks, from the first to the last in the given half of the design, are respectively like the last to the first in the other half, taken from opposite sides. The plan shows a fancy crêpe, that fits with plain weave, arranged so that the ground weave will be unbroken where the two halves of the repeat join.

The designs given in Figs. 372 and 373 simply illustrate different methods of arranging the primary masses, but in each system further variety of effect can be produced by introducing additional ornament. Thus, in Fig. 375, two floral figures which form one mass, are arranged in the method shown at A in Fig. 372, while leaves



Fig. 377.

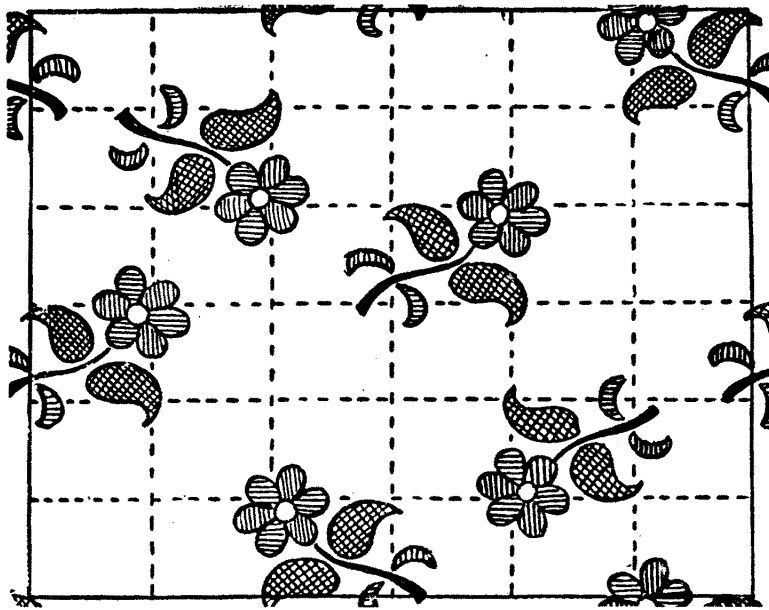


Fig. 378.

and stems are introduced on the drop-reverse principle to fill up the spaces between the figures.

Fig. 376 illustrates a 4-sateen arrangement in which diversity is produced by

the use of a different, although similar, figure in each of the four positions, while small buds and leaves are employed to fill up the ground spaces.

Six-Sateen Arrangements.—Different methods of arranging figures in 6-sateen

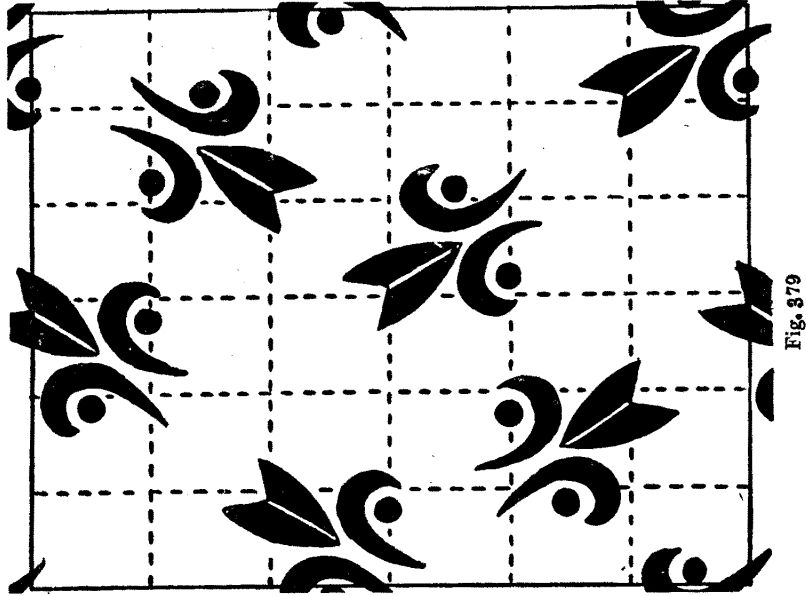


Fig. 379

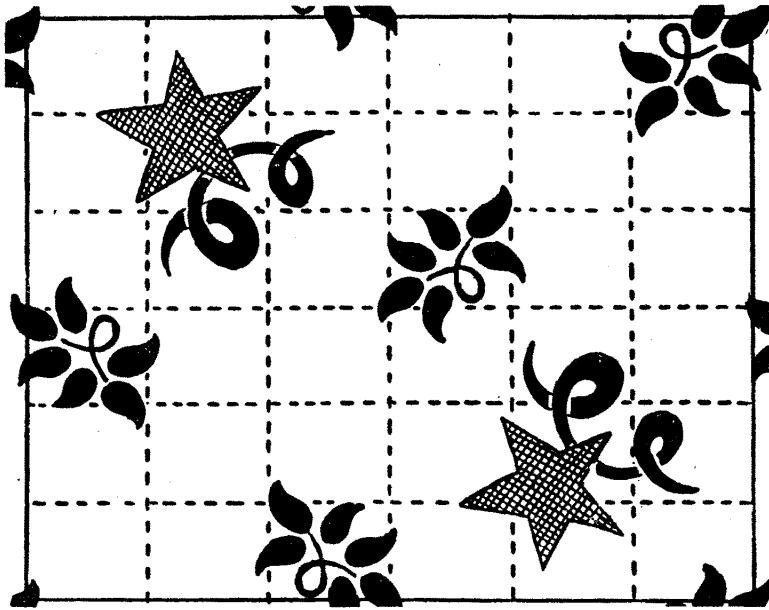


Fig. 380.

order are illustrated in Figs. 377 to 381. In this case the positions of the figures are found by dividing the repeat both ways into six equal parts and marking the spaces

in the order of the 6-sateen weave. The masses group in threes both upward and outward, and to secure even distribution it is necessary to place each mass as centrally as possible upon its space.

On account of its symmetrical form the figure in Fig. 377 is placed the same in each position. Inclined figures, however, afford considerable scope for producing diversity of effect, as a variation in the method of reversing causes a change in the relation of the masses to each other. This is illustrated by the designs shown in Figs. 378 and 379, while many other arrangements can be made.

The design given in Fig. 380 shows how the 6-sateen order naturally permits

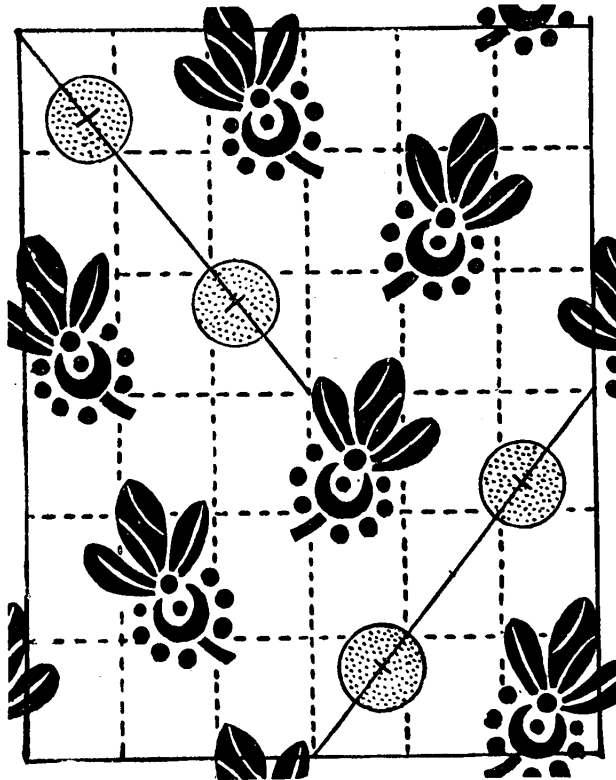


Fig. 381.

two different forms to be introduced, one of which occupies the central position of each group of three figures. It will be noted in the example that the central figures are distributed in the drop-reverse order, and form the main features of the design; while the remaining figures are subsidiary, but in such positions that they overlap and give perfect distribution.

The design given in Fig. 381 shows how variety of effect may be produced by combining a 4-sateen order with the 6-sateen. The figure in the latter order is turned in two directions, and forms the main feature of the design; while that in the 4-sateen order is made subsidiary and quite distinct in character, in order that the contrast will be effective. The centres of the secondary figures can be conveniently

found by drawing two lines diagonally from corner to corner through three spaces, as shown, and marking off from the extremities a fourth of the length of each line.

It will be noted in each design given in Figs. 378 to 381 that instead of the first figure being placed on the first space it is placed on the sixth, the order of arrangement thus being changed from 1, 3, 5, 2, 6, 4, to 6, 2, 4, 1, 5, 3. This enables the grouping of the figures to be more readily seen, but the chief advantage is that the figures are

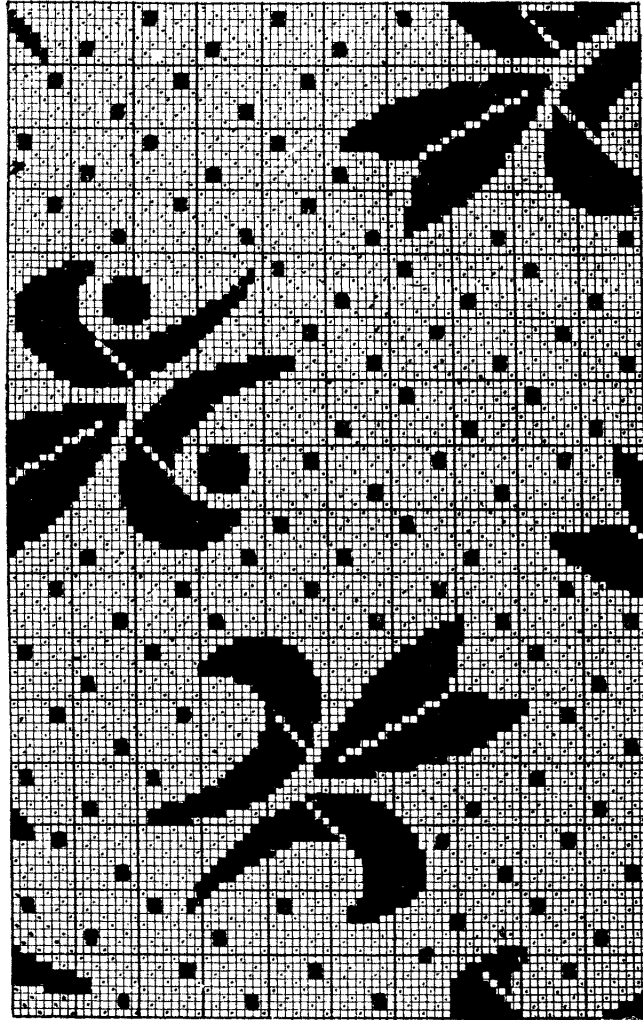


Fig. 382.

in such positions in relation to the boundary lines of the repeat that the design can be readily made with the lower half exactly like the upper half turned over. An examination will show that Figs. 379, 380, and 381 are thus arranged, and the feature may be made use of to simplify the construction of the point-paper plan, in the same manner as in drafting a drop-reverse arrangement. Thus, Fig. 382 shows the half-repeat of Fig. 379 drafted upon 128 ends and 80 picks, and so far as regards

the figure the marks from left to right in this half correspond with those from right to left in the second half. With ground weaves that will reverse the arrangement

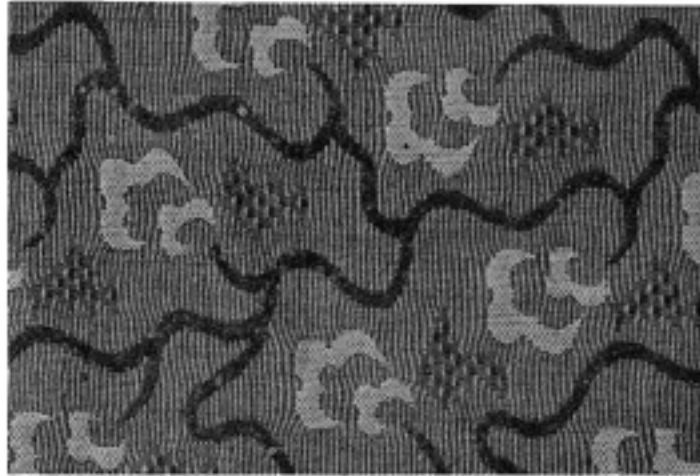


Fig. 383.

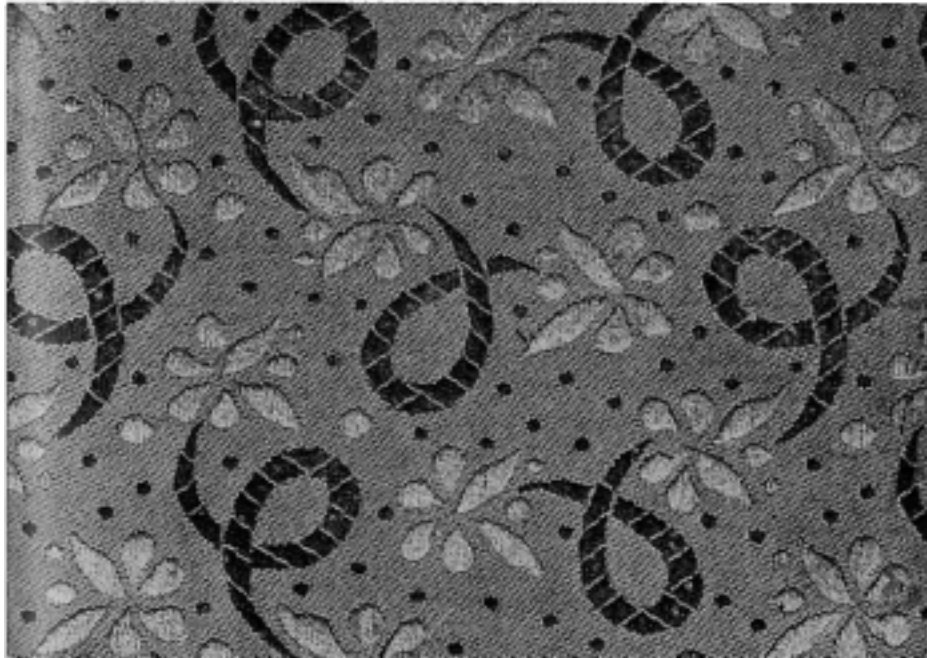


Fig. 384.

enables all the cards to be cut from the half-repeat, but the ground weave shown in Fig. 382 requires the full design to be made.

Two methods of giving additional interest to designs in which the 6-sateen is used as the basis of distribution, are illustrated in Figs. 383 and 384. In the former

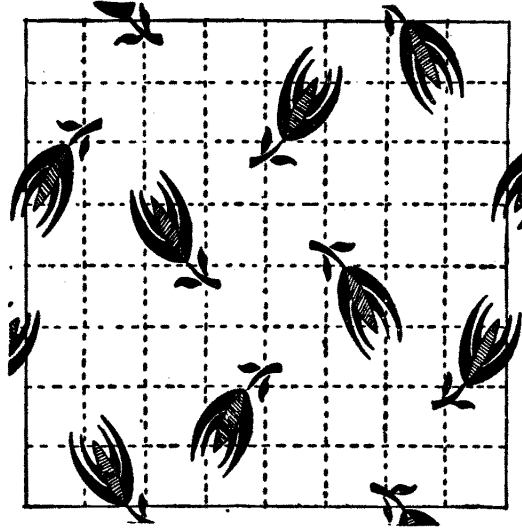


Fig. 385.

Irregular Eight-Sateen Arrangements.—Standard irregular 8-sateen arrangements are shown in Figs. 385 and 386; the object in the former being placed on

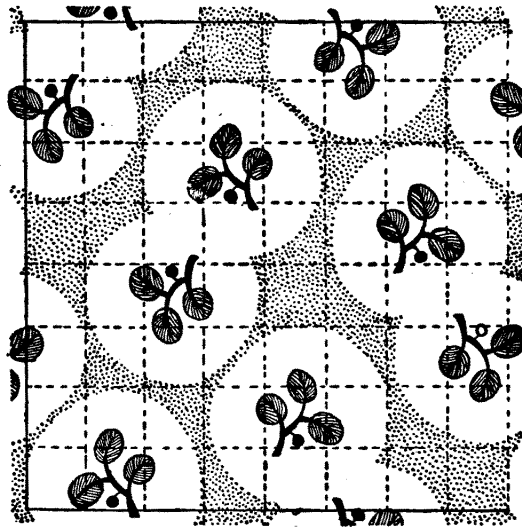


Fig. 386.

In Fig. 386, on the other hand, the figures group in pairs vertically, and the greatest distance between them is in a horizontal direction, hence this arrangement is more suitable for flat figures.

the sateen figure is turned in two directions, while the space between the figures is filled in with a trail effect arranged on the drop-reverse principle. The lower half of the design is exactly like the upper half turned over from side to side. In Fig. 384 the sateen figure is turned in four directions, but in this case the ground space is filled in with four additional masses, arranged in alternate order. The arrangement is such that one-half of the design is exactly like the other half turned over vertically, and the example therefore corresponds, as regards the method of drafting, with that shown in Fig. 361 (p. 310).

the spaces in the order of 2, 4, 8, 6, 3, 1, 5, 7, and in the latter in the order of 2, 5, 8, 3, 7, 4, 1, 6. The chief difference between the arrangements is in the manner in which the figures group in pairs. Even distribution of a given mass can be secured upon either basis, by suitably proportioning the length and width of the repeat, but the shape of the ornament generally decides which arrangement is the more suitable. Thus, in Fig. 385 the figures group in pairs outwardly, the greatest distance between them being in a vertical direction, so that the arrangement is suitable for figures which are longer than they are broad.

The designs given in Figs. 385 and 386 are constructed in a manner that enables them to be readily drafted upon point-paper. Thus an examination of Fig. 385 will show that the figure is so reversed, and the boundary lines are in such positions, that the design appears the same whether viewed from the top or the bottom. Therefore if the ground weave is suitable, the design may be drafted, as illustrated by Fig. 374. In Fig. 386 the upper half of the design is exactly like the lower half turned over, and the design can therefore be drafted in one of the methods previously described in reference to a drop-reverse arrangement.

A representation of a fabric in which the figure is arranged upon the same basis as Fig. 386, is given in Fig. 387, but in this case a different shape of figure is used in each position, so that no simplification of the point-paper work is possible.

Fig. 299 (p. 265) illustrates a third grouping of the figures in the 8-sateen irregular order, which can be used



Fig. 387.

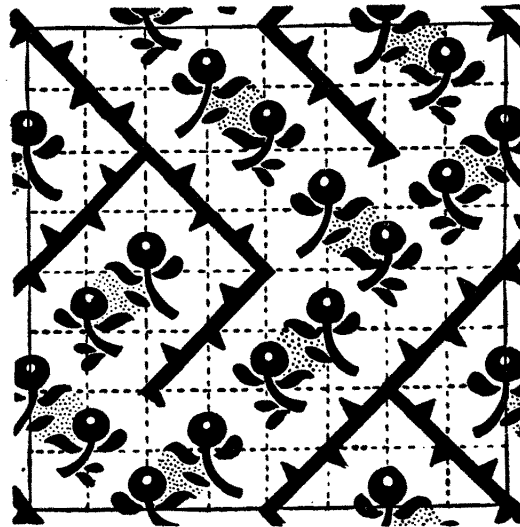


Fig. 388.

to yield good results. The flowers which form the masses are placed in the order of 3, 1, 5, 2, 6, 8, 4, 7, and small buds are inserted to fill up the ground spaces.

The design given in Fig. 388 is arranged upon the same basis as Fig. 299, but in this case each unit is formed of two figures, which are reversed in such a manner that they fall into straight lines. The example illustrates that the basis readily lends itself to the production of a design of a geometrical character, which is arranged on the drop-reverse principle. Figs. 299 and 388 show, by comparison, how widely different styles can be constructed in the same basis of arrangement, the ornament in the former being as free as in the latter it is stiff.

CHAPTER XX

CONSTRUCTION OF DESIGNS FROM INCOMPLETE REPEATS

Completion of Repeats by Sketching and by Drafting upon Design Paper

FREQUENTLY designs have to be reproduced from small cuttings of cloth which show only a portion of the complete repeat of the figure. This is due, in many cases, to the original sample having been cut by the merchant into several pieces to enable quotations to be obtained simultaneously from different manufacturers. In some instances, it is only necessary for the ornament which is introduced to complete the design to be in keeping with the given portion of figure. In other cases, however, and particularly in cloths for Eastern markets, it is very necessary that as little deviation as possible be made from



Fig. 389.

the original design. Good judgment, combined with an intimate knowledge of the various bases upon which designs are constructed, and of what constitutes a well-balanced design, will generally enable an accurate copy of the original figure to be obtained in an expeditious manner.

If the repeat in width is incomplete, an endeavour should be made in filling in the missing portion, to adapt the figure to the size of repeat which can be obtained in the jacquard for which the design is intended. The missing portion of figure may be added, either by making a complete sketch of the design, or by working directly on the point paper from the sample; and the method of drafting the figure will vary according to the basis upon which it is judged that the design has been constructed.

Assuming that the figure is required to be reproduced from the small sample of cloth represented in Fig. 389, a sketch of the complete design may be constructed, as shown in Fig. 390. In this method an accurate copy of the outline of the given portion of figure is first made, either by tracing or by pricking round the edges, and a horizontal line is drawn parallel with the weft threads. In Fig. 390 the solid

black figure corresponds with the portion shown in Fig. 389, while the line A B indicates the direction of the weft threads in relation to the figure. From an examination of the given portions of the design it will be seen that the parts at C and D in Fig. 390 are the same but turned in opposite directions from which it may be judged that the design is based on the drop-reverse principle. The length of the half-repeat of the design is therefore equal to the distance in a vertical plane between similar parts of the figure, and the two half-repeats are indicated, as shown by the dotted horizontal lines. A tracing of the given figure is turned over and placed half the repeat upward, with the horizontal lines and duplicate parts of the figure coinciding, and a copy is made in the reversed position, as shown by the shaded portion of Fig. 390. It is convenient to draw a vertical line, as shown

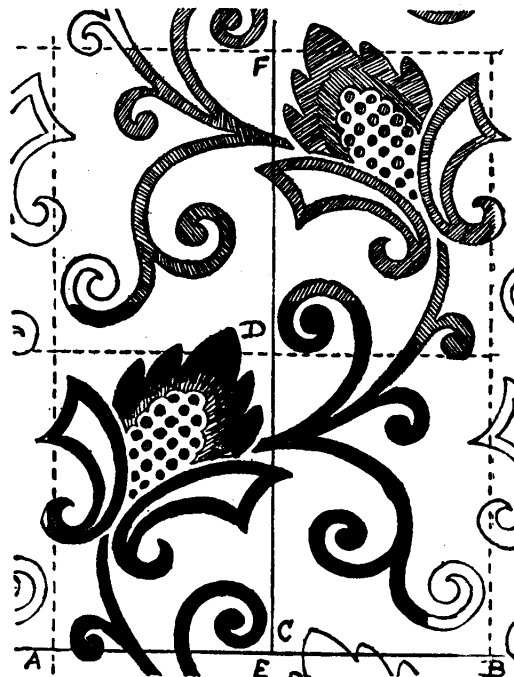


Fig. 390.

at E F, in the same relative position to the parts of the figure which are alike at C and D, as the position where the figure reverses is indicated by the line. The proper width of the repeat (shown by the dotted vertical lines) is found by moving the tracing horizontally to a position in which it is judged that the chief parts of the ornament are evenly balanced. Missing portions of the figure are then drawn in, and the parts traced at the top, bottom, and sides, as shown by the outline drawing.

The point-paper design given in Fig. 391 corresponds with the lower half of the repeat of Fig. 390, the line E F being taken as the centre of the design, so that the upper half is exactly the same as the lower half turned over (see Fig. 350).

The point-paper design of Fig. 389 could be constructed directly from the sample

of cloth with the aid of a thread arrangement (see Fig. 271, p. 243), in which case the cloth would be conveniently placed with one of the threads occupying the same relative position to the figure as the line E F in Fig. 390. Careful examination of the pattern under the threads would enable a suitable width of the complete repeat to be estimated, as by counting the spaces, the position of any part of the figure, when reversed, can be found. The given portion of figure would be drafted



Fig. 391.

to the proper scale, and copied half the repeat upward in the reversed position and then missing parts would be added to the design where required.

The portion of the design given in Fig. 392, and the corresponding drawing shown in solid black in Fig. 393, scarcely give any indication of the basis upon which the figure has originally been arranged. For convenience, however, it can be

assumed that the portion of figure, shown at G in Fig. 393, corresponds with that indicated at H when turned over from top to bottom. The distance in a horizontal plane from G to H is then equal to half the width of the repeat, so that the construction of the complete design is similar to the example illustrated in Fig. 359 (p. 308). The two halves of the repeat are indicated, as represented by the vertical



Fig. 392.

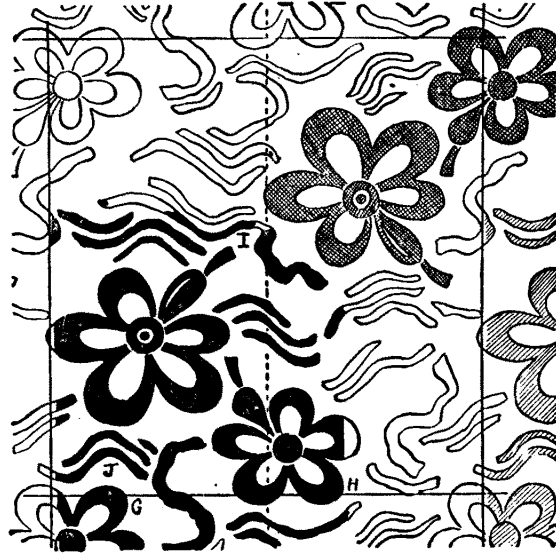


Fig. 393.

lines in Fig. 393, and by means of tracing paper the given portion of figure is copied the width of the repeat distant, as shown by the lightly-shaded figure on the right.

Taking the two floral shapes to be the main feature of the design, the tracing is turned over from top to bottom, and placed with the vertical lines corresponding,

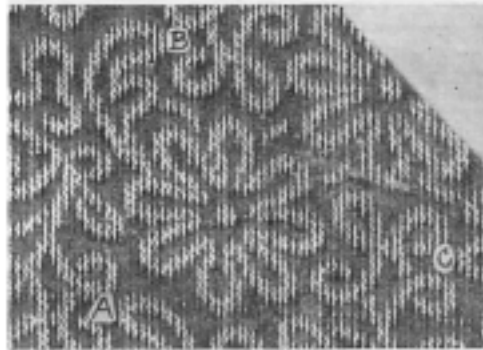


Fig. 394

one half the repeat to the right from the first figure. It is then moved in a vertical direction until it is judged that there is about the same space between the main figures at I as at J, and a tracing is made as shown by the darker shaded figure. The repeat of the design in length is thus indicated, and portions of the main

figure are traced at the top and sides, and the missing parts are drawn in, as shown by the figure in outline. The ornament which is introduced to fill up the ground space, can either be made to reverse from top to bottom in the same manner as the main feature, or it can be filled in on the all-over principle, as in the example.

In most cases the readiest method of drafting an incomplete design is to draw the outline of the given portion of figure to scale directly from the cloth on to the point-paper, some form of thread arrangement being used for squaring out the pattern. It is also convenient, although not so expeditious, to sketch the given portion of figure, and divide it into spaces by ruling lines. It is not, as a rule, necessary for time to be occupied in making a complete sketch of the design, as the figure can be completed on the point-paper after the given portion has been drawn and painted in. This is illustrated by the example shown in Figs. 394, 395, and 396. An analysis of the pattern given in Fig. 394, and the corresponding sketch shown in the lower portion of Fig. 395, will show that the same shape of figure occurs at the positions

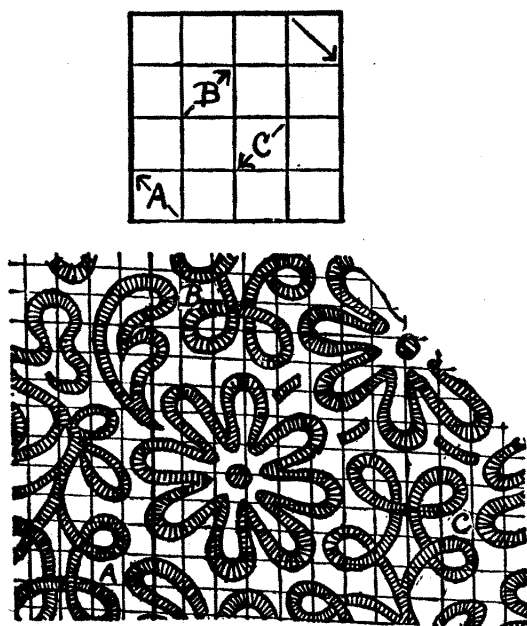


Fig. 395.

lettered A, B, and C. Taking A as the starting-point, at B the figure is turned over from side to side, and at C from top to bottom. The distance between two horizontal lines which pass through corresponding parts of the design at A and B thus gives half the repeat in length, and similarly the distance between two vertical lines which pass through corresponding parts at A and C gives half the repeat in width. The basis on which the design has been constructed is therefore the 4-sateen, the unit being placed and reversed as shown in the upper portion of Fig. 395. The sketch in the lower portion is shown squared out in preparation for drawing the figure to scale on point-paper, the half repeat in width (from A to C) being divided into 11 parts, and in length (from A to B) into 10 parts. The complete point-paper

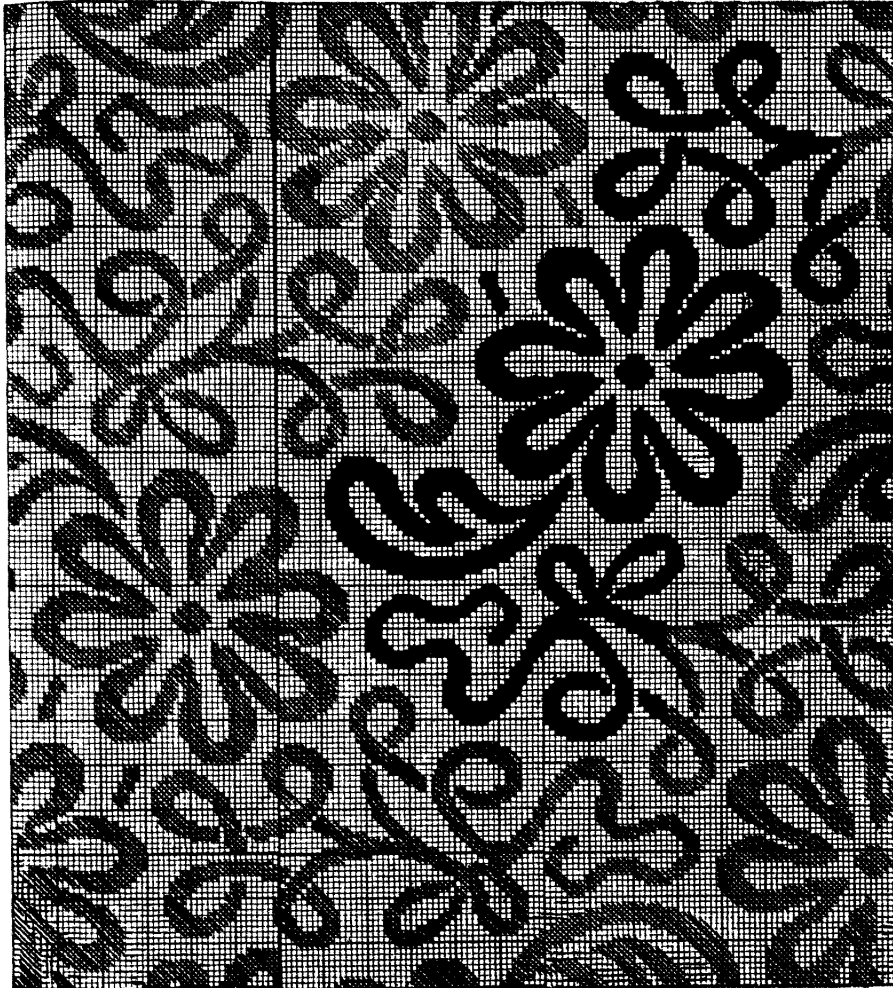


Fig. 300.



Fig. 397.

plan is shown in Fig. 396, each division of the sketch being taken to represent eight ends and picks, so that the full design repeats upon 176 ends and 160 picks. In drafting the figure on the point-paper it is first necessary to indicate the unit of the design, as shown by the portion filled in solid in Fig. 396. The unit is then repeated three times, as shown by the shaded figure, either by copying square by square, or by the aid of tracing paper, the required positions being readily obtained by comparing with the pattern, and by noting that corresponding parts are half the repeat distance from each other in width or in length. A further point to note is that one vertical line (the fifth), in Fig. 395, cuts similar parts of the figure in the same relative position, and is taken as the centre of the point-paper plan. The second half of Fig. 396, when turned over, is therefore exactly like the first half, as in the case of a drop-reverse design.

When the given figure of an incomplete design is somewhat massive, and there is no indication of the basis of construction, as in the example shown in Fig. 398,



Fig. 398.



Fig. 399.

a convenient method of procedure consists of arranging the mass on the drop-reverse principle. The given portion of figure is thus made full use of by being included twice in the repeat, and the style of the design is retained, while the minimum of space has to be filled in with missing figure. The method illustrated by Fig. 398, and the corresponding complete design given in Fig. 397, is based upon the system (described in reference to Fig. 353), in which the two halves of a drop-reverse design are drawn at the same time by using two sheets of point-paper, one of which is turned over and placed directly below the other sheet, with a sheet of carbonised paper underneath. The width of repeat that is most suitable for the design is estimated, and the given figure is drafted to scale accordingly. Before separating the sheets of point-paper an endeavour is made to join up the figure at the sides. Then the two sheets are put together and adjusted so as to get a suitable length of repeat and even balance of the figure; and, if necessary, a portion of the upper sheet is transferred from one side to the other. Thus, in Fig. 397, the solid marks in both halves

show the portion of figure obtained from the pattern in Fig. 398 at the first drawing, and the shaded marks the portion added, while in order to make the design fit correctly eight threads require to be transferred from the right side to the left of the upper half.

Figs. 399 and 400 show another convenient method of constructing the complete point-paper design from a small cutting, which, however, can only be used when



Fig. 400.

the given figure is evenly balanced. The point-paper draft, shown in Fig. 400, is made upon a comparatively small number of threads, and is therefore different in several respects from the figure represented in Fig. 399. Only one half of the complete design is given in Fig. 400, but the main feature is so arranged on the point-paper and the additional details are drawn in in such a manner that the second half

of the design is exactly like the first half turned round 180° . The first to the last pick in the first half taken from left to right, correspond with the last to the first pick in the second half, taken from right to left, the lower portion of the first figure thus forming the upper portion of the second figure, and *vice versa*. The main feature of the design is arranged in alternate order, but as turning the figure round 180° does not alter the angle at which it is inclined, the method is not suitable for inclined figures.

CHAPTER XXI

FIGURING WITH SPECIAL MATERIALS

Imitation Extra Weft Figures—Imitation Extra Warp Figures—Figured Warp-Rib Fabrics—Rib Designs produced in Two Colours of Warp—Methods of Ornamenting Warp-Rib Structures.

By careful and judicious arrangement special materials can be employed in such a manner in developing a design as to give the impression that extra threads are included in the cloth. The special figuring threads may be introduced, either in the weft or the warp, the latter method being usually the more convenient. In intermittent figured fabrics bright lustrous threads, either warp or weft, may be inserted

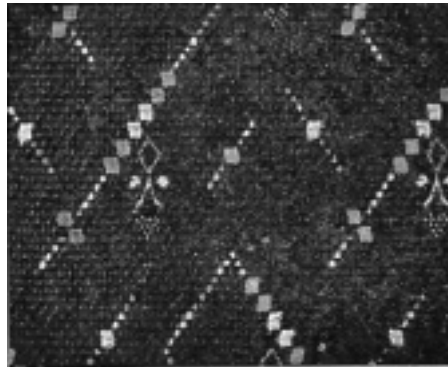


Fig. 401.

where the figure is formed, and an ordinary class of yarn in the spaces between, both classes of threads being interwoven in the same manner in the ground portions of the cloth. Under certain conditions the difference between the yarns is scarcely observable in the ground, and a bright lustrous figure is produced with a minimum use of the more expensive yarn.

Imitation Extra Weft Figures.—The fabric represented in Fig. 401, and the corresponding sectional plan given in Fig. 402, show how an ordinary fabric may be made to appear as if figured with extra weft. The figure and the order of wetting are arranged to coincide, and in the example the picks are inserted in the order of 16 dark and 16 light, to correspond with the arrangement of the figure, which in Fig. 402 is indicated in the same order by different marks. In order to produce the imitation extra weft effect, it is necessary for the ground of the cloth to be warp surface, in strong colour contrast with both wefts, and very finely set ;

as for example, for the 8-thread sateen ground weave—160 ends per inch of 2/80's cotton. Except for a slight shadiness, the weft intersections in the ground are concealed by the fine setting of the warp, and the figure is developed in two distinct colours on what is practically a solid-coloured ground.

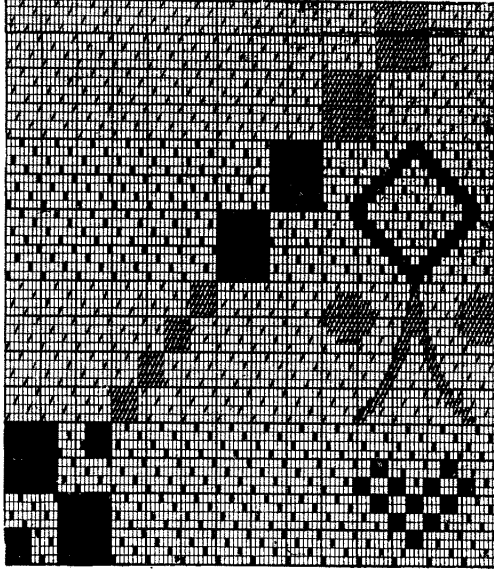


Fig. 402.

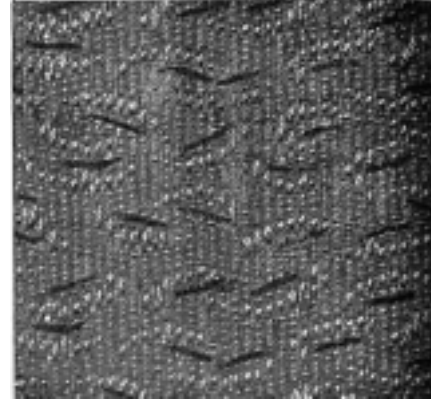


Fig. 403.

Imitation Extra Warp Figures.—The foregoing principle can be employed in producing an imitation extra warp effect by colouring the ends in sections to correspond with the form of the design. Fig. 402, turned one-quarter round, is illustrative of the method, the marks being taken to indicate warp so that a warp figure in different colours will be formed upon a weft-face ground.

Another method of figuring with special warp threads is illustrated in Fig. 403, and the corresponding design given in Fig. 404, in which the marks indicate warp. The arrangement in the warp is 2 ground threads of 2/60's cotton to 1 figuring thread of 2/10's mercerised cotton, or 2/15's worsted, 48 threads per inch;

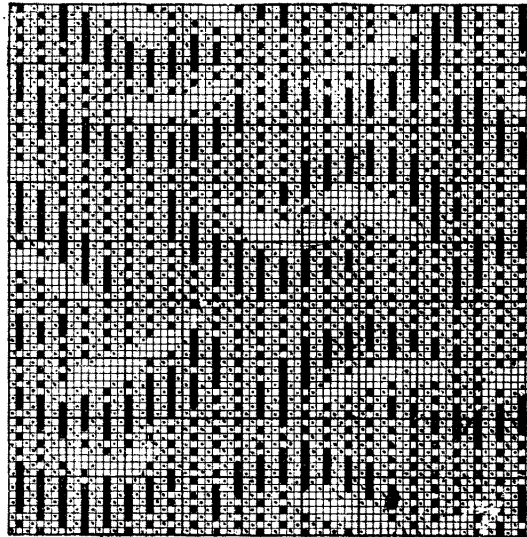


Fig. 404.

while the weft is 20's cotton in the same colour as the ground warp, 56 picks per inch. The cloth is chiefly ornamented by floating the thick warp threads, as

indicated by the solid marks in Fig. 404, but weft figure is also formed, as shown by the blank spaces in the design. Similar styles are woven in which the warp threads are arranged in the proportion of 3 ground to 1 figuring, or 4 ground to 1 figuring, etc., the decrease in the proportion of the figuring threads being usually compensated for by an increase in their thickness.

Figured Warp-Rib Fabrics.—As previously explained in reference to Figs. 94 and 95 (p. 87), a typical warp-rib structure is composed in warp and weft of a fine thread alternating with one thick thread, or two or more threads working together as one, while with the weft all the same thickness a good warp rib results so long as the ends are properly balanced. In figured warp ribs the ends which form the rib are generally composed of a lustrous material, and they are floated on the surface in the manner illustrated by the fabric represented in Fig. 405. The following are suitable weaving particulars:—

Warp, 2 figuring ends (in one mail) of 2/40's mercerised cotton, 1 binding end of 2/60's cotton, 40 double-figuring ends, and 40 binding ends per inch.

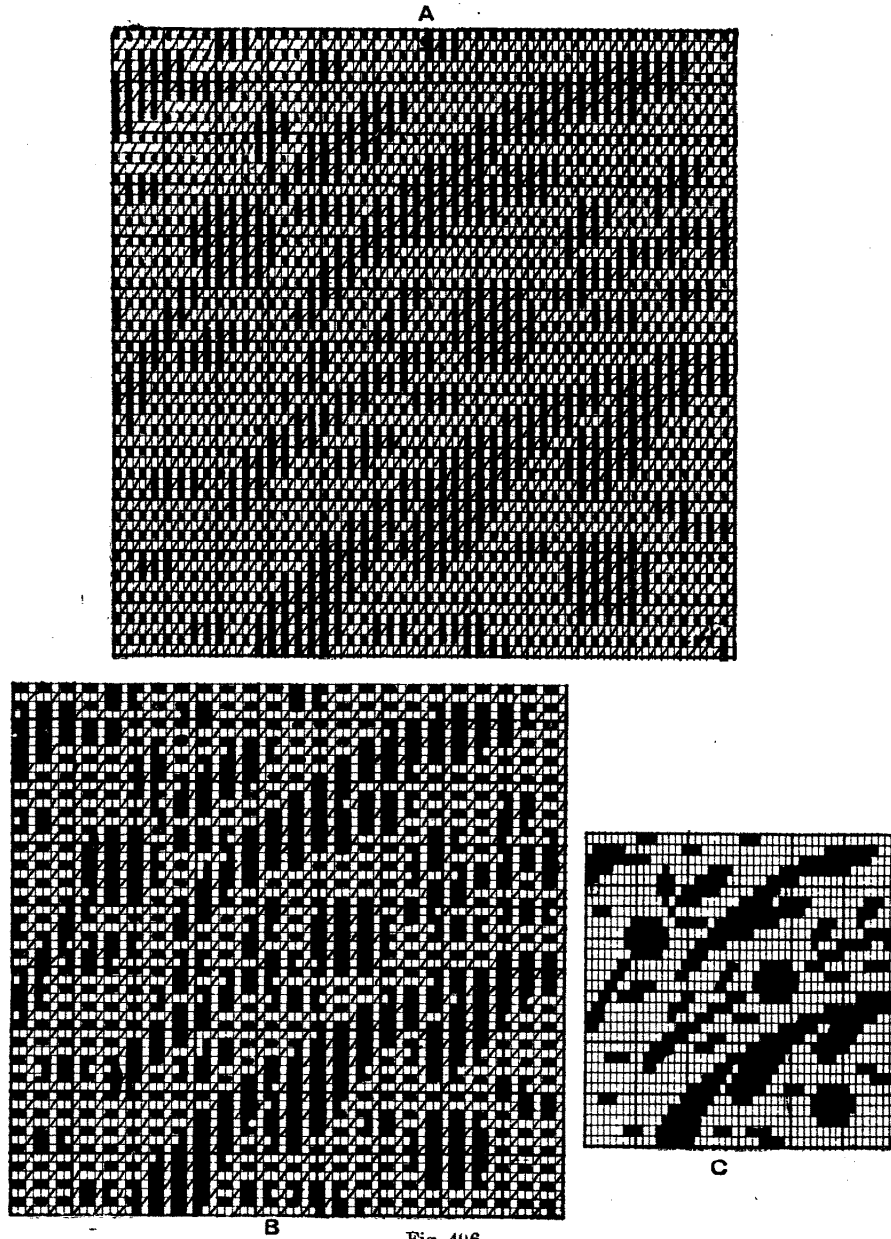


Fig. 405.

Weft, 36's worsted or 24's cotton in the same colour as the binding ends, 54 picks per inch.

A in Fig. 406 shows the complete weave of a portion of the design represented in Fig. 405, the solid marks indicating the lifts of the double figuring ends, and the diagonal marks those of the binding ends. The ground of the cloth is plain weave, and the figuring warp floats are arranged to fit with the plain, which, as shown in Fig. 405, causes the figure to appear very prominently, but with a stepped outline. It will be seen in A, Fig. 406, that all the figuring ends are raised on the even picks; the binding ends are raised on the odd picks in the ground, but where the figure is formed they are lifted in alternate order. The odd binding ends, however, work alike in plain order throughout the design, and they, therefore, may be drawn upon a heald placed in front of, or behind the harness, and be operated independently. This arrangement enables the figuring capacity of a jacquard to be increased by one-third, as compared with a full-harness mount—that is, 80 harness cords per inch are required in a full-harness mount to suit the foregoing particulars of the cloth; whereas in a heald-and-harness arrangement only 60 harness cords per inch are

necessary. In the latter method the design is indicated, as shown at B in Fig. 406, 8×7 design paper being used to correspond with the 8×5 paper given at A.



In another method of producing the figured warp-rib structure, all the binding ends are drawn through a heald, the capacity of the jacquard thus being doubled.

On the even picks all the harness is raised, and on the odd picks the heald and as many harness cords as are required to form the figure. The chief dis-

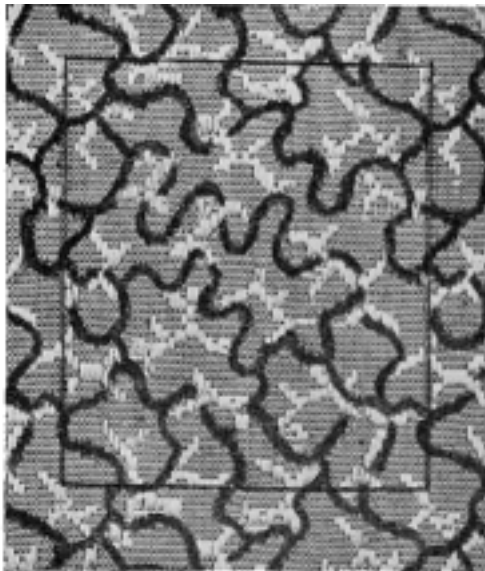


Fig. 407.

advantage of the method is that on the picks on which the heald lifts long floats of

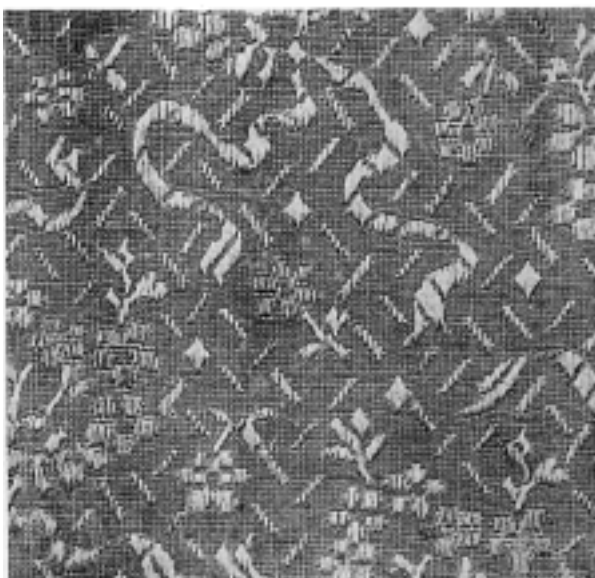


Fig. 408.

weft are liable to be formed on the under side of the figure; but, on the other hand, small jacquards can be adapted to produce large repeats, while the construction of

the point-paper design is very much simplified. Thus, the design to correspond with A in Fig. 406 will be constructed, as shown at C, in which the lifts of the figuring threads on the odd picks only are indicated, the ground ends being raised by the heald. In cutting the cards the marks of C are cut on the odd cards, while the even cards are fully perforated, if the cloth is woven right side up. The harness lifts are made much easier by weaving the cloth wrong side up.

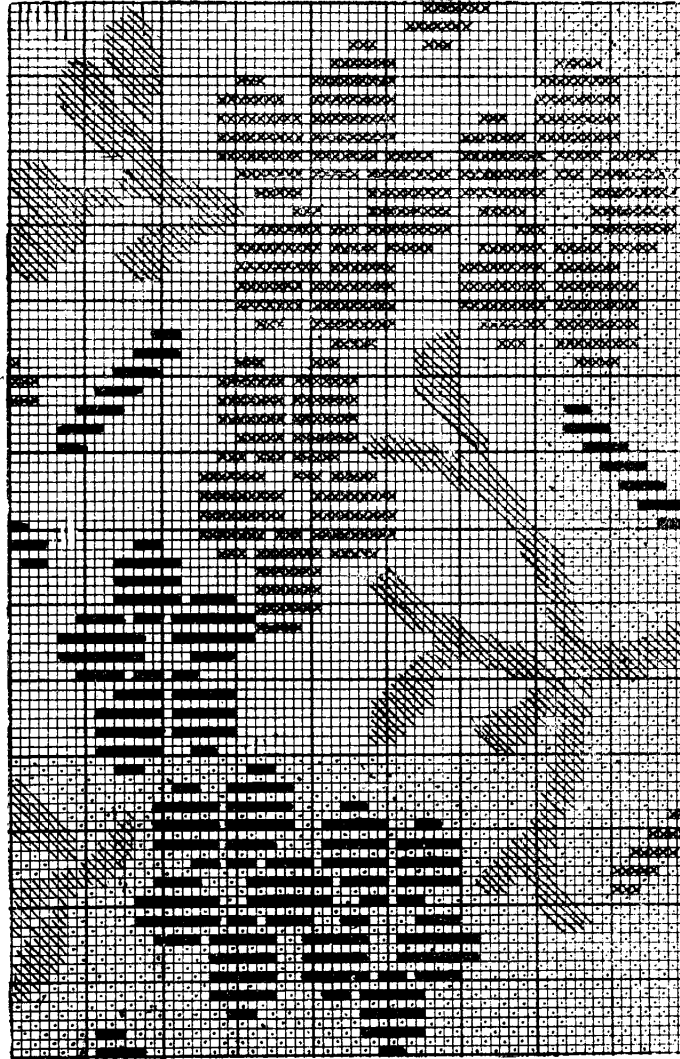


Fig. 409.

The combination of weft figure with a warp-rib figure is illustrated by the fabric represented in Fig. 407. The inclusion of the weft figure makes it necessary for all the ends to be operated by the harness, and the design is constructed in the method shown at A in Fig. 406, except that the weft effect is indicated in a different colour in order that it may be cut opposite to the warp figure.

Rib Designs produced in two Colours of Warp.—The fabric represented in Fig. 408 illustrates a class of figured warp rib which is different in structure from the



Fig. 410.

foregoing. In this case all the ends are similar except as regards colour, the

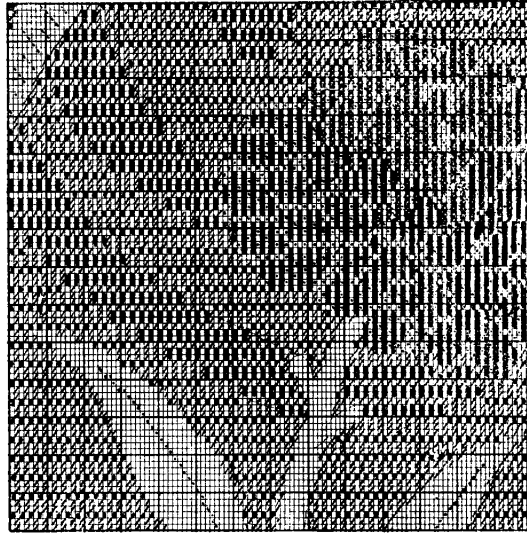


Fig. 411.

arrangement being an end of pink and light green alternately. In the ground differently coloured horizontal rib lines are formed, and both colours are employed

in producing the figure. A section of the design on point-paper is given in Fig. 409, the full squares representing the figure produced by the pink warp, and the crosses that formed by the light green warp; while the shaded squares show how a subsidiary effect is obtained by floating both colours of warp together, the intermingling of the colours giving a grey appearance to this portion of figure. Since both colours of warp are used separately for figuring, the warp threads should be finely set, and equally lustrous. The weft requires to be even and smooth, and of a neutral shade, while fewer picks per inch than ends may be inserted—as, for example, for plain



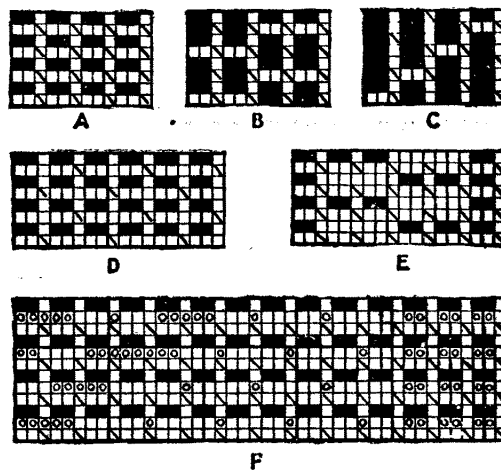
Fig. 412.

ground weave, 60 picks per inch of 30's ordinary cotton, and 80 ends per inch of 2/40's mercerised cotton.

In the fabric represented in Fig. 410, the warp threads are arranged alternately in two colours, as in the preceding illustration, but in this example a portion of the figure is formed by the weft, the colour of which is in contrast with the warp colours. Thus, as is shown in the corresponding point-paper section given in Fig. 411, the flower is formed by floating the odd ends in one section, as indicated by the full squares, and the even ends in the other section, as represented by the crosses, while the weft forms the leaves and stems, as shown by the blank squares. The example is also illustrative of a very good method of giving interest to a style by the modifi-

cation of the ground weave. It will be noted that the ground weave is 2-and-1 warp rib, the greater portion being formed by the even ends predominating on the surface, but a trail pattern is introduced in which the odd ends predominate;

Methods of Ornamenting Warp-Rib Structures.—In order to further illustrate the diversity of effect that can be produced in the rib structures, a fabric is represented in Fig. 412, which shows a method of figuring by means of bright silk weft. Also a number of rib weaves are shown separately in Fig. 413, two or more of which can be used in combination. It is assumed that in the plans two figuring ends alternate with a fine binding end, and a fine pick with a thick pick, the figuring ends in the ground passing under the former and over the latter, as shown at A. In some cases the rib ground is given a very rich appearance by employing brightly-coloured silk weft for the fine binding picks. Where the silk weft floats over the



F
Fig. 413.

double-figuring ends, it shows as a fine line of bright colour between the ribs formed by the warp.

B in Fig. 413 shows the weave that is used in the ground of Fig. 412, and this and other variations of the rib-structure can be employed along with, or instead of, the ordinary plain rib. C illustrates the usual method of figuring with the rib ends; each float should be arranged to commence and terminate with a thick pick.

The plan D shows how brightly-coloured binding picks can be floated on the surface so as to diversify the form of a design; while, as represented at E, the thick picks can be similarly floated. The plan F illustrates the introduction, between the fine binding and the rib picks, of special figuring picks, the floats of which are represented by the circles. These special picks, which are really extra, can be used to spot the rib ground, as shown on the right of F, and to form a weft figure, as indicated on the left, both of which systems of interweaving are represented in Fig. 412. All the ends are lifted on the extra picks, except where the circles are indicated in F, Fig. 413, and the centre portion of the plan shows how the picks are bound in on the underside of the cloth.

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