

DECORATIVE AND FANCY  
TEXTILE FABRICS

WITH DESIGNS AND ILLUSTRATIONS

BY  
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## CHAPTER I.

### A FEW HINTS ON DESIGNING ORNAMENTAL TEXTILE FABRICS.

IT is a matter of surprise that there are hundreds of designers whose work lies entirely in the construction of patterns for certain classes of woollen, worsted, cotton, linen, silk and other materials, who, when asked to depart from their regular routine and launch forth into ornamental designing, of however simple a character, are entirely at a loss how to proceed. This has been forcibly brought before our notice time after time by manufacturers, who, desiring to introduce innovations into their trade, have applied to us for ornamental designs, that their own designers might work out on point paper ready for weaving. The designers at such establishments had not, previously, been required to extend beyond a few shafts in the composition of patterns, because the cloths made were mostly of a stereotyped class, *viz.*: corkscrews, diagonals, checks and similar effects, and, as every one knows, the scope is limited and the requirements of the fabrics such that ornamental designs are not desirable, but in many cases positively objectionable. Therefore designers of these materials have prosecuted their studies so far and no further, and, having perfected themselves in one particular line, have had no thought for the future.

#### FREEHAND DRAWING NECESSARY.

Changes often occur which have the effect of inducing producers of fabrics to enter into styles of manufacture new to

them, in order to keep trade together. Thus, an employer, who for a generation has been engaged entirely in the production of gentlemen's cloths, may suddenly decide to cater for the ladies or for other branches, where ornamental patterns are required. The designer finds himself nonplussed, because, being wanting in the knowledge required for constructing an ornamental pattern, he may also be entirely deficient in the first requirement, namely drawing. This seems somewhat incredible, but we have personally met with designers who were unable to draw a simple scroll or flower. In such a case, what results? The manufacturer must either procure



FIG. 1.

outside aid or look out for another man whose abilities lie in the direction specified. It is therefore necessary that every designer, no matter in what particular line he may be, should be proficient in the first of all requirements, *viz.* drawing. When this has been attained, practice in the technical details of ornamental pattern construction is required, and much may be done in one's spare time.

Professors at technical schools will bear out the statement that the student who comes out at the head of his fellows at the end of each session is the one who has given attention to ornamental designing, providing, of course, that his other knowledge is up to the requisite standard.

## SUGGESTIONS FOR DESIGNS.

There are many experienced designers who possess abundant stores of material—illustrated art works, scraps of fabrics, wall papers, Christmas cards, and such like helps of artistic merit which have been gathered together at various times. These are intended to assist the imagination, the fertility of which is often a matter of surprise to the outsider. There



FIG. 2.

is no doubt such things are a great help to some designers. There are others who look to nature for much of their "material" in forming patterns, whose spare time is spent in the fields, the woods, or in gardens—studying trees, flowers, foliage, birds, insect life, light and shade, etc., etc., and who seldom or never depend on artificial aids in their work. Then again, others utilise art and nature—sometimes one, sometimes another, and sometimes a combination of the two aids.

There are others who refer to nothing visible, but will commence with a blank sheet of paper before them and, with great rapidity, will sketch object after object until a complete design is the result. This ability and power of imagination, however, are not attained readily, but are the result of much study, practice and natural aptitude. The "easy way" for a beginner is to look about and notice what objects surround him from which he may take a suggestion upon which to build up his design. It is remarkable how easily such suggestions occur to one. Anything of an ornamental nature,

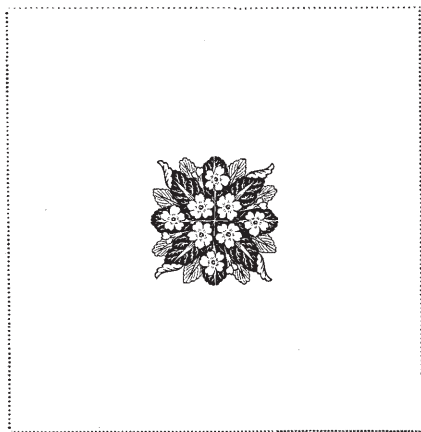


FIG. 3.

however simple, is of sufficient importance to be noticeable. As an instance, we take one's home. There are curtains, carpets, table covers, wall papers, the picture frames upon the walls, the plants or flowers in the garden, the carving upon the furniture. These are all suggestive, and from a scrap of any of them the student may find a "motif," and, when once his pattern is in progress, he will probably be surprised to see how little resemblance it possesses to that which gave him his idea. There are no end of everyday objects which will strike the observant mind as of use. The windows of shops are a fruitful source of suggestion to some



designers, whilst a mind ever on the alert will find, even in the streets, that ideas strike him as he walks along. A lady's dress or mantle, the ornamental carving upon a building, and the thousand and one things which one meets with are all sources of inspiration.

CORRECT STYLES OF ORNAMENT.

A designer will usually possess one or two good illustrated books of designs, which will serve to educate him in the

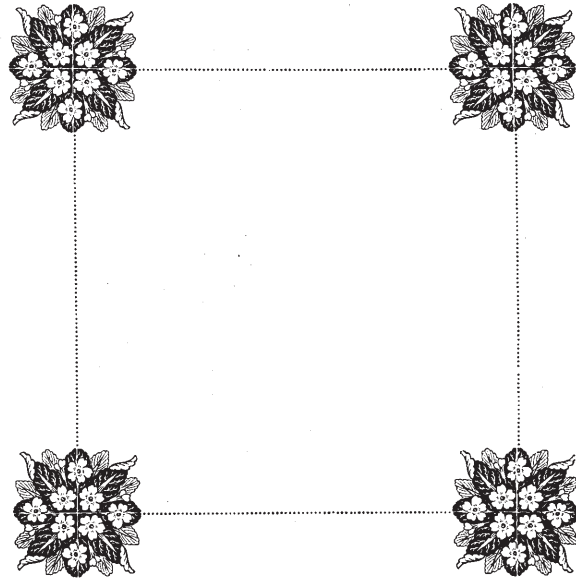


FIG. 4.

various periods or styles of ornament, as also in the correct effects of colour incidental to the respective periods or styles. In these works, the primitive, the Persian, the Indian, the Egyptian and the various other styles are profusely illustrated, and although in most branches of what we may term "commercial" designing not much attention is paid to "correct style" or "period," it is necessary for a student to be well up in such matters, as they tend to educate and enlarge the mind, and ideas occur more freely, and finally he does not

know how soon a call may be made upon him for any distinct style. There are many works published, the one known as *L'Ornement Polychrome* being amongst the most useful. This work contains an immense number of beautifully coloured designs, which will be found an education to students.

#### A SUGGESTION CARRIED OUT.

I have spoken upon the ease with which a designer may receive suggestions, and it may be interesting and instructive to give an illustration of the manner in which a simple suggestion may be carried to a complete design. Fig. 1 shows a simple spray of lilac, which we may have noticed upon a Christmas card, or as an illustration in a book, or in its natural form in the garden. To construct a design from this is an easy matter to the experienced hand, but to a young student it is not so easy. In Fig. 2 a design is constructed from the lilac. Of course, it is not necessary to hold fast to the one particular flower. It is only the "motif"—other flowers may be introduced as desired to relieve what might otherwise be a monotonous pattern. The example is given simply to illustrate how a design may be drawn from any given object. Having dealt with the suggestive aspect of designing, I will pass on to the practical construction of patterns, giving a few particulars and illustrations of the readiest methods of sketching designs.

#### AN ELEMENTARY DESIGN.

In the designing of a pattern, the first point to be taken into account is the size it must assume when woven. The design must be drawn to that particular size. Before proceeding further, I may say that those which repeat across or straight over form the simplest style of designing, and therefore samples of such are given. Take in the first place an elementary pattern, and suppose the width of the woven repeat to be two inches and the length of the repeat the same.

The boundary lines must, of course, first be drawn in pencil. These are represented by dotted lines, which form a square. In the centre of these construct the pattern as shown in Fig. 3. This will repeat upwards and onwards at intervals of two inches, and the same will be the result wherever the position of the figure is within the boundary lines. Another method is given in Fig. 4, which will show clearly the repetition of the pattern. In this case the ornament is drawn in one corner

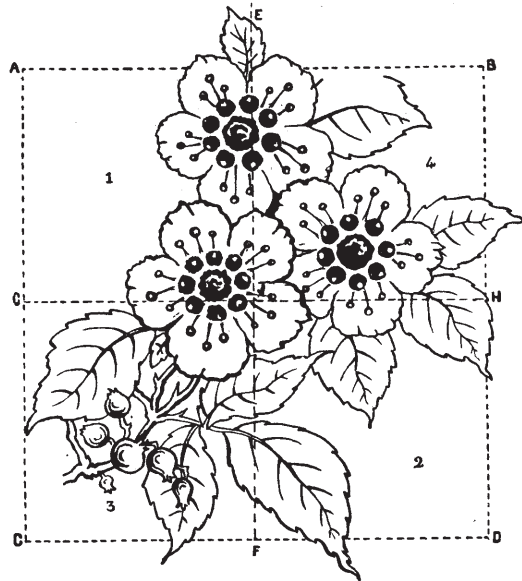


FIG. 5.

and repeated at the other three. It is not necessary to make any further remark beyond stating the fact that on the ruled or point paper a different quarter only of the ornament must appear, which will be found to join and repeat accurately when woven.

A MORE ELABORATE EXAMPLE.

Having given an elementary example, I will now come to one of a more difficult character, and here again I will take a

small repeat, simply as an illustration, as the actual size of a pattern of this character would be much larger, in order to look effective, even in fine counts of yarn. The size of a repeat depends upon the requirements of the fabric for which it is intended, and of course varies for different classes of cloths. The method is the same no matter what the size of the design may be. The boundary lines having been indicated, commence drawing the chief object—a flower or figure

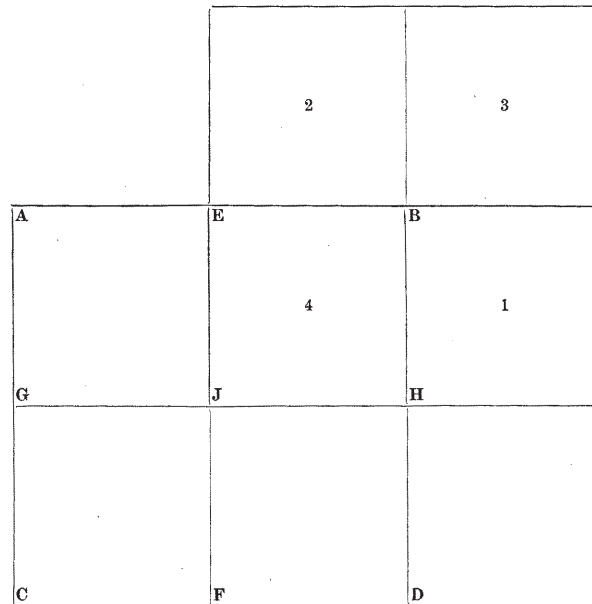


FIG. 6.

—as shown in Fig. 5. And here it is necessary to remember that the pattern must be repeated, and that as much as possible without producing a liney or stripey effect, consequent upon certain patches of the groundwork or prominent portions of the figure successively catching the eye in an upward, onward or diagonal direction. This is an error easily made, and should therefore be strictly guarded against. Having drawn a certain part of the pattern, the next step is

to place it in its proper position, in order to secure the repeat, and this, in the case of a straight-over design, requires that the ornamentation shall join at each side and at the top and bottom of the boundary lines. To accomplish this, the part already drawn must be traced. Lines E F and G H must be drawn. They will serve as dividing lines, showing the parts to be transferred to their respective positions, in order that the design may be completed.

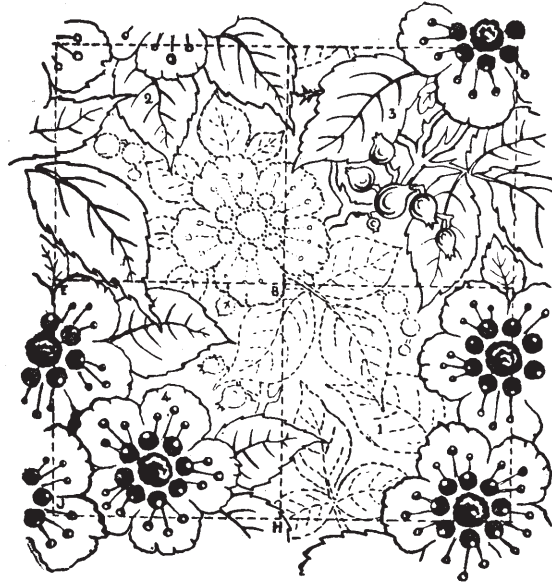


FIG. 7.

An experienced designer will do this with the least possible amount of trouble, as experience suggests, but, for the novice, it will be the easiest way to construct a square of the same dimensions as A B C D in Fig. 5, a right angle of which is already shown at E J H in the same figure. Having done this, continue the lines E B and H B as shown in Fig. 6. The portion of the pattern within the square 4 (Fig. 5) will not require transferring, but those

parts within the squares 1, 2 and 3 must be transferred to the squares marked 1, 2 and 3 in Fig. 6. By referring to Fig. 7, it will be easily seen how this may be done and with what result. It will be noticed that an irregular space remains, which requires filling. The continuation of the pattern has been made as indicated by the dotted lines in Fig. 7. Now trace the remainder in the squares 2, 3, 1, and transfer to their proper positions at 1, 2, 3 (Fig. 5), and a complete design will result, as shown in Fig. 8. It may be asked, why not complete the pattern as shown in Fig. 7?



FIG. 8.

This may, of course, be done if preferred, but in Fig. 8 the main feature is clearly shown, whilst in the preceding figure it is divided. As a working pattern sufficient is shown, but the designer may complete a square of Fig. 6, filling in his pattern, when from the larger area covered a better idea of its effect may be obtained.

All this is understood and is extremely simple to those who have any knowledge at all of designing figured effects, but there are many who have not this knowledge, and therefore these hints are given for their benefit.

## CHAPTER II.

### A FEW HINTS ON DESIGNING ORNAMENTAL TEXTILE FABRICS (*continued*).

REVERSE or turn-over designs are employed for certain classes of fabrics, the ornament of which is reversed or turned over, instead of being repeated straight across. If the student examines, say, a few pieces of silk damask, he will find this style of pattern much used, because the effect produced is that of a wider repeat than would be possible under other conditions. Of course, a particular tie-up or building of the Jacquard harness is required, but this is also the case with other designs, and the harness is good for any pattern of the same class and size as long as it bears the wear and tear. It is owing to the particular mode of tying up that the effect of a broader repeat is obtained. Supposing, by way of example, a fabric is taken the repeat of which is 12 inches. Begin by drawing the pattern in such a manner that the ornament will reverse or turn over at A B and at C D (Fig. 9), whilst it will repeat from B D to A C, as in any ordinary pattern. Thus the design has the appearance, not of a 12-inch, but of a 24-inch repeat, the harness being tied up so that a warp thread at A and E and two at C may be actuated at one and the same time respectively. By reference to the complete design shown in Fig. 10, it will be seen how the ornament reverses at A B and at C D, and also how the pattern joins or repeats from B D to A C, as explained at Fig. 9. It will, therefore, be understood that for some fabrics these patterns possess a

great advantage over the ordinary styles. Silk damask has been mentioned as a case in point, but this is only one of the many kinds of textiles in which the adoption of this mode of arranging patterns proves advantageous. Suppose a dado curtain is drawn, the border, body and dado pattern may be taken and constructed, each one on the same lines, the body and dado reversing over and over, and the border reversing once from the centre. In such a case, the ruled or point paper pattern shows only half the full design, the reverse portion of border, body and dado not being required.

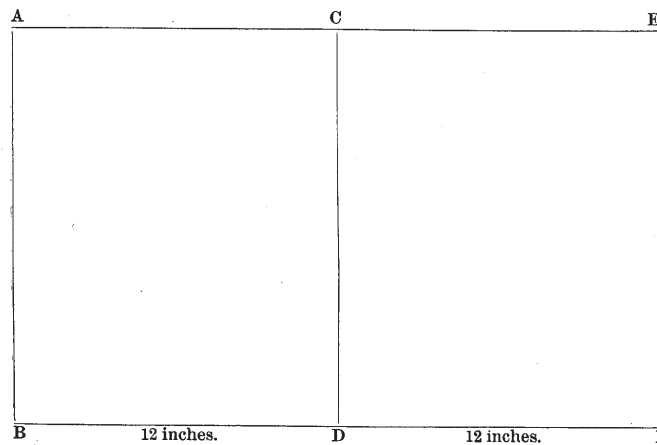


FIG. 9.

The effect produced on the curtain, as well as on all other fabrics treated in the same manner, is most satisfactory in comparison with the cost.

#### DROP PATTERNS.

The student, having mastered the few points required to be considered in the formation of patterns which repeat across or straight over, and in those which reverse or turn over, should next direct his attention to what is termed drop patterns. This class of design is much oftener used than the style first described, as the general effect gained is



more pleasing. By noticing a piece of fabric hanging upon a wall, or a cover upon a table, it will be seen that the main feature of a straight-over pattern forms the four corners of a square, but, supposing the same fabric is ornamented with a drop pattern, the main feature will form the four corners of a diamond; then by comparing the two fabrics the student cannot fail to be impressed with the fact that the



FIG. 10.

latter has much the better appearance, the square formation looking *set* and formal. Given the required width, then the length of pattern to be designed must be decided. No matter what the length may be, the principle is the same. First draw the boundary lines and divide the space into four equal portions, as shown in Fig. 11. In drawing the pattern, whatever ornament appears in section A must be transferred to that marked B, and also that within section

C must be transferred to that marked D. Thus this result is arrived at—the pattern is the same in A and B and in C and D, and, finally, the two sides and the top and bottom of the design join accurately. Fig. 12 forms a complete illustration of a drop pattern—the dropping from A to B and from C to D being clearly noticeable. The method of drawing is very simple. The student may sketch away anywhere within his boundary lines, and the result will be the same. There will be certain portions to be traced into positions as above described. In Fig. 12 the principal

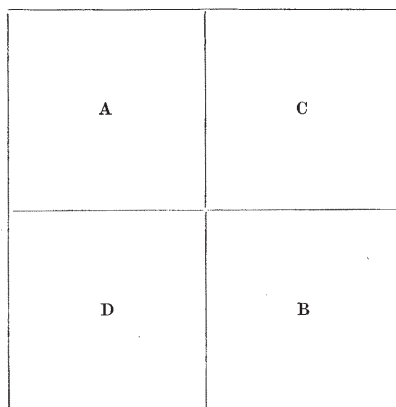


FIG. 11.

feature of the design is shown in the centre. If this is traced in the corners, there remains an irregular portion around the central feature which requires filling. The two portions of ornament within section A may now be joined by the introduction of connecting ornament. The same may be done within the section C. These last instalments must be traced in proper positions in B and D. There are now blank spaces at the terminations of the centre or dividing lines. If the pattern was cut across the centre and joined, the top to the bottom, the space which requires filling would be clearly shown. But a better method is to leave the

design intact, simply tracing sufficient of the bottom portion of the design and transferring it to the top, to show the space still to be filled. Having completed the final portion, transfer to the proper position, and the whole design results.



FIG. 12.

A FURTHER EXAMPLE OF THE DROP PATTERN.

Having already alluded to the ordinary drop pattern, illustrations are given in Figs. 13 and 14 of a method of utilising this type, which is in use for certain classes of fabrics, and particularly for carpets, cretonnes, etc. In order the more easily to describe this mode, suppose a Brussels carpet is being designed, the full width of the fabric being 27 inches. It is quite a common practice to weave a carpet, the width repeat of which is double that, or 54 inches.

Now, as ordinary Brussels carpet has one standard width, *viz.*, 27 inches, it is obvious that to obtain a pattern of 54 inches in width, two separate widths of carpet must be used. To accomplish this the drop pattern is utilised, the length of which is generally equal to its width, *i.e.*, one and a half yards, but not necessarily so. The example given in Fig. 14 would be 27 inches long, which will answer every purpose for illustrating our remarks. In Fig. 13 A A represents the full width of the fabric, and A B the length. Rule the paper with the usual boundary lines, A A, B B. Next, draw one

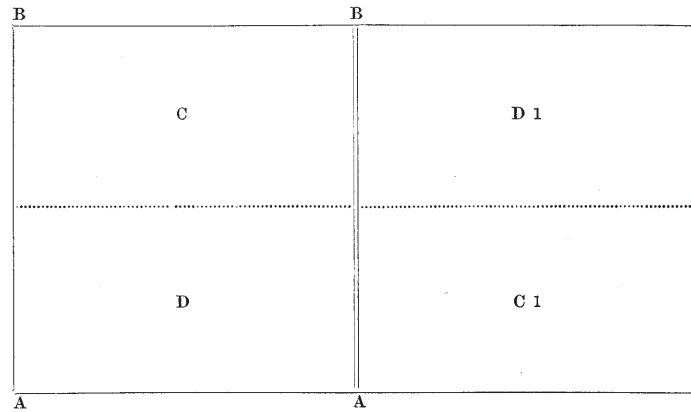


FIG. 13.

dividing line, as shown in this figure. More space will be required around the boundary lines than actually to fill, because each portion must be transferred to its proper position in order to complete the whole design. Thus it will be well to rule sections corresponding with D 1 and C 1, and sections similar to C and D 1, the base of the latter of which would be B B. In the actual drawing, the method of procedure is much the same as in the case of the drop pattern described in Figs. 11 and 12. In fact one half this pattern, taken lengthways, marked A D in Fig. 11, will furnish a full design for the purpose under notice, but the

length will be double the width, *viz.*, one and a half yards, the width being three-quarters of a yard. The student is referred to the remarks describing Fig. 11, the instructions for constructing the pattern being similar to those given there. The diagrams Figs. 13 and 14 both show how the two widths of cloth join. That portion of ornament in section C comes again in C 1, and that in D repeats in D 1. The pattern joins top and bottom, from A to B, three-quarters of

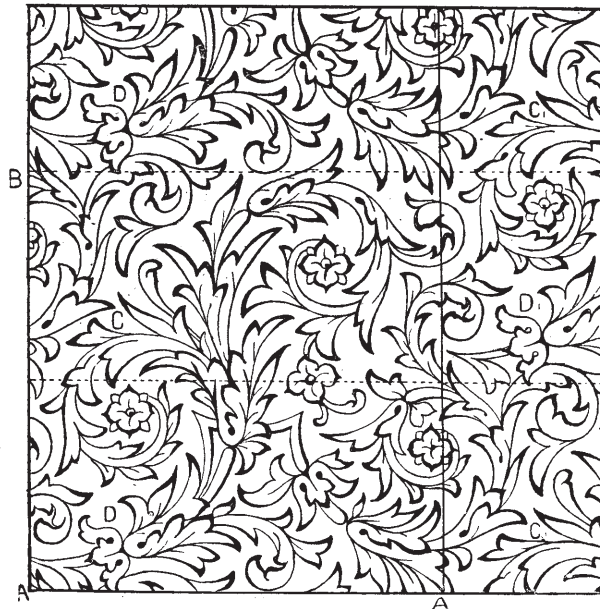


FIG. 14.

a yard, and across in one and a half yards. Thus in carpets, in plush and in cretonne goods for hangings, etc., we are enabled to obtain designs which, for general conception and boldness of treatment, would be impossible, except under more expensive conditions.

#### REVERSE DROP PATTERNS.

Reference has been made above to the method of composing drop patterns; there are, however, varieties of this class

of design, a very effective one being that in which the ornament drops and reverses at the same time. A skilful draughtsman will compose designs of this class which will somewhat bewilder the inexperienced observer, who may attempt to find the repetition of the ornament. The difference between this and the drop pattern, Fig. 12, already described, is trifling, being nothing more nor less than turning



FIG. 15.

the ornament completely round in dropping it into position. However, the student will probably find himself puzzled at times in doing this, but, after a little practice, the seeming intricacies of the style will disappear and he will have no more trouble in drawing one of these than he has in any of the other patterns. An illustration is given in Fig. 15. To briefly explain the points to be observed in drawing one of these designs, first rule the paper exactly as for the ordinary drop pattern, noted in Fig. 11; then sketch in a portion of

the ornament, as in former cases. This now requires repeating in proper position; that portion in section A will come in section B, reversed, and that in section C will come in section D, also reversed. But what about the reversing of the ornament? This is easily accomplished. Trace the portion already sketched, and rule other lines upon the tracing paper, exactly as shown in Fig. 11, that is to say, trace the objects and the lines also. If the tracing is turned over a reverse of the ornament is shown through the tracing paper. Now take this, still face downwards, and place it upon the sketch, but let the lines surrounding section A in Fig. 11 come exactly over those surrounding section B on the sketch; then, by going over the tracing with a pencil, or rubbing carefully down with a paper knife, or such article, a reverse repetition of a portion of the ornament in proper position is got. Then portions in section B will require transferring to A, and so also from C to D, and from D to C, always turning the tracing face downwards, in order to reverse the ornament, until the design is completed, as in Fig. 15, which will now join straight at each side and at the top and bottom. In designing this type of pattern, much care is required in preventing a striped or lined appearance, because it will be found that certain figures or flowers in dropping and reversing come under each other. Now if there was a prominent spray of leaves tending upwards, say, somewhere near the centre dividing line, the same spray would appear underneath, the distance between the two being governed by the length of the whole design. Such a feature would at once be striking, and would, in the woven fabric, have a tendency to form an upward line throughout the piece. It is, therefore, particularly necessary to avoid anything which may tend to produce a lined or striped appearance. This applies to any design, but, in the present case, the caution cannot be too strongly impressed upon the student.

## CHAPTER III.

### A FEW HINTS ON DESIGNING ORNAMENTAL TEXTILE FABRICS (*continued*).

#### DIAPER PATTERNS.

PARTICULARS and illustrations of the various methods of constructing patterns for piece goods have been given. Designs for this purpose are usually known as body patterns, and of whatever class these piece goods may be, the instructions already given may be followed in all cases. Before concluding other remarks upon this part of the subject, some reference must be made to small repeating or "diaper" designs. From the simplicity of their construction, it may be considered that they should have been dealt with at the commencement of these pages, but they are not as largely used, on account of their set and formal appearance, as are those which take in a wider and a more varied range of ornamentation, such as the examples previously given. For table covers and such-like fabrics they are serviceable, and, as these are treated of later, the "diaper" patterns are introduced here.

Two illustrations, Figs. 16 and 17, are given. To draw these, and repeat for the full designs, construct a square and divide it into four equal parts, as in some of the examples already given. For Fig. 16, each of these four parts must be subdivided by lines running from corner to corner. Thus the square is cut into sixteen triangular divisions. Now sketch in one of these triangles some objects that will lend themselves readily to repetition. Taking Fig. 16 as an



example, the objects given within one triangular division reverse or turn over sixteen times within the square. The second example, Fig. 17, differs from Fig. 16, by reason of its repeating or turning over only eight times within the larger square, the four smaller squares being subdivided once only, instead of twice, as in the former case. Now sketch an ornament in one subdivision. This will then reverse eight times, and the complete pattern will result. There are varieties of these patterns, but as they are the easiest form of ornamental designing, their further consideration may be left as variations will readily suggest themselves

FIG. 16.



FIG. 17.

by practice. Fig. 16 is utilised in treating upon bordered fabrics, such as table covers, carpets, etc., so that an illustration of the full pattern may be noticed.

#### DESIGNS FOR BORDERS.

The construction of border designs is a somewhat easy matter to those who have mastered the general principles governing the construction of ordinary body or piece goods patterns, but there are points to be observed which it will be well to mention here. These may be briefly enumerated. First, a border should usually consist of two or more bands—a narrow one and a wide one, or, as in the example given

in Fig. 18, one wide and two narrow bands. The wider band may be considered as the border proper, the first narrow band serving to divide or form a distinct cut-off from whatever ornament the border may be placed against. The narrow band or bands should be either plain or formed of some pleasing object, frequently repeated. Commence with a plain line or lines, then form a band of balls, rings or scrolls, or other small objects, and finish off with another plain line; or a plain line succeeded by a repeated scroll running into the broad band or border proper will be satis-



FIG. 18.

factory—anything, in fact, which serves as a distinct dividing line may be utilised with good results. Next, the broad band or principal feature of the border must be constructed, and, for table covers, carpets and such-like fabrics, and for almost all such goods, a bolder treatment than that employed in the body pattern gives the best effect. Another narrow band may now be added—sometimes it is better to draw this a little wider than the first one—then finish off with a plain band, often called the heel, or have a repeated figure running down upon this plain band, but whichever is chosen it greatly adds to the appearance of the whole design.

The plain band or heel should usually be in the darkest colour used. Borders are also constructed consisting of, first, a narrow ornamental band or of even a simple dividing line, after which comes a broad band of ornament, drawn in such a manner as to produce a finished effect, by the simple addition of a half-inch or an inch of plain ground as a termination. Given the depth of the border, the wide and narrow bands should be drawn in such a manner that their relative proportions may have a pleasing effect to the eye, and that no top heaviness may be observable. The width of the border being decided upon, it is necessary to see that the pattern repeats within the given width. Fig. 18 forms a good illustration of these remarks.

There are various fabrics, too numerous to mention, which are not complete without the finish which a border gives to them, and I would therefore impress upon the student the desirability of paying some attention to their construction, for even though he may be employed in some branch where such modes of ornamentation have not hitherto been required, he never knows how soon a special call may be made upon him. Not long ago, fashion decreed the adoption of borders and panels (*i.e.*, very deep borders) for dress goods. How many designers, whose knowledge of ornamental designing consisted only in their ability to construct a simple sprig or other similar figure, found themselves nonplussed, it would be hard to tell.

#### STRIPED FABRICS.

In treating upon borders, a few remarks may be introduced upon the designing of striped fabrics—an important variety, including, as they do, dress goods of cotton, wool, silk, plush, wool and silk damask, tapestry and cotton hangings, mantle cloths, etc. There is such a varied scope in the drawing of these patterns that to give an example suitable

for each of the above-named fabrics would take up too much space. A striped fabric, broadly speaking, consists in the repetition of a border, or borders, in a horizontal, vertical or diagonal direction, suitably divided by more or less plain ground, according to the nature of the fabric, or the exigencies of any particular case. A dress material may have a one-inch border effect to three inches of plain ground, whilst a tapestry fabric may have five inches of border to one of plain ground. In the former case, unless the plain was very greatly in excess of the ornamental effect, a most wretched fabric would result, whilst in the latter, if the plain ground was not sparingly used, a good appearance could not be produced. It may be generally regarded as a rule that, in all fabrics for wearing apparel, the ornamentation by striped effects should not be unduly crowded or pronounced, whilst, in those for hangings or similar purposes, ornamentation by stripes may be used to an unlimited extent. Now whether for a horizontal or vertical striped hanging, a good design may be produced from the border, Fig. 18, taking the design as it stands, and repeating top and bottom, a small portion of plain colour being given at the bottom, which will serve as a connection. Or a variation would be made by following the plain colour by a single line, and this line with the same width of plain ground as there appears above it, and then repeating the ornamental border; or there might be plain, then a line of colour; a line of ground, another of colour, and plain again, followed by repeating the ornamental border. A better effect, where the depth of the repeat would admit of it, could be gained as follows: Take the border as it stands, with the plain at the bottom; follow with a single line of colour; then plain, half the width of that above the single line; follow with an ornamental border, half the width of the first one; then a narrow band of plain; a line of colour, and then another narrower

band of plain, and repeat the broad ornamental border. Taking Fig. 18 as the example, this would produce a horizontally striped fabric, and it does not require a great stretch of imagination to turn the same design on end, the ornament tending upwards, when an equally good vertically striped pattern would result. These remarks upon striped fabrics are amply sufficient for all purposes.

BORDERED FABRICS.

Having dealt with body, or all-over patterns, and given some information upon border designs, it is now necessary

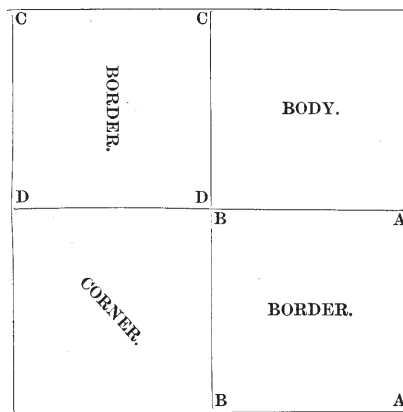


FIG. 19.

to deal with bordered fabrics. These comprise carpets, table covers, rugs, counterpanes, dress materials, etc. Very little information is needed, besides that already given, to enable the student to draw patterns for any of these fabrics, as the construction of the borders has only to be dealt with, and but few remarks are required to supplement those already made on borders given above. Having followed these instructions, it may be assumed that the student is able to construct a border design. Now in applying this to a body pattern, he will require to draw a corner piece, and, in order to thoroughly explain the usual methods employed, a diagram—Fig 19—is

given as the easiest way of illustrating these remarks. Assuming that the width of the border is equal to that of the body, construct a square of the exact dimensions required for the complete design. Divide this into four equal parts, and the result is one section for the body, and three for the border, that is to say, the body will have a border on two sides, with a corner connecting the two borders. It may be taken for granted that there are three ways of completing the border. The first is to draw the pattern within the square A A B B, and here may be remarked that this should always be done in this section, that is, below the body, for this reason—having the body pattern upright before us graceful ornament can be more easily constructed with good effect than when an opposite course is adopted. This seems peculiar, but it is, nevertheless, a fact. The old saying that “there is a right way to do everything” was never truer than in the case of designing fabrics. Let the student try for himself, and he will find that, in the wrong way, there is an awkwardness about his efforts, due to the fact that he sees his body pattern from a wrong view: now take the right way, and it is different. He constructs a pattern which, when repeated at the side, will not have any appreciably awkward effect. Having drawn in the border, which must repeat accurately from A A to B B, now repeat it at the side. There is still a square to form the corner. This may be done by running the first narrow band, surrounding the two sides of the body, across the border at each side and letting it join into the second narrow band, thus cutting off the corner. This gives a square, which can be filled in with any ornament to harmonise with the border. But a much better effect is gained by having the two sides and corner of the border continuous, as shown in Fig. 20.

In this case Fig. 16 has been utilised. By doing so, the complete pattern is shown worked out from the section given

in this figure, which enables the student to judge of the effect produced by objects often repeated to form a whole design.

Fig. 20 forms the second illustration of the methods adopted for drawing borders. Between this and the third

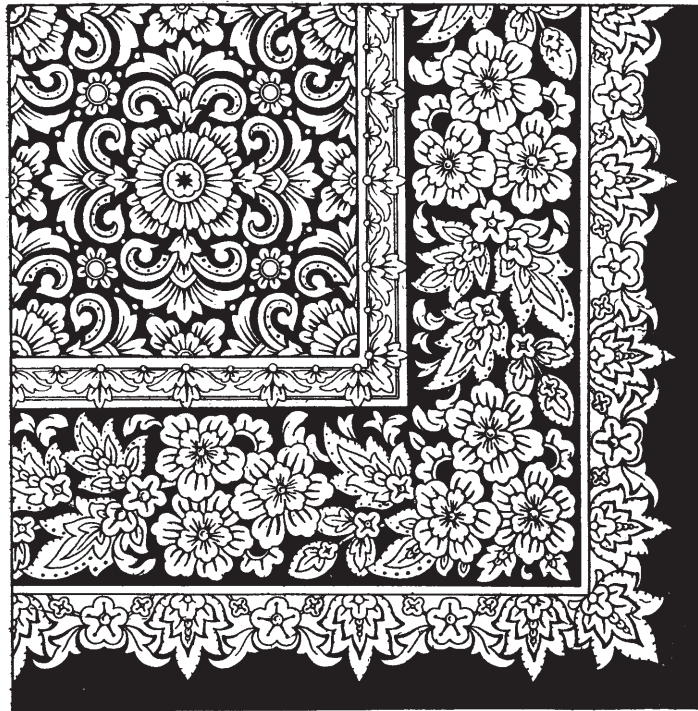


FIG. 20.

method, there is only a slight difference ; this consists solely in the manner of repeating the border from the bottom to the side. In the present case, it will be noticed that the bottom border has been traced so that, when transferred to the side, the portion coming at A A shall repeat at D D, and consequently that portion at B B must come at C C. Now

to fill in the corner with the same style of ornament is an easy matter, and a continuous border results.

The third method, Fig. 21, produces a precisely similar effect to the preceding one. The difference in the two is simply this—when we have drawn the bottom border, we

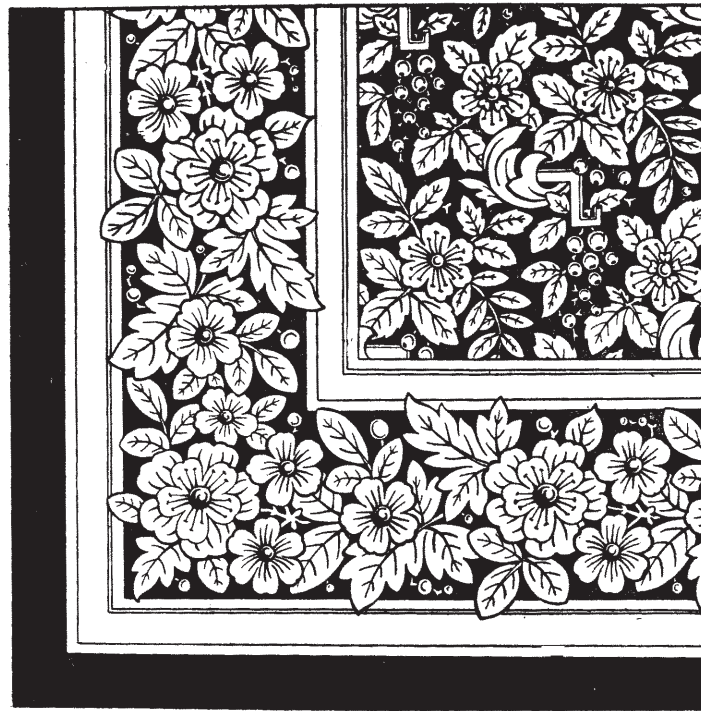


FIG. 21.

trace it and, in transferring to the side, turn the tracing paper over, thus reversing the pattern, so that B B will come at D D and A A at C C. Thus a repetition of objects at B B and D D come close together, which is sometimes objectionable, as it tends to produce stiffness. Having drawn in the corner, there is again a continuous border around the body



pattern. Taking everything into consideration, a decided preference may be given to the second method of designing bordered fabrics, as, in this case, there is less liability to stiffness, and consequently a better general effect may be reckoned upon. The examples given are particularly suitable for table covers, carpets and curtains of all descriptions.

## CHAPTER IV.

### A FEW HINTS ON DESIGNING ORNAMENTAL TEXTILE FABRICS (*continued*).

#### CENTRE PATTERNS.

THERE is a great variety of bordered fabrics which differ widely in body and border from those already treated upon. Instead of the body being composed of an often-repeated design, it consists solely of a large pattern in the middle, which reverses over and over—four, eight, sixteen or any number of times, in a circular direction, until the complete pattern results. This style is employed very largely for counterpanes of many descriptions, as well as for table covers of worsted and linen damask, printed cotton, etc., also for carpets, hearth rugs, sofa rugs, etc., etc.

Fig. 22 shows one quarter of a design. This would produce a square counterpane or other fabric. For most purposes, however, an oblong design is required, particularly for counterpanes, hearth rugs, sofa rugs, and, in the majority of cases, for table covers. But the illustration given will answer every purpose in aiding the student to master this style of designing. He must first draw a square or oblong of the size required for his pattern. If it be a square, a diagonal line must be drawn from the bottom left-hand corner to the top right-hand corner. This gives a centre line for the turn over of both body and border. For constructing the centre, the required space may be divided, by a simple geometrical problem, into as many sections as are

desired, letting the lines converge to one central point at the top corner. In the case of an oblong design, a diagonal line cannot be drawn from corner to corner, but, by the same geometrical problem, the top right-hand corner may be divided for the reversing of the centre pattern, and so also the bottom left-hand corner, by one diagonal line for the



FIG. 22.

reversing of the border. In this figure one quarter of the centre is shown consisting of two sections, or a figure eight times reversed, to complete the whole centre. The border reverses from the bottom to the side; then both centre and border reverse each way, and so the full pattern is completed, thus producing a square fabric, with a centre pattern and a

border all round. The oblong pattern is a little more difficult to design. The centre may be constructed exactly as for the square fabric, or it may be greater in length than in width, in order to cover some of the space which would otherwise remain vacant, consequent upon the pattern being oblong instead of square. This may be done by drawing a pattern similar to that shown in Fig. 22, which reverses equally from section to section, and, in order to fill up some of the vacant space, add to the pattern wherever required, by throwing out a piece of scroll work or a few flowers. Or the corner may be filled in with ornament, which will only reverse four times for the whole design. In this case, the space covered may gradually diminish in width, so that, when reversed, an oval formation will be produced. Or another way may be adopted. Suppose the corner is divided into four equal parts—in the top section, sketch in some ornament which would reverse to the next section. Now, instead of reversing it exactly, sketch an enlarged reversal of the ornament. Then treat this second section in the same manner, reversing on to the third section, and the same with the third, reversing on to the fourth section. There is thus a pattern consisting of four reversals of the same ornament, but, on account of each section being enlarged, an oval formation in the whole centre is produced.

In designing the borders, any class may be adopted for most fabrics, either those which have distinct dividing lines, or those which have no such lines, but run into the centre, as shown in Fig. 22. It is generally conceded that the latter class of border is the most effective. For a square fabric, no difficulty occurs, because the bottom border simply reverses to the side, the only other point to be observed being that the full quarter pattern must reverse at the right side and at the top, to complete the whole fabric. A corner should always be drawn, which should run up into the centre. For

the oblong fabric, the same corner may be adopted, but when the border is reversed from the bottom to the side, there will still be a portion at the top of the side border to be filled in. This may easily be done by drawing a continuation of the same class of ornament. Another way is to trace and reverse as much of the bottom border only as may be desired, continuing the bordering by drawing in fresh ornament until completed, but, in any case, it must reverse at the top. Between the centre figure and the border, there will be a certain amount of plain ground. This may be either left plain or may be filled in with small repeating figures, such as small



FIG. 23.

diamonds, sprigs of leaves or flowers, or any diaper effect, not too large to take away from the pleasing appearance of the complete design.

#### STAIR CARPETS.

The remarks upon bordered fabrics would be incomplete without some reference to stair carpets, which consist of Brussels, tapestry, felt and such-like varieties. It will generally be found that where a body pattern is at all suitable, a stair carpet will be made to correspond with it. That is to say, the body pattern will be employed, suitable borders being

drawn at each side. But, in many cases, a body pattern may be altogether too bold for such a purpose, but sometimes, in such circumstances, the nature of the design may allow of reduction. That is to say, the whole pattern is reduced proportionately, so that the same thing is on a smaller scale. Considering that a carpet is three-quarters of a yard wide, and that the full width is often taken for one repetition of the design, and that stair carpets for ordinary purposes vary from a half to one yard wide, and must include two borders in this width, it will be seen that, in many cases, the reduction of the pattern becomes necessary—particularly as the yard wide

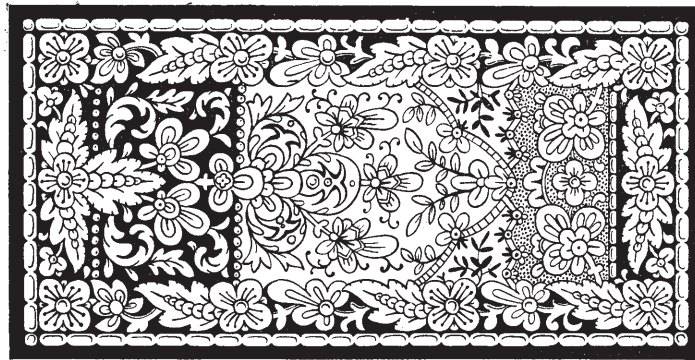


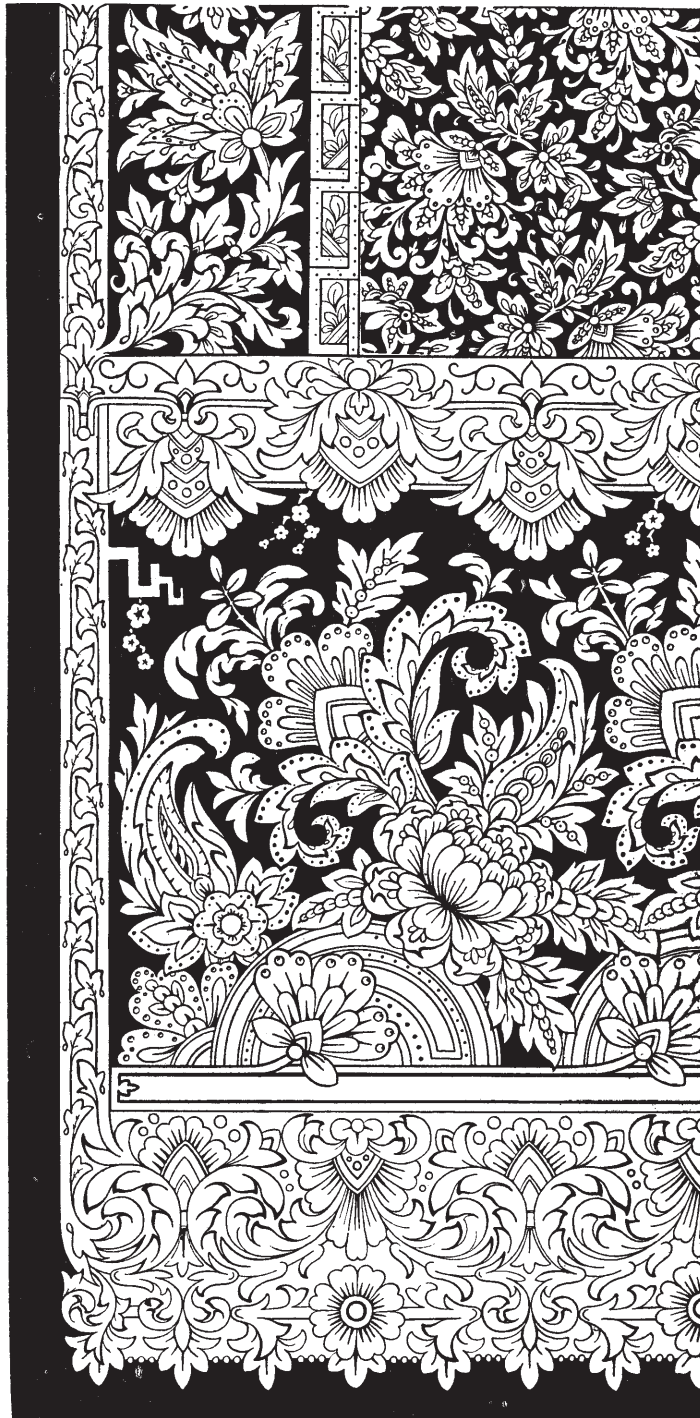
FIG. 24.

stair carpets are an exceptional width. But it is often the practice, where the construction of a body pattern will, with good effect, lend itself to this, to copy in full size just as much of the most effective portion of it as may be required to fill in the space between the two borders. There is no repetition of the design in width necessary, and, therefore, this may be easily done, the only thing required being the repetition in length. It may be taken as a rule that large figures do not look well for this purpose. Imagine a staircase carpeted with a very bold design, and then another covered with an effective and neat pattern, and it will not require much judgment to

pronounce upon them. A five-eighths stair carpet is a class commonly in use. Five-eighths, or twenty-two and a half inches, must be divided for the body and two borders. A good proportion is twelve and a half inches for the body and five inches for each border. For other sizes, similar proportions may be taken. It will be seen that there is not a great amount of space in which to draw a bold body pattern, even were such desirable. It may, therefore, be taken for granted that neat and effective ornament is best for the purpose. Moreover, the very nature of the use to which such fabrics are put demands that neatness should be considered. Particulars have been given for the construction of border and body patterns, which do not require enlarging upon, and, therefore, the illustration shown in Fig. 23 is sufficient to enable the student to construct a stair carpet pattern of this description without further instruction.

#### DESIGNS FOR RUGS.

In the designing of rugs, many styles may be adopted. There may be a centre pattern upon a plain or ornamental ground, this being surrounded by one repeated border, such as those shown in the table cover patterns, Figs. 20 and 21, or a centre pattern with a border similar to that shown in Fig. 22. The most effective rug patterns are those in which the ornamentation is most varied. But then, the entire rug pattern must be designed, which gives much scope for variety, both in borders and body. A good body pattern may be composed from trailing figures, such as those shown in Fig. 15, and to this might be added side borders both alike, but different end borders. In fact, where the whole rug pattern has to be designed, there is no limit to the scope for the production of effective patterns. A style which finds much favour is that shown in Fig. 24. The body pattern springs from one end; the side borders are alike; the two end borders, however, differ from the side, but are very similar





one to the other. Of course, this arrangement of borders is not necessary, but is left to the choice of the designer. It will be noticed that this pattern turns over from the centre, therefore one half requires to be designed.

#### DADO CURTAINS.

Curtains embrace many varieties, including tapestry, chenille, wool and silk damask, lace, Madras muslin, plush, printed cotton and muslin, etc. To give examples suitable for each would take up too much space, and therefore one only is given in Fig. 25, which will be effective for tapestry, wool and silk damask, plush and such-like goods. For printed cotton or muslin, this would make a good pattern, although it may be generally accepted as a rule that curtain patterns, without dado, are more successful. For chenille goods, an altogether bolder type of design is necessary, the coarse nature of the yarn not admitting of very finely ornamented patterns. For lace and Madras muslin curtains, dados are not much in favour. In the former case, stripes surrounded by the same border on three sides are effective and much used, whilst, for the latter, all-over patterns, such as those shown in Figs. 15 and 21, with a border on three sides, are in favour. In designing a curtain, the first point to be observed is to divide the given size into the necessary proportions for the body, border and dado, and a good division is to give the same space for the border as is to be covered by the body. In the example this has been done, but often the proportion allowed for the border is less. It will be noticed that the border does not appear as wide as the body. In designing the body and border, proceed exactly on the same lines as for the body and border patterns already described—in fact, in order to show the easy adaptation of a body pattern to the purposes of a curtain design, Fig. 15 has been introduced into the present pattern. This figure is a drop pattern, and, therefore, assuming that one of this description is being

designed, rule the body section into four equal parts and proceed exactly as described in the remarks on drop patterns. As to the designing of the border, information is given under the head of designs for borders.

In designing the dado much scope is offered for variety, but, in all cases, it is necessary to commence with a band or such-like distinct feature, which will serve to cut off the dado from the body. In the present case, a broad band has been introduced which serves the purpose well and is a method much in use. But another effective way is to have a more ornamental and less formal "cut-off," formed so that the body pattern may run down into it in an irregular manner. For instance, suppose, instead of the broad straight band, one was drawn the top portion of which consisted of repeated semicircles, or of pointed work. It would be required to finish off the body and border patterns, sketching in a completion to each figure which comes against the semicircles or points. But in doing this, every bit of fresh ornament added to the body and border must come below the bottom boundary lines. This must be observed in order that the body and border patterns may repeat from top to bottom.

The space devoted to the dado must be divided in the length in exactly the same proportions as for the body and border, as it will be noticed that the whole of the dado repeats in exactly the same width as the body. In designing the present pattern, a deep panel running across the curtain has been introduced. This panel is a distinct and necessary feature in dados, except where cross stripes are introduced in its place. In some cases, instead of the panel running quite across the curtain, the border may be repeated down to the bottom of the dado, or, in place of this, a different border may be used, always providing for the border proper repeating top and bottom within the same limits as the body. Or instead of repeating the border, a narrow panel may be

employed. In the example shown, the panel running entirely across the curtain requires a repetition within the same width as in the body, and, therefore, there is as much space to fill as corresponds with the width of the border. This is easily done, as reference to Fig. 25 will show. As a side boundary to the panel, the outer narrow border band has been used, and it is scarcely necessary to say that, in all cases, to produce a finish to the panel, some such feature must be added. As a termination to the dado, a broad bottom border may be drawn, finishing off with a repeated figure, running into a plain band; some form of ornamentation may be employed which may have a deep effect and which runs into the plain ground, as shown in Fig. 25. The little finishing touches given to this pattern come with practice. By these is meant the joining of one portion of the pattern to another, by little bits of ornament forming pleasing connections, as, for instance, the manner in which the scroll-work at the bottom of the dado terminates in the narrow band at the side of the panel.

As a curtain design without dado, this pattern may be easily employed. Take it—body and border—exactly as it now is; repeat the border across the bottom, and add a corner as for a table-cover pattern. Then, in order to give a finish to it, across the bottom place the scroll-work border shown at the bottom of the dado. Such a pattern would then form a good example of a curtain design, minus dado, and upon the construction of such patterns no further remarks are necessary.

Particulars for drawing all the most common classes of designs, with figures illustrating them, have now been given. It has been our endeavour to give the instructions as simply as possible, remembering that they are written for those who have no knowledge at all of designing ornamental fabrics, and it is hoped that our efforts may be of benefit to them.

## CHAPTER V.

### HINTS FOR RULED-PAPER DRAUGHTSMEN.

THE subject of ruled-paper drafting is one upon which a few words may be said in treating on the subject of Ornamental Textile Fabrics. There is a wide difference between a designer and a ruled-paper draughtsman. The first is an inventor of patterns, the second occupies his time in working out these patterns upon ruled or point paper, from which the Jacquard cards are cut. In many establishments the two varieties of work are separated, the men of inventive capacity and artistic ability readily working themselves into the foremost position, whilst others have to be contented with inferior places and with a correspondingly less salary. Yet it is usual for the inventor of patterns to possess the fullest knowledge of ruled-paper drafting, without which he would not be considered in all respects a designer. In fact, in most branches of manufacture, it is absolutely necessary that his skill in this work should equal his inventive capacity. Take, for instance, Brussels carpet designing: it is quite the regular thing for a man to dispense entirely with a sketch—he will not go to the trouble of composing his pattern previously—he will, with a sheet of ruled paper before him, and by the aid of a pencil, brushes and a few pots of colours, straightway design and complete a pattern. This is not a difficult thing to accomplish, because the Brussels pattern is an exact *facsimile* of what the fabric will be when woven. But in the same department, others may be employed in drafting from small coloured or

uncoloured sketches, which may have been purchased from outside artists. Much the same mode of procedure is adopted in tapestry carpets. In tapestry fabrics—those goods which are manufactured for curtains, table covers, and upholstery purposes—it is necessary for the designer to be well up in ruled-paper work, for he must fully understand how best any effects which he may introduce into a coloured sketch can be produced in the cloth. He knows for what particular grade of fabric he is designing, and fully understanding all technical details in the drafting for this, he can compose a design, well knowing that when this is handed on to the ruled-paper draughter, no mutilation of the pattern will be necessary in order to fit it for the purpose intended.

Now, where sketches are bought from outside artists, this mutilation is quite common. The writer has, scores of times, had patterns before him, the work of the best Frenchmen, which as artistic efforts were beautifully effective, but, when reduced to the cold, practical requirements of a particular fabric, were useless, because so much of their beauty was destroyed whilst being transferred to ruled paper. And such a state of things was absolutely unavoidable, because too much had been attempted in the sketch. The inventor was an artist, but had he shown more of the practical designer in his compositions, it would have been better, not only for the manufacturers who bought his sketches, but also for those who had the working out of them. In many establishments the designer is required to perform both offices—not only to invent the patterns, but, likewise, to work them out ready for the card-cutter. It may be concluded that it is necessary for all to be expert at ruled-paper drafting.

#### DESIGNERS' APPLIANCES.

All designing departments should be well supplied with the very best appliances required for the work which is

carried on in them. The best advice that can be given to the student who reads these pages is : Let everything be of the best. There is nothing to be gained by inferior pencils or brushes—a man cannot do good work with bad tools. A common pencil may scratch the paper, or be constantly breaking, or may necessitate an undue use of india-rubber—these little things seem almost too trivial to be worthy of mention, but it is quite the contrary. Little annoyances cause the designer's attention to be unduly diverted, resulting in a break in the flow of his ideas, besides which, comfort in working must be reckoned as worth something. Even in the little question of the use of india-rubber a useful hint may be given. Much of that sold by stationers is of no value ; a piece of india-rubber which will not even rub out a line, or, having erased it, leaves a dirty stain behind, is worse than useless. From long experience nothing has been found to equal a piece of grey india-rubber washer, such as can be purchased from any mill furnisher for a few pence, and which will last a generation. On the question of brushes a few words may be said. The cheaper kinds, such as camel's hair, are too soft and pliable for the production of satisfactory work. Every student should purchase a few good sable hair brushes, which, although costing a dozen times as much as camel's hair, will be found well worth the extra expense. With careful usage they will last a very long time, and when their points are worn away they are in their very best condition for ruled-paper work—indeed, it is a practice in some establishments, where large-squared design paper is used abundantly, to cut the sable brushes in order to give them a flat point, so that each square on the paper can be filled at one stroke. It would be impossible to prepare a camel's hair brush in this manner, and it would be equally impossible for the average hand to produce such beautifully fine work upon a sketch as is possible by the use of sables.

In selecting such brushes, buy those in which the hair is held in albata—a white metal—or in tin. They are more durable than those made from quills, because frequent soaking in water sooner or later softens the quills, which then often split at the brush end, when the hair falls out, and the brush is done.

#### COLOUR GRINDING.

Designers' colours cannot be too well ground. The more time spent in this operation the better and easier the colours will work upon the paper. The implements required are a slab of marble, or plate glass, a muller—a cup-shaped article, usually of marble, having a flat, smooth bottom—a steel pallet knife, and a similar one of bone. The bone pallet knife is always required for the grinding of carmine, in order that the pure brilliancy of the colour may be maintained, for use a steel knife and a black tone is at once the result—in fact, one might as well dispense with carmine and substitute one of the inferior colours as resort to the use of a steel pallet knife. For some classes of work the colours are mixed with size or Russian glue, whilst for others, the practice is to employ gum of good quality. In either case its value is obvious, being simply to produce adhesion to the paper. But, where gum is generally employed, an exception is made in the case of carmine, which should always be mixed with Russian glue, or the result will be similar to that produced by the steel knife—its brilliancy will be impaired. In grinding colours the method is to first dilute the colour upon the slab with water, to crush it well with the muller, then this article should be worked round and round the slab, keeping the liquid colour in the centre. In a few minutes the gum or size may be added—experience will teach how much to use—but it is never advisable to put the full quantity in at once, because even the experienced hand will at

times overdo it. It is better to proceed with caution—to paint a little of the colour time after time on a slip of paper, which when dry should be rubbed on the back of the hand. If the colour rubs from the paper on to the hand more gum or size should be added, but when the contrary is the case no more is required. Each colour should be ground until every particle of grit is removed, and the student will find that the result quite justifies the time expended. Of all colours, carmine is the easiest to mix—in fact, it may be simply rubbed in a pot with the finger, when, with proper care, every particle will dissolve. Being a most expensive colour, this course may be recommended to students because, by its adoption, there is no waste. It is always well to give such colours as drabs and greys a good grinding, otherwise the tendency is for them to lie blotchy and uneven upon the paper, particularly where large patches of these colours are used. It will always be found advantageous to use gum for black.

#### VARNISHING PATTERNS.

In some classes of designing it is found of great advantage to have ruled-paper patterns well varnished. This is the case where such designs are subject to a great amount of wear and tear, as, for instance, in the case of those for tapestry carpets. To accomplish this a white spirit varnish must be used, and if carefully applied with a large hog's hair paint brush or a broad, flat, camel's hair brush, it will dry quickly, after which a second coat may be put on. But where patterns are to be varnished, the colours employed should always be mixed with gum, and a larger quantity of the latter must be used, or the former will have a tendency to smear when the varnish is applied. In grinding colours for varnishing it is, therefore, necessary to try each one on a slip of paper, but instead of being satisfied when they do not rub off on the back



of the hand, it is well to subject the slip to a little rough treatment in order to make sure that the colour will not crack off. If it stands this test satisfactorily, the colour may be considered fit for varnishing. The mixing likewise is a little different, for the presence of an undue amount of gum has a tendency to produce dulness. It is found necessary, therefore, to allow for this in combining any particular colours in order to produce a required shade. For instance, carmine, being easily ruined, should never be used alone, but a colour, the basis of which is vermilion, would be found more suitable for the purpose. With attention to these few hints the student will find all else a matter of that practice which gives experience.

#### VARIETIES OF RULED PAPER.

The varieties of ruled paper employed throughout the textile industries are scarcely credible. Who would imagine that one printer alone has been in the habit of supplying no fewer than three hundred and fifty varieties, ranging from  $3 \times 4$ ,  $4 \times 4$ ,  $4 \times 4\frac{1}{2}$ , to  $4 \times 17$ , and  $5 \times 5$ ,  $5 \times 5\frac{1}{2}$ , to  $5 \times 36$ , from  $5\frac{1}{2} \times 6$  to  $5\frac{1}{2} \times 36$ , from  $6 \times 6$  to  $6 \times 36$ , from  $8 \times 8$  to  $8 \times 36$ ,  $9 \times 9$  to  $9 \times 36$ ,  $10 \times 10$  to  $10 \times 36$ , and so on, up to  $16 \times 40$ ? These include the papers used in the dress goods, coating and suiting trades; for tapestry fabrics, damask and silk manufactures; for Brussels, tapestry, chenille and rug designs; for lace curtains and nets; for quilts and toilet covers, and, in fact, for every class of manufacture, a great number of them being for special purposes.

#### DRAFTING RULED PAPERS.

The process of copying sketches upon ruled or point paper is, in some branches of trade, called "putting on". In order to perform this properly, good drawing is absolutely necessary. It is the same with this as with all other classes of draughtsmanship—without skill in freehand drawing

nothing can be successfully accomplished. Given a small sketch to work from, the first thing to be done is to draw an enlargement in pencil, to the size needed, according to the requirements of the cloth for which the ruled paper is intended. Some designers use charcoal. This can be purchased in sticks by the bundle, but it is by no means so cleanly as pencil, and, except in special cases, the latter is greatly to be preferred. But the proportionate enlargement

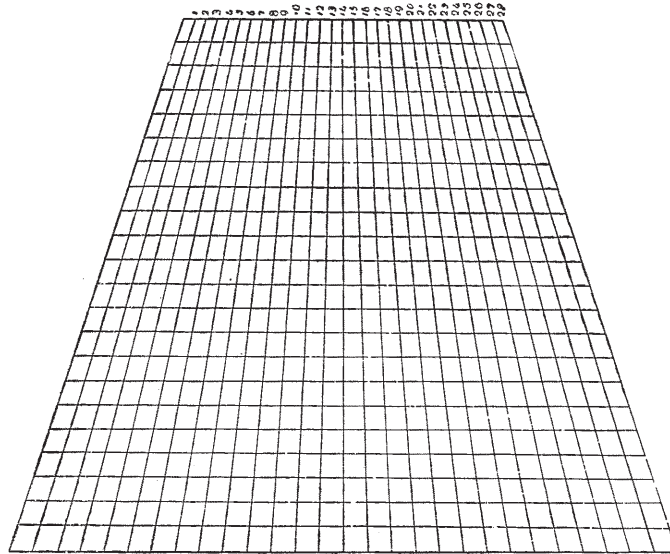


FIG. 26.

of a given sketch is not such an easy matter, unless the simplest means are adopted. Take a Brussels design as an example. Say the sketch is 6 inches square and the full size of our ruled paper is three-quarters of a yard, this being the actual size of a  $10 \times 10$  large square Brussels paper. In this width, there are 256 small squares, called cords, 25 of the large black squares, called designs, and six cords over—that is  $25 \times 10 = 250 + 6 = 256$ . We have thus  $25\frac{1}{2}$  large squares. The easiest way to enlarge the sketch to

this size is, therefore, to rule it into  $25\frac{1}{2}$  equal portions, both in a horizontal and an upright direction. This is quickly done by the use of a diverging scale, such as the reduced example shown in Fig. 26, and which any designer or student may rule for himself of the size most useful for his requirements. The method of procedure is as follows: Take a narrow strip of paper and upon this mark the width of the repeat of pattern. Place this upon the scale, so that the first mark upon the strip is immediately over the first diagonal line. Then with the eyes upon the space, between numbers

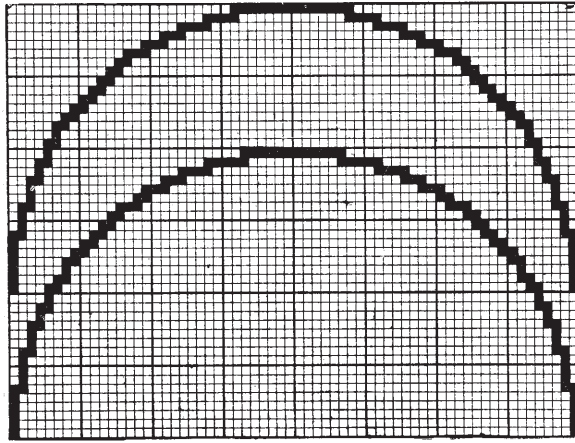


FIG. 27.

25 and 26, run the strip downwards until the second mark upon the latter comes midway between these two numbers. Now mark off the  $25\frac{1}{2}$  equal portions, and place the strip upon the sketch. Mark the latter, according to the strip, at the top and bottom, repeat the same at each side, and rule. Thus it becomes an easy matter to enlarge the sketch in the exact proportions. Of course, the same result may be accomplished by the aid of a pair of compasses or dividers, but the above is a much readier, more perfect and less tedious method. Where small square design paper is employed, it

will be sufficient to rule the sketch to correspond with every three or even every five "designs".

#### ERRORS IN DRAFTING.

Having made a correct proportionate drawing from the sketch, the next point is, of course, to paint it in. This requires the exercise of good freehand work, or an indifferent result will be produced. It is quite possible, and indeed not by any means unusual, for two men to be engaged upon similar work, when one will bring out a mass of broken-

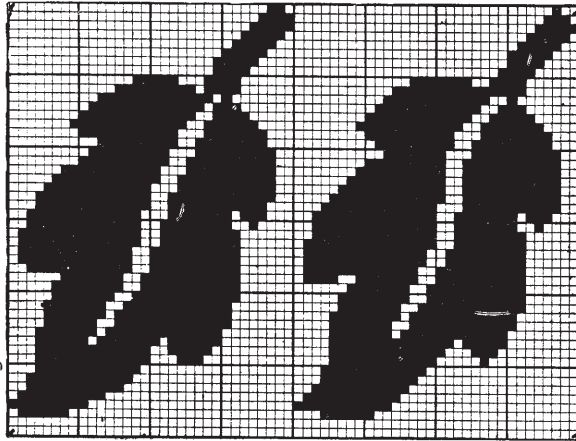


FIG. 28.

backed and altogether faulty ornament, whilst the other will produce a work, the drawing of which is full of spirit and life. Yet, in each case, the pencil lines may have been strictly followed. In the one, the man runs on as a mere machine, he follows his copy, without any idea of effect, the result being altogether displeasing. In the other case, skill in drawing, combined with general artistic ability, causes the artist to notice where errors are made, and to rectify them as he proceeds. The result is the best possible enlargement, which, when produced in the cloth, shows the design

of the same size as the sketch, and which is just as perfectly and truly a copy of this as it is possible for a woven fabric to be like a hand-painted design. A couple of very simple examples are given in Figs. 27 and 28. In the first of these, two semicircles have been drawn, and, although the lines have been followed strictly in each case, the first one appears broken-backed, whilst the second shows a curve as graceful as it is possible to make it. In such objects as circles, long or short curves, stems of leaves or flowers, in scrolls, and so on, a system of careful graduation should be adopted; by this we mean such as is employed in the more perfect of the semicircles, shown in Fig. 27. Working from one of the bottom corners upwards, we paint the cords or small squares in this graduated order. Beginning with 6, this is followed by 4, 3, 2, 2, 1, 2, 1, 1, 1, from which point the curve turns over and repeats itself, thus, 1, 1, 2, 1, 2, 2, 3, 4 and 6 to the centre. Now mark the order of the other semicircle. Beginning with 7, it is followed by 3, which is too much of a drop in good drawing, then it goes on with 3, 2, 2, 2, 1, 1, 1, 1, to the turn-over point. This amply illustrates the meaning of careful graduation in drawing with the brush on ruled papers. The two leaves shown in Fig. 28 are each painted versions of the same pencil drawing, the actual lines being in each case closely followed. It is easily seen which of the two is the more perfect. Further examples might be made use of, but the above simple ones will probably be found sufficient, in order to point out common errors that a little skill and careful attention will overcome.

## CHAPTER VI.

### THE JACQUARD MACHINE.

ORNAMENTAL textile fabrics are of various classes, foremost amongst them being those in which the pattern is produced by the loom, those on which it is printed upon woven cloth, and those on which it is obtained by embossing. Amongst the former is an exceedingly wide range of fabrics in worsted, woollen, silk, linen, and the less important fibres; they include such fabrics as silk, worsted, woollen and cotton dress goods; worsted, silk, linen and cotton damasks; tapestry fabrics, composed of silk, wool and cotton; carpets, counterpanes, figured plushes, Utrecht velvets—in fact, a very numerous variety. Amongst the printed goods, the most important are cretonnes, blinds, muslins and cotton dress goods; druggets and such-like fabrics. Tapestry carpets are printed, but the printing takes place in the yarn, and, therefore, before the process of weaving. Embossed fabrics are those chiefly used for curtains and upholstery purposes.

The most important class of ornamental textile fabrics is that in which the pattern is produced during the process of weaving, and which fabrics require the use of the Jacquard machine and harness in their production. It will, therefore, be advantageous, before proceeding further, to give a few particulars of this machine. It would take a large volume to exhaust all that might be said upon this most important and ingenious mechanism, but the space at command will not admit of more than a brief reference to it.

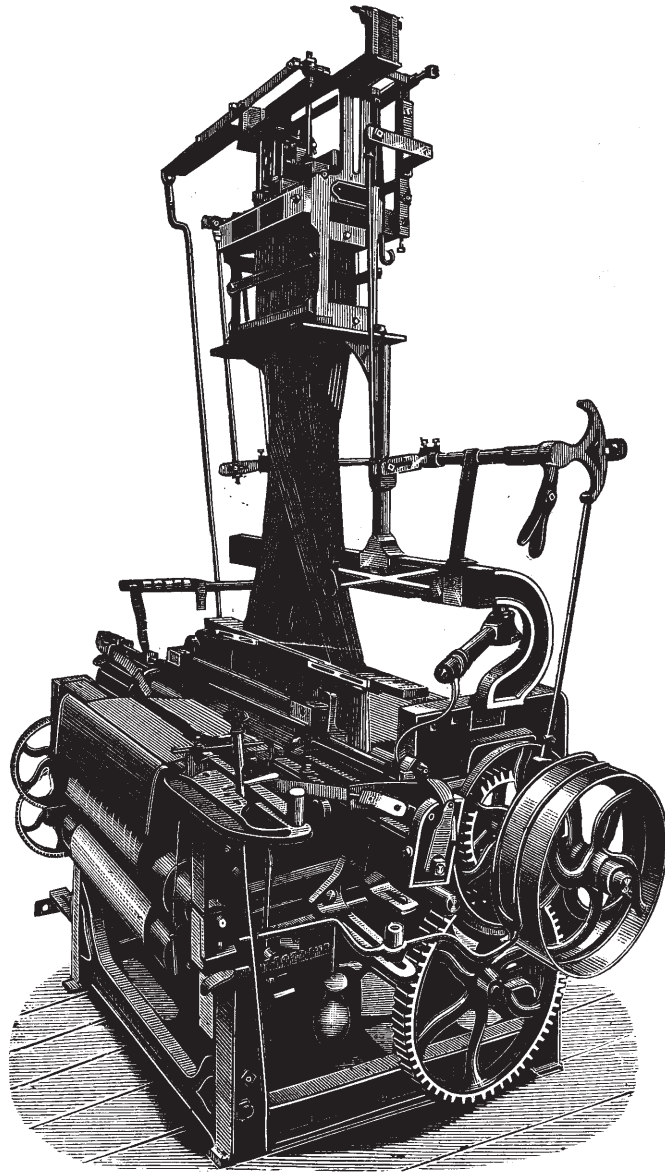


FIG. 29.

Many of those for whom these pages are written will be thoroughly conversant with the class of machines called witches or dobbies. These are used in the production of fabrics in which the repeats are very limited, such, for instance, as coatings, suitings and small diaper effects for vestings and dress goods, etc. Nevertheless these machines are often called Jacquards, a mistake which it is difficult to understand. There is a great difference between a Jacquard and a dobbie, as will be seen from the short description given of the former.



FIG. 30.

## DESCRIPTION OF THE JACQUARD.

Jacquards are made in various sizes from 200's upwards. There are what are known as single and double-lift Jacquards. Briefly, these consist of an arrangement of upright and horizontal wires, inside the machine; of a harness suspended from the upright wires; of Jacquard cards, which are in reality another form of the design, and of the cylinder over which the cards pass, thus giving motion to the horizontal and upright wires, and raising the required harness threads or cords in order that a shed may be formed. The Jacquard machine



has formed the subject of endless patents, both in this and the other manufacturing countries, and although there are various modes of construction, its distinguishing features are always the same—in fact, so perfect was its first inception that its general principles remain, to this day, as when introduced by Joseph Marie Jacquard. In giving a short description of the Jacquard, a 300's single-lift machine is taken, and one, the general construction of which is common in the Bradford trade. The Jacquard is mounted above the loom upon two gantrys, *i.e.*, horizontal bars or beams of iron or wood suitably supported. The distance between the machine and the loom is sufficient to allow for the proper accommodation of the harness. Fig. 29 gives a good illustration of a loom and a Jacquard. The machine first of all consists of a framework of iron, having four sides. Inside this framework are the upright and horizontal wires.



FIG. 31.

THE UPRIGHTS AND NEEDLES.—In the machine under notice there are 304 of each, divided into rows. First, taking the uprights, it will be noticed from Fig. 30 that they have a hook at the top and another at the bottom. The bottom hook is formed by bending the wire in such a manner that a portion of it turns upwards parallel with the main portion of the upright. Many of these wires are made with a simple turn at the bottom, similar in form to the letter U. Fig. 31 shows the horizontal wire called the needle. It will be noticed that at the end of the needle there is a loop, whilst upon the needle there is a twist or eye. Fig. 32 shows the upright and needle in proper position one to the other, as placed in the machine. The position of the eye upon the needle varies according to that of the upright to which it is

attached in the machine. The illustration gives a view of one of the front uprights and needles. In the case of the second row of uprights, the eye upon the needle will be just as much farther back as the distance between the second and first rows of uprights, and so on for each row throughout the machine. Thus the eyes upon the first row of needles being one inch from the front, those upon the last row of needles are one inch from the back end.

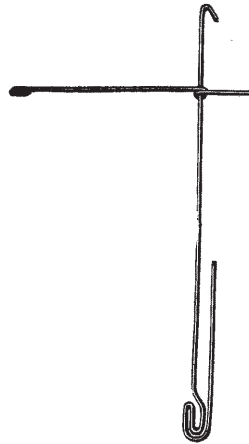


FIG. 32.

**THE BOTTOM BOARD.**—The bottoms of the uprights rest upon a board usually called the bottom board. Every upright has a hole immediately under it in the bottom board. Just above this board is a grid or comb with stout wires running between the uprights from front to back. These wires simply prevent the uprights from twisting or otherwise getting out of position.

**THE BLOCK AND KNIVES.**—Towards the top of the machine and immediately below the top hooks of the uprights, the block is situated. This consists of an iron framework large enough to enclose the whole of the uprights in

the machine. Across the block are situated rows of thin bars called knives. The number of knives corresponds with the number of rows of uprights. This is a most important feature in the mechanism, as the block rises and falls, causing the knives to come in contact with the hooks on the uprights, and, providing no card was in use, the whole of the uprights would rise and fall with the corresponding movement of the block. The knives are arranged across the machine with their faces at an oblique angle, in order that, upon the fall of the block, the knives may slide over the tops of those uprights that have not been raised according to the exigencies of the pattern being woven. But for this arrangement of the knives, they would, in falling, come down upon the uprights, the result being much damage to this important and most easily injured portion of the mechanism.

**THE FACE BOARD AND SPRING BOX.**—At the top, to the front of the machine, the face board is placed. This is perforated with holes corresponding to the number of needles, and consequently each needle has its own particular hole, through which its point passes, projecting sufficiently for the card to come in contact with it. Immediately opposite the face board, at the back of the machine, is the spring box. This is also perforated to correspond with the number of needles. In every perforation there is a small coiled spring. The loops at the back ends of the needles are so formed as to have the power of depressing these springs, every needle having its own spring.

**THE CARD CYLINDER.**—The card cylinder, illustrated in Fig. 33, has four flat faces or sides. Each side is perforated, the same number of holes, of course, being allowed on each side as there are needles in the machine and holes in the face board; in the present case this is 304. The cylinder is fixed towards the bottom of the cylinder frame in such a

manner that the holes on any of the four sides come exactly opposite those in the face board. There are pegs upon each side of the cylinder which fit into corresponding holes in the face board. The cylinder frame has a swinging motion from its top, similar to a door upon its hinges. This movement allows of the cards being successively brought in and removed from contact with the needles. The card cylinder turns a quarter of a revolution at a time, a spring catch projecting from the side of the Jacquard to the cylinder in order to accomplish this. A spring hammer holds the cylinder in position until it requires another turn.

The machine has extra uprights for the edging or selvage, which are provided for in the bottom board, face board, spring box and card cylinder.

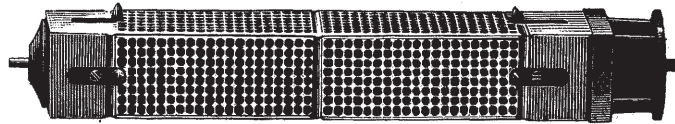


FIG. 33.

THE JACQUARD CARDS.—The cards consist of strips of pasteboard, having holes punched in them in accordance with the requirements of the design. Each card represents one pick in the pattern, and every hole punched means one warp thread to be raised. When the whole of the cards to complete a design have been cut, they are laced or sewn together to form an endless band. In the case of lacing, suitable holes are punched in each card, through which they are bound one to the other by the aid of string. Holes are punched corresponding with the pegs upon the cylinder.

#### THE HARNESS.

Such is a brief and simple description thus far of the mechanism of the Jacquard machine. How the various parts obtain their motion will be referred to later. There is still

the harness to deal with, and this is treated of as shortly as possible. The operation of making the harness is called "tying up," and every particular composition of a harness is called a "tie-up". The harness is constructed of thin linen cords of great strength, and in order to add to their durability, they are subjected to treatment by a composition of litharge and other ingredients. As a simple example, suppose a design is being woven in a 300's single-lift machine, this would give 304 uprights to be utilised. If it is desired to have ten repetitions of the pattern in the full width of the cloth woven, there would be 3040 warp threads to operate upon. Therefore, ten harness cords would be operated upon at the same time by each upright in the machine. This would constitute a "ten pattern harness".

**THE NECK BANDS.**—The harness cords are connected with the uprights by means of neck bands, cords looped to each upright, and each neck band passes through a hole in the bottom board. Continuing the above example, there would be 304 sets of ten harness cords. Each of the sets of ten is stitched together and attached to its own neck band.

**THE COMBER BOARD.**—The comber board is a flat board stretching across and suitably supported upon the loom. This board is perforated, the closeness of the holes being guided by the number of warp threads per inch. The number of holes corresponds with the number of warp threads to be employed in the full width of the cloth to be woven. In the present example, this would be 3040. Now in the 300's single-lift machine (304 uprights), there are eight rows of uprights arranged in two nineteens, or thirty-eight to a row. As the same number of harness threads, *viz.*, 304, forms one pattern, the comber board is marked into ten divisions or patterns. In each division there are 304 holes. There are, therefore, 16 rows of 19 holes, or 8 double rows of 38 to the double row, or 3040 in the whole comber

board. Then in the full width of the comber board there are 16 single complete rows, numbering 190 holes to each row, the same total, 3040, in the comber board. Taking a single upright and the harness thread attached to it, and showing the distribution of these harness threads across the comber board, a good idea of the formation of a harness is given. Taking the first upright to the left hand in the front row, and numbering from left to right, there would be the ten harness cords distributed, one in the first hole in each division or pattern, on the front row in the comber board, or, to put it another way, the 1st cord would be in the 1st hole, the 2nd in the 20th hole, the 3rd in the 39th, the 4th in the 48th, the 5th in the 67th, the 6th in the 86th, the 7th in the 105th, the 8th in the 124th, the 9th in the 143rd and the 10th in the 172nd hole. Now, taking the sets of ten harness cords which are attached to the remaining 303 uprights and distributing them in similar proper order through the holes in the comber board, the complete harness is produced. The particular upright above mentioned is taken as an example, because the harness cords come to the front row of the comber board, but the actual tying up of a pattern is done from right to left and from the back rows of uprights to the back rows in the comber board, so that the particular upright mentioned in the example would be the last to be operated upon in tying up a harness. Still, the distribution of the harness cords would be in the exact order given. The comber board is supplied at each end with holes for the accommodation of the harness cords for weaving the edging, or selvage.

THE HEALDS.—The harness cords having passed through the holes in the comber board have the healds or heddles attached to their ends. These are of two kinds, *viz.*: those of cord, containing a metal mail, as shown in Fig. 34A, and those composed of wire, as shown in Fig. 34B. In the case of those made of wire, the warp threads are passed through

the loops or holes towards the centre. In those made of cord, the warp threads pass through the eyes in the centre of the mails. A harness weight or lingo is attached to the bottom of every heald, as shown in Fig. 35. The lingo is a long straight weight, a portion of it only being shown in this figure.

There are innumerable styles of tying up the harness, and to enter into these would be a very long task indeed. These pages are written for the benefit of those who possess no information on the subject, and, therefore, the remarks here made will be quite sufficient for this portion of the subject.

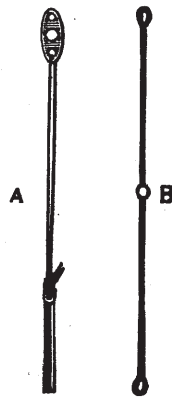


FIG. 34.

HOW THE JACQUARD OBTAINS ITS MOTION.—The Jacquard, of course, obtains its motion from the loom. Upon one end of the top shaft there is a sweep-plate, towards the edge of which a treading rod is attached. This treading rod is of a sufficient length to extend a little above the top of the Jacquard. To the top end of the treading rod, one end of the lever is attached, the other end of the latter, which is immediately above the centre of the Jacquard, being connected by means of a bar or rod to the block containing the knives. The lever is pivoted at a suitable point, and is also

supported at this point. Now, upon the revolving of the top shaft, the sweep-plate revolves also. This causes the treading rod to ascend and descend. This in turn gives motion to the lever, and from this to the block. When that end of the lever which is connected with the treading rod descends, the reverse end attached to the block ascends, carrying the block with it, and *vice versâ*. The swinging motion of the cylinder frame is obtained from the opposite end of the loom. Upon the end of the top loom shaft there is an eccentric. From this eccentric a rod reaches upwards to the motion shaft, to the end of which it is attached by the aid of an iron arm. Upon the motion shaft there are smaller iron arms, placed in such positions that jack rods attached to them reach upwards, one to each side of the Jacquard. Side arms are fixed upon the cylinder frame, projecting along the sides of the machine, and to the ends of these the upper ends of the jack rods are connected. The swinging motion imparted to the motion shaft is transmitted by the aid of the jack rods and side arms to the cylinder frame, and thus is the cylinder alternately placed in, and removed from, contact with the needles projecting through the needle board.

THE ACTION OF THE JACQUARD.—How the Jacquard gets its motion from the loom has been shown. It only requires a few words upon its action. Given a set of cards: these are placed upon the cylinder, and the loom is set in motion. When a card comes in close contact with the needles, wherever there are holes, the needles penetrate them, and thus there is no movement of them, consequently the uprights remain in their proper positions to be raised. But all needles coming in contact with the blanks in the cards are pushed back, carrying their uprights with them. Thus, upon the blocks rising, the knives catch all the uprights which have not been pushed back, and raise them, and, therefore, the harness threads attached to these particular uprights are



elevated, carrying their warp threads with them, and so form a shed with those warp threads not raised. Those needles which are pushed back by the blank spaces in the cards depress their own particular springs in the spring box, but immediately upon the cylinder turning for the accommodation of the next card, the needles are released and the springs push them back again to their proper position, ready for the next card to operate upon.

THE DOUBLE-LIFT JACQUARD.—The difference between a single and a double-lift machine is easily understood. Whereas, in the former, there is one block and one set of knives, in the latter, there are two blocks and two sets of knives. The arrangement of these parts is such that each set of knives is kept out of the way of others in rising and falling. There is a double set of uprights, but the needles are the same in number as in a single-lift machine. There are, however, two twists or eyes upon each needle, so that two uprights are operated by one needle. The uprights are longer than those in the single-lift Jacquard, and, instead of resting upon the bottom board, they come quite through this for some distance, but there is a bend at the end of each wire to which the neck bands are attached, and, following this bend, at the upward termination of the wire, there is a second hook. This hook, when not lifted, rests upon a grate. Each set of harness cords is attached by neck bands to two uprights, instead of to one, as in a single-lift machine, so that the harness is being operated upon by the two sets of uprights. The power is transmitted from the loom by means of a sweep-plate, fixed on the end of the bottom loom shaft, instead of on the top loom shaft, as in the single-lift machine. There are two treading rods fixed at opposite points on the sweep-plate. There are two levers, one for each block. The power actuating the cylinder frame is obtained precisely the same as for the single-lift machine.

By the use of a double-lift, a loom can be run much faster than with a single-lift Jacquard. Fig. 35 gives an illustration of a double-lift Jacquard.

Such is a brief description of the Jacquard machine, which has enabled manufacturers to produce much more beautiful fabrics on the power loom than would otherwise have been possible.

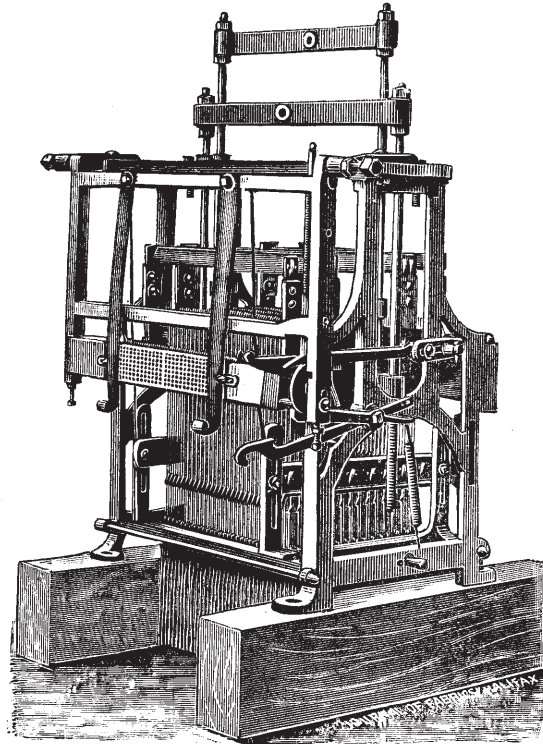


FIG. 35.

## CHAPTER VII.

### BRUSSELS AND WILTON CARPETS.

HAVING given a brief description of the Jacquard machine, which is used in some form in the manufacture of all ornamental fabrics made upon the power loom, I will now deal with the more important of those fabrics which are of a distinctly ornamental nature. Carpets are particularly of this class. Besides being amongst the most useful of articles, they are prominent in the adornment of the home, whether they be of Brussels, Tapestry, Axminster, or of the class known as "Scotch," "Kidderminster," or "Art Squares," or of the common varieties.

For the present the remarks on Brussels and Wilton carpets. Generally speaking, the two are really one fabric, there being little difference in the process of manufacture. In what this difference consists is briefly mentioned later. The manufacture of Brussels carpets has changed wonderfully. Twenty years or so ago, but one standard quality was made; now, so-called Brussels carpets can be bought at very low prices, but of the wearing qualities and taste exhibited in the design, it is best to say nothing. There have, however, been wonderful improvements made in machinery, as, for instance, in the looms for the manufacture of carpets in one piece up to four yards wide. The standard width of ordinary Brussels and Wilton carpets is three-quarters of a yard.

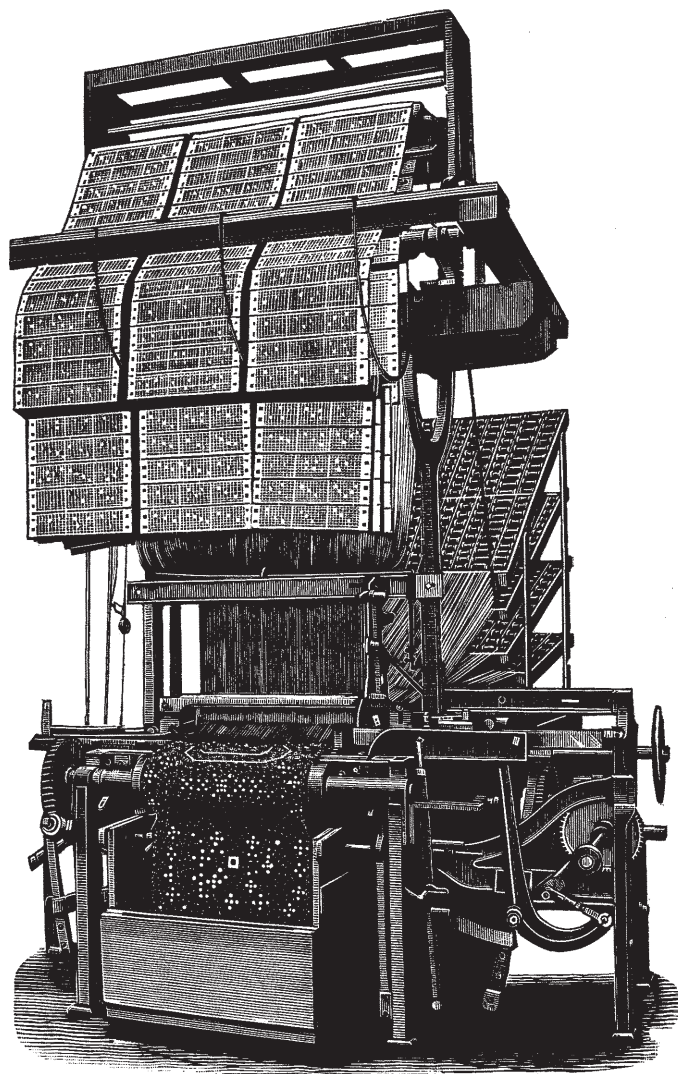


FIG. 36.

## THE BRUSSELS LOOM.

The engraving—Fig. 36—gives a very good illustration of a Brussels carpet loom. This has been taken

from a photograph supplied through the kindness of Messrs. John Crossley & Co., carpet machinery makers. The Jacquard, the card, the harness and the loom itself are all clearly visible. There is, however, one feature in the illustration which will not be understood by the general reader, *viz.*, the creels, shown at the back of the loom. These will be referred to later. As every one knows, the face of a Brussels carpet is composed entirely of small loops, the whole of it consisting of warp yarn.

WARP AND WEFT.—Brussels and Wilton carpets are woven upon the double shed principle. The wire forming the loops is inserted at the same revolution of the crank shaft of the loom, as when the shuttle is being picked or thrown. There are two chain warps and one stuffing warp, besides that which forms the face of the fabric. The last is, of course, operated by the Jacquard mechanism, but for the working of the chain and stuffing warps, three healds are employed. These warps are carried upon two beams placed at the back of the loom—the two chain warps upon one beam and the stuffing warp upon another. The face warp, only, consists of worsted yarn, the chain and stuffing warps being of cotton, linen or similar material, as is also the weft.

THE CREELS.—The warp forming the face of the fabric is wound upon bobbins, placed upon the creels, which are shown at the back of the loom. These creels vary in number according to the quality of the carpet. For what is known as a “five-frame,” five creels are necessary; for a “four-frame,” four creels, and for a “three-frame,” three creels. Sometimes, however, a variation in the pattern causes the use of a sixth creel for the making of a five-frame fabric, a similar increase in the number of creels being necessary in the case of three- or four-frame fabrics. This, however, will be referred to later. Suppose “five-frame” carpet is being

made. In the best quality, the standard pitch is 256 ends, showing upon the face in the width of the cloth, but, in reality, this number of ends must be multiplied by five, that is 1280 ends, representing the full number of ends of face warp employed. There are, therefore, 256 bobbins of yarn upon each of the five creels.

THE REED.—Through each dent in the reed, one end of each colour is drawn, and through the same dent, two chain warps and the stuffing warp are also drawn. There are thus no fewer than eight ends in each dent.

THE JACQUARD.—The Jacquard machine employed varies from that previously described, but still the principle of the machine is the same. The points of difference may be easily described. There are no wire uprights in this machine, their place being taken by cords, yet the result is the same, the necessary warp threads being raised as required. Still, machines have been made in which wire uprights were employed, but those in general use have cords, in place of uprights, worked by needles, precisely as in the ordinary Jacquard machine. There is the usual card cylinder, of course, but in this case it is hexagonal in shape instead of four-sided. There is a "lift board," situated towards the top of the Jacquard, perforated with holes, corresponding with the number of needles employed. This "lift board" raises the tail cords to which the harness threads are attached. The "lift board" is constructed so as to have a tilting movement, the object of which is to obtain a clean top shed, that is to say, that the warp threads may be exactly in line with each other. The comber board rises and falls by the aid of a lever, and by a cam is fixed to the bottom loom shaft. The object of this is that in weaving a five-frame carpet, four frames, according to the exigencies of the pattern, may be lifted out of the way, so that the shuttle may pass for the purpose of binding the fabric. There is no

spring box, the needles being pushed back at every pick of the pattern by means of a back board, suitably actuated.

THE CARDS.—The ordinary Jacquard cards are employed, but, as will be seen from Fig. 36, three sets of cards are required for a three-quarters wide carpet. When carpets of a greater width are being woven, an extra set of cards is used for each quarter of a yard in the width of the fabric. Thus, for a yard wide, four sets of cards are necessary. Of course, the more sets of cards in use, the larger the Jacquard must be. The needles are increased in number, and the various parts of the machine are arranged accordingly.

THE HARNESS.—Little need be said upon the harness, which is of the usual character, with mails and lingoies complete. One point, however, may be mentioned—each pick of



FIG. 37.

the pattern brings 256 ends of warp to the face of the fabric. This means that in an ordinary fabric, such as dress goods, 256 harness cords would form one pattern of the harness, but, in the present case, this is not so. In weaving a five-frame design, there are five times 256 warp ends to provide for, therefore the harness contains 1280 ends.

THE WIRE MOTION.—The wire motion is a most important piece of mechanism, and is situated at one end of the loom. Its purpose is to actuate several long wires, upon which the loops of the fabric are formed. Figs. 37 and 38 are views of the two ends of a Brussels and a Wilton wire, Fig. 37 being the Brussels wire, which varies from 31 to 31½ inches in length, and Fig. 38 the Wilton wire, varying from 30½ to 31 inches in length. The number of wires in use varies, but, ordinarily, there are from 26 to 28,

covering about three inches of fabric. Suppose a loom is working, and the first 27 of these wires have been operated upon, that is to say, 27 picks of the pattern have been formed. The twenty-eighth wire is being operated upon, the loops of the fabric are formed upon the wire, and the moment this has been done, the first wire in the set is drawn out of the fabric, and, when quite clear, passes forwards and is inserted in position, that is, taking the twenty-eighth position, and upon this wire the next pick of the pattern is formed. And so it goes on; as each wire is occupied another one is drawn from the fabric to take its place.



FIG. 38.

## WILTON CARPET.

As before stated, there is not much difference between the manufacture of Brussels and Wilton carpets. There is, however, a slight difference in the binding of the latter, and the loops of the fabric are cut as the wires are drawn out after each pick, and for this purpose there is a small knife at the end of each wire, as shown in Fig. 38. After weaving, the fabric is passed through a cropping machine, which produces a smooth, even pile.

## BRUSSELS CARPET.

The term "five-frame" carpet is commonly in use in all wholesale and retail warehouses, as well as in the factory, but outside the latter place, there are very few who understand anything as to the meaning of the term. They know that it is intended to convey the impression that the goods



are of the best quality, but why, they cannot explain. I happened, a short time ago, to be in one of the largest wholesale carpet houses in this country, and, in conversation



FIG. 39.

with the salesmen, I discovered that not one of them knew what a five-, four-, or three-frame carpet was. I will endeavour, as briefly as possible, to give a few particulars upon this point. Upon reference to Fig. 36, it will be noticed that

there is a series of frames called creels, at the back of the loom, placed in a slanting position, their near ends coming almost in close contact. In the weaving of a five-frame carpet, not fewer than five of these would be employed. Now, supposing there were five colours in one design—say, yellow, red, blue, green and black—there would be 256 bobbins of each colour. These bobbins would be placed upon the creels, each colour upon a separate creel. There would thus be five full creels of yarn, which would make a five-frame carpet. But there may be five, six, or any number of colours in a five-frame fabric, and here comes in the skill of the designer in arranging his design so that he may distribute his colours artistically, and yet within the recognised scope of the fabric for which he is designing.

A FIVE-FRAME DESIGN.—Fig. 39, a design for a Brussels or Wilton carpet, is given simply as an example to illustrate our explanations, and not as a specimen of a fashionable or good selling type of pattern. The design is on 128 ends and would therefore require repeating once to make up the full three-quarters, or 256 ends. Carpet designs have one distinguishing feature which is not at all common to designs for woven fabrics in general. The carpet pattern, when drawn upon the full-sized design or point paper, is the exact counterpart in size, colour, and in all other particulars of the fabric woven from it. Thus the designer sees, as it were, the actual thing growing under his brush, and therefore precisely what the fabric will be when woven. The point papers in use for the best quality carpets are  $10 \times 10$  and  $8 \times 8$ . Returning to the explanation—the design shown in Fig. 39 is for a five-frame fabric, although six colours are employed. The use of the extra or sixth colour is made possible by what is known as “planting,” that is, the arrangement of two colours on one frame. The simplest form of doing this is to have four full frames. Say, there

are black, brown, gold, red, blue and green, which are good plain colours for illustration. The black, brown, gold and red could be full frames, that is, 256 bobbins of each colour would be used, and thus each would be employed throughout the full width of the fabric. But with the blue and green it would be different. These two colours must be "planted," which means that, throughout the length of the piece, wherever blue appears, no green may appear in line with it, and *vice versa*. Fig. 39 shows this arrangement. If the reader carefully examines this design, he will notice

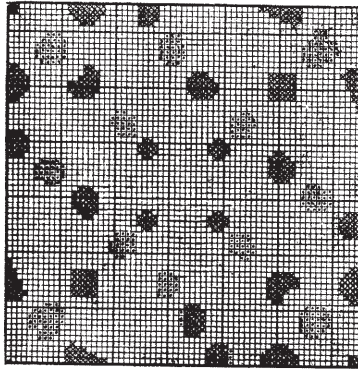


FIG. 40.

that the darkest and the second drabs (the lighter being employed for the ground) do not run in line, but are parallel with each other.

In order that this may be clearly understood, an illustration is given in Fig. 40, which shows how these two colours are planted. The crosses indicate the darker, and the dots the second drab. There is only one quarter of the design given, but this is sufficient, as the planted colours turn over each way.

In a "five-frame," as before stated, there are at least five colours which can be traced as spreading quite over the

full width of the cloth. If there are more than five, it will be apparent that no more than an equivalent to the five colours will be used, and no fewer should be used, but that is another matter which is not always observed. Any salesman or buyer should, with a little attention, be able to "spot" precisely whether a carpet is three-, four-, or five-frame. It may be asked what particular virtue a five-frame has over a three- or four-frame. This is easily understood. There are 1280 ends of yarn used, and no more than 256 can come to the face of the fabric at one pick of the pattern, therefore there are 1024 ends forming the back of the fabric. It will thus be seen that the carpet is thicker, softer, and consequently more durable, besides which, better designs can be utilised.

THE PLANT OR GAMUT.—Immediately under the design is the plant or gamut. This indicates the arrangement of the colours in the design. In the present case it shows clearly that the first four colours are "full frames," that is, they are employed indiscriminately throughout the design, as may be required, 256 bobbins of each colour, of course, being used in weaving. The fifth and sixth colours are shown on the plant exactly as they are arranged in the design. There are 70 ends of dark drab and 58 ends of light drab, or 128 ends in all. When the pattern is repeated once there are 256 ends, or a full frame. Now, as the gamut is detached from the pattern, the designer, who places it in proper position under the portion of the design upon which he is working, is enabled to indicate upon it every fresh bit of colour that he uses; therefore, it effectually prevents the introduction of an excess of colour in the pattern. The bobbins are placed on the creels according to the arrangement of the colours on the gamut, and thus, in weaving, these colours appear in the carpet in their proper positions.

MANIPULATION OF COLOURS.—In the designing of carpets,

by the careful manipulation of colours, wonderful effects may be obtained with many colours at precisely the same cost in yarn as if five only were employed upon the five creels. In the example only six are given on account of the difficulty of clearly showing more in a black and white engraving, but it would have been easy to have employed seven, eight, nine, or more in the same design, the only requirement being that all the extra colours should be planted. Now, suppose seven were employed instead of six colours in this design, say a salmon pink, there would then be one frame consisting of blue, green and salmon pink. The salmon pink could be placed at each corner of the four rosette figures, shown diagonally between the large centre figure and the same figure at each corner of the design. The gamut or plant would require to have the salmon pink indicated upon it. Counting from the left-hand side, this extra colour must be placed on the five ends from Nos. 20 to 24 inclusive, from Nos. 42 to 46, from Nos. 84 to 88, and from Nos. 106 to 110.

In the illustration one frame only is shown planted. It is, however, quite a common practice to plant the colours in more than one. Say there are three full frames. There could be changes of colour in the next two. There is scarcely an end to the planting of the colours, or to the general manipulation of them to which the designer may resort. He must, however, keep in view one or two important points—the planting of his colours must not be such as to produce a distinct striped effect—this must be entirely avoided, as also must a tendency to a blotchy appearance. It is quite possible for the designer to find that there is such a thing as too much scope for the production of effects of colour, which is apt to tend in the direction of vulgarity, instead of to neat and artistic excellence.

CHINTZ PATTERNS.—In the unlimited extent to which

planting of colours may be employed, probably a drab or green chintz pattern forms the best example. Taking a green chintz, which is a design in which floral effects are introduced, the designer gets as closely to nature as possible. He may employ a black, two greens and a yellow, which may be used for the ground, ornament and foliage—four full frames. The flowers will be in natural colours, but there would only be one frame remaining, on which these colours might be arranged. Here comes in the skill of the designer. He will arrange the flowers in such positions that only those immediately under each other shall be in the same colour. But dotted about in various positions across the width of his design he will have flowers in crimson, in scarlet, in blue, in grey and in other shades. But how does he get variety of shade in the *same* flowers? Simply by striping his flowers downwards. He commences at one side, say with deep crimson, and this is used from top to bottom of the flower, say for four ends, then on the next four ends he has a lighter crimson, and so on, until, at the opposite side of the flower, he has the palest pink or even a white. Each flower is treated in the same manner, and a very satisfactory result is obtained. Every change of shade must be indicated on the gamut, which may, in the end, show that on one frame there may be 20, 30, or more shades of colours, which means that on one creel alone there may be bobbins carrying 20, 30, or more different shades of colours.

USING EXTRA CREELS.—Occasionally a sixth creel will be employed for the making of a five-frame fabric, but this practice is by no means often resorted to. It is mentioned to show what may be done under certain conditions. For instance, the nature of the design may be such that only very small quantities of one or more colours are visible in some portions of the design. These small quantities of colour should be “stopped out” by substituting some of the

other colours. There would, therefore, be a certain number of *ends* vacant, that is, a certain number of bobbins of yarn of one or more colours would be saved. The same number of bobbins might be placed upon the sixth creel, and thus an extra effect of colour would be obtained in the design. To make this clearer refer to Fig. 39. Looking straight up the centre of the design it will be noticed that between the small rosette at the top and bottom and the large figure in the centre there is only one pick of ground colour, but in line with this there are two or three picks of the same shade, within the large figure. This ground colour for, say, three ends could be "stopped out" with a little manipulation. The same is done in the dropped repetition of the pattern, and it gives us six bobbins of colour. If these six bobbins were utilised in some other portions of the design, by the introduction of small dots of a bright shade, a good effect would be produced. This "dodging" of colour is, however, oftener resorted to in three- and four-frame carpets, four or five creels thus being used. It is by no means an uncommon occurrence in a three-, four-, or five-frame fabric to "stop out" portions of colour in any one frame and to abstain from introducing a corresponding amount of colour in another place. The result of this is that a certain quantity of yarn is saved, and the general effect of the design is little, if any, the worse for the saving.

SIZES OF DESIGNS.—In the designing of Brussels and Wilton carpets, much scope is allowed to the designer, as will be evident from the foregoing particulars. In point of size of design also there is a good margin for the production of bold patterns. It will be understood that as  $10 \times 10$  or  $8 \times 8$  design or point paper is used, the ends of face warp equal the picks in a given area, as will be noticed from Fig. 39. A three-quarters design is 256 ends wide by 256 picks long. A yard and a half pattern is, of course, 256 by 512. Any

length of design may be adopted up to the latter size, but it is not a usual thing to go beyond it. The yard and a half pattern is much used for bold effects, but one may go further than this by the adoption of the method described and illustrated previously in these pages. This method gives to a pattern the effect of a yard and a half wide repeat. For a description of this, it will be necessary to refer to "A Further Example of the Drop Pattern," and to Figs. 13 and 14 illustrating it. Hitherto body Brussels have only been dealt with, but there are borders and stair carpets, upon which we may be expected to say something. However, as most, if not all, that has already been said is applicable to the latter as well as to body Brussels, it is scarcely necessary to say much more. The sizes mostly in use for stair carpets are half-yard, five-eighths, three-quarters and four-quarters. The proportions for body and border of a stair carpet are important; the border may be too wide or too narrow. As instances of due proportions, we may mention that a five-eighths stair would have, say, 46 ends for each border and 126 ends for the body or filling, or 218 in all. A three-quarters would have, say, 54 for each border and 148 for the body or filling, or 256 in all. Borders vary in width—three-eighths, half-yard and five-eighths being sizes in use, although the most common are the two former. A three-eighths border would have, say, 126 ends, and a half-yard 172 ends. The planting of the colours and all other particulars are the same as for body Brussels.



## CHAPTER VIII.

### TAPESTRY CARPETS.

TAPESTRY carpets rank amongst the most important of ornamental textile fabrics, and we, therefore, propose to give a few particulars of their method of manufacture. The ordinary observer is quite unable, except from an examination of their backs, to distinguish between a tapestry and a Brussels carpet, and yet, in the processes of manufacture and in the cloths produced, there is a wonderful difference.

#### DIFFERENCE BETWEEN BRUSSELS AND TAPESTRY.

By placing the two side by side, a clearness and sharpness about the Brussels pattern is noticed which is absent from the tapestry. In the latter there is a mistiness about the colours, and the pattern lacks that sharpness and delicacy which characterises the former. This is due to the process of manufacture. A Brussels is a yarn dyed and a tapestry may be described as a printed fabric, but the printing is done upon the yarn before the process of weaving. The whole method of manufacture is most ingenious. In the making of a five-frame Brussels, to which the previous chapter was mainly devoted, no fewer than 1280 ends of face yarn are required for the weaving of one piece of standard quality—each frame consisting of 256 bobbins. It was pointed out that 256 ends only can come to the face at each pick of the pattern. Therefore, 1024 ends of yarn are hidden in the body of the fabric. There are many qualities of tapestry made, but these remarks will be confined to the standard

quality. In the production of this only 216 ends of face yarn are required, instead of 1280, which shows at once that the Brussels carpet has the great advantage of being thicker, softer and altogether a more durable cloth, apart from other advantages which it possesses. There is a limitation in the

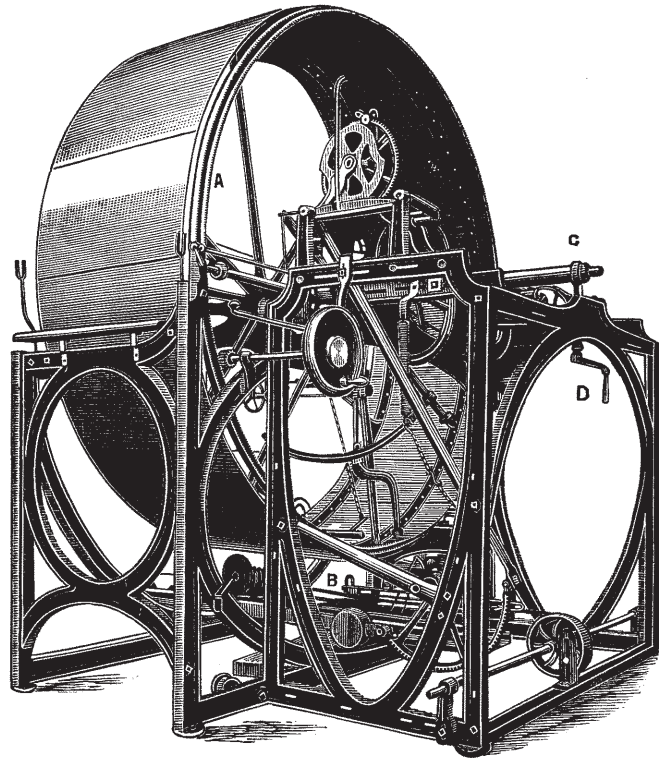


FIG. 41.

number of colours used in a Brussels as described in the last chapter. In tapestry there is no limit. In the Brussels the whole of the colours used show a more or less striped appearance at the back of the fabric. In a tapestry they do not show at the back at all. In passing, it may be said that this fact is made use of by householders in purchasing carpets,

this being about the only way the average person can tell the difference between them. In order to pass off tapestry as Brussels, some ingenious makers have resorted to amongst other methods the striping in a regular manner of the backs of the former. The stripey effect in the latter is broken and irregular. A casual observation of the clearly defined character of a Brussels pattern should enable a buyer to distinguish between the two fabrics. There are three processes which call for special mention—those of printing, setting and weaving.

#### THE PRINTING PROCESS.

The illustration—Fig. 41—is that of a printing drum. It has been already stated that the yarns are printed before weaving. This operation is a most important one. The drums are of various sizes, the one shown being what is technically known as a “half print”—the precise meaning of which will be seen later. The dimensions of this are as follows: Circumference, 18 ft. 9 in., and width, 3 ft. First of all the drum is covered with thin oil-cloth of a special kind. The yarn is then wound upon the drum, from 6 or 8 bobbins, and, when full, the printing commences. One man, the printer, and a boy, the filler, are required for each drum. The printer stands upon a platform immediately in front of the drum.

THE PRINT BOARDS.—To the right hand of the printer is a narrow frame, not shown in our illustration, furnished with a cord and pulley. The print boards are attached to this cord, and the pulley enables them to be raised or lowered as required, in order that the operator may have any desired portion of the design within range of his eye. They consist of long, narrow boards, from which the precise manner in which the yarn must be printed is ascertained. The pattern to be printed from is cut into a certain number of strips, each

of which is fixed upon a separate board. Every colour upon these bears a distinct number in white paint.

THE INDEX.—At the right-hand edge of the drum and running around its circumference are two indexes, A, one being for tapestry, numbered from 1 to 648, the other for tapestry velvet, numbered up to 432. The numbers upon the various colours on print boards correspond with those upon the index, and by reference to the two sets of numbers, the operator is enabled to print any colour exactly in proper position upon the yarn, as the drum revolves, either automatically or by hand as required, and to stop at any point desired.

THE COLOUR BOXES.—For each colour printed upon the yarn, a separate colour box is required, furnished with wheels, in order that they may pass under the print drums, a pair of *lines* being laid down for this purpose. Inside each box is a revolving disc. The colours are put into the boxes by the filler, whose duty it is also to place them upon the lines in the order called for by the printer. As the box runs along the lines forwards and backwards, the disc inside it revolves, bringing the colour with it. This disc is in close contact with the yarn, and, consequently, as the former revolves, the colour is printed in a straight line across the latter, the full width of the drum. This portion of the mechanism is situated under the drum at B. The filler stands at the right-hand side of the machine, at which point he has free access for the changing of the colour boxes.

PRINTING THE YARN.—Having briefly described the drum, the index, the print board, and the colour boxes, a few words will now be sufficient to show how the yarns are printed. The yarn being wound upon the drum and everything being in order, the printer refers to his print board. The colour, numbered 1, may be a red—his drum revolves to the corresponding number on the index; the word is given to the filler, and the required box is placed in position.

Away it runs forwards and backwards, leaving its impression upon the full width of the yarn upon the drum. All the red in the design is treated in a like manner, followed by other colours, the drum revolving and stopping as may be necessary until the yarn presents an array of stripes of varied hues—red, green, blue, black, brown, yellow, or any others that may appear in the design. It may be somewhat puzzling to understand how these yarns are made to compose a pattern, but this will be shown later.

REMOVING THE YARN FROM THE DRUMS.—When the whole of the yarn contained upon the drum has been printed, it is removed bodily, in order that more may be wound upon it, to be treated in like manner. Firstly, it will be seen that as the yarn is wound round and round the drum, it could not be bodily removed, and, secondly, as the lower portion of the drum is encased in a framework, the yarn could not be removed at all, except by the process of unwinding. In order to accomplish this, *three* contrivances are adopted. To produce a slackening of the yarn, a section of the drum (a “door”), at two opposite points, is let down. The yarn is, therefore, at once *loosened*. Then the upper portion of the framework, at the left-hand side, is also let down, which appears to produce this result, *viz.*, that as the shaft upon which the drum revolves is deprived of its means of support at the left side, it must inevitably topple over. But not so. Such a result is prevented by a little arrangement upon the right-hand end of the shaft. Upon this shaft there is an eye-bolt at C, by which, on tightening by the aid of the handle at D, the drum is held firmly in its proper position. The yarn and also the oil-cloth upon which it is wound are removed bodily, and all the parts are re-adjusted ready for the printer to operate upon a fresh lot of yarn. Such, briefly, is the process of printing yarns for the manufacture of tapestry carpets.

STEAMING THE YARNS.—Tapestry yarns after being printed are subjected to a steaming process, which fixes the colours. For this purpose, steaming chests are used, the shape of which varies, some being oblong, whilst others are cylindrical. The yarn is placed in these chests, stretched upon frames. There is little in this operation which calls for special description, neither is there in the process of washing—cold water only being used—nor in that of drying.

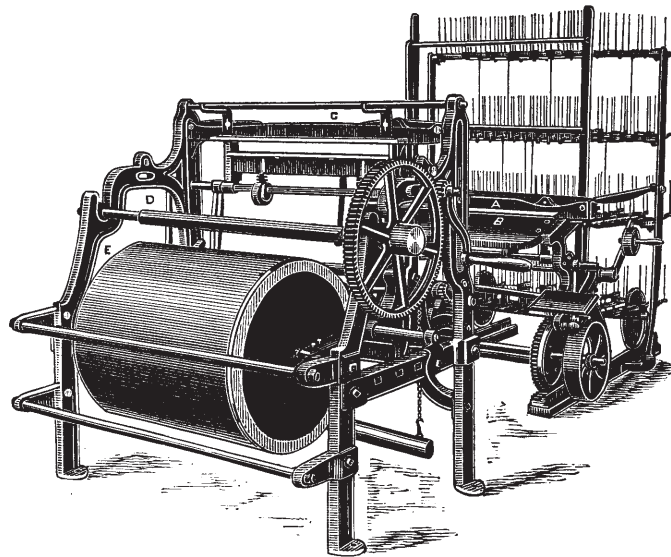


FIG. 42.

## THE SETTING MACHINE.

When the printed yarn has been steamed and dried, it requires winding upon bobbins. It was mentioned that the yarn from 6 or 8 bobbins was wound upon the half-print drum at one time. This must now be re-wound upon the same number of bobbins. When the whole of the yarn, composing the full width of the carpet, has been printed and re-wound, it is sent to the “setter”. The illustration—Fig. 42—is a view of a setting machine. This operation is

usually undertaken by members of the female sex. The back portion of the view shows the creels, upon which the bobbins are placed. The ends of the yarns are then drawn through a pair of clasps, A, extending across the front of the creels. In front of the latter is the setting board, B. This is marked across its width with a series of parallel lines, the object of which is to enable the setter to arrange the various colours of the yarn in proper positions to form the pattern. The yarns next pass through clasps, shown at C, and from thence to the beam, which is placed upon the shaft, D. The large wooden roller at E presses against the beam, as the yarn is being wound upon it, and thus makes a hard, firm beam of yarn.

HOW THE SETTING IS DONE.—It will be understood that each end of yarn is printed in a variety of colours. There may be an inch of red, succeeded by six of blue, three of black, four of green, and so on, the colours ever varying throughout the whole length. As a large number of bobbins are being used it will be readily understood that by a proper arrangement of the various colours drawn from the whole of the bobbins some rough formation of a pattern is produced. It is the setter's duty to accomplish this. By a little manipulation with each end of yarn, using the lines upon the setting board as a guide, we ultimately arrive at an elongated representation of the desired pattern. Just to what extent this elongation appears will be understood when it is considered that a pile or looped fabric is to be woven, that the loop consists of two sides and the turn or top of the loop, and that, in the process of weaving, the two sides of the loop are practically hidden, the turn or top forming the face of the fabric. The creels are made to advance and recede for about the space of 12 ft., this being the length of yarn operated upon at one time. When this length has been properly set, the clasps, A, fix it until it has been wound on

the beam. The same operation is repeated until the whole has been transferred to the beam, when it is ready for the weaver.

#### THE TAPESTRY LOOM.

The loom for weaving tapestry carpets is similar in some respects to the Brussels loom already described, and yet there are important points wherein it differs. A fabric is being woven consisting only of 216 ends, whereas the five-

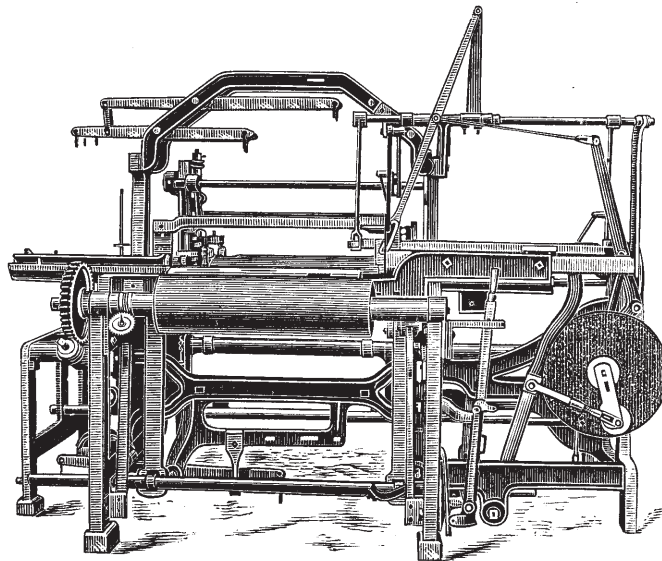


FIG. 43.

frame Brussels loom operates 1280. There is, therefore, no Jacquard, and consequently no cards or harness, neither are creels required. In other respects, the loom is much like that for the weaving of Brussels, as the following particulars will show.

**WARP AND WEFT.**—The warp forming the face of the fabric is wound upon a beam, as already stated. There are also two chain warps and a stuffing warp. The two chain warps



are carried upon one beam, and the stuffing warp upon another. The double shed principle is adopted as in the Brussels loom. The chain and stuffing warps, and also the weft, are of cotton, linen or similar material, and are operated by four healds.

THE REED.—Through each dent in the reed, one end of face yarn, an end of each chain warp, and an end of stuffing warp are drawn. There are thus four ends through each dent.

THE WIRE MOTION.—The wire motion is almost identical with that on the Brussels loom, similar wires being employed to those shown in the previous chapter, the tapestry wire being like that in Fig. 42, and the tapestry velvet wire like that in Fig. 43. The motion operates in exactly the same manner as that already described. As the pick is formed upon one wire, another is inserted in its place. This wire motion is shown to the right of the loom, illustrated in Fig. 43. This is a view of a tapestry velvet loom. This is given because on the tapestry loom the wire motion being almost identical with that on the Brussels loom, a comparison between the tapestry and tapestry velvet motions may be made.

#### TAPESTRY DESIGNS.

There are various qualities of tapestry carpets, but the standard quality is 216 ends in width. For the designing of this quality, 8 + 7 ruled or point paper must be used. There are many points of difference in designs for Brussels and tapestry carpets. For instance, in the latter, there is no planting of colours to trouble one, as the method of manufacture is such that any number may be employed. Of course, the designer uses discretion in this matter. He will require just sufficient colours to produce a telling and tasteful effect. It is by no means an easy thing to draw a good tapestry design. Whilst in Brussels, every flower or orna-

ment, in fact, every line or dot which appears in the design is reproduced in the carpet, in tapestry this is not the case. Certain colours run or spread into other colours, and the designer must thoroughly understand what will be the effect of the design when it is woven. Now suppose he draws a band in two colours, say a gold and a brown, with a row of balls in brown and white—he would have about double the thickness of gold lines compared with his brown lines. So

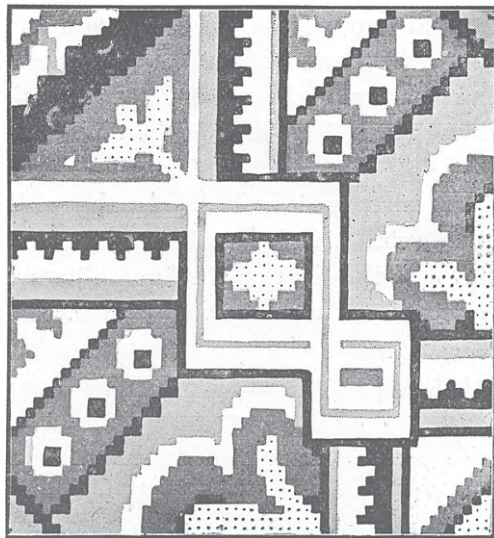


FIG. 44.

also, the balls would be mostly white, very little brown being sufficient to show up well when the pattern is woven. Thus, as the designer applies his colours to the paper, he must see in his mind's eye the result in the carpet, the lightest colours being made most prominent, but when woven, the light and dark will be pretty evenly balanced, owing to the *spreading* above mentioned. The result of this *spreading* of the colours is noticeable in any tapestry. It is to this that the pattern

owes its ragged and misty appearance, which is entirely absent from Brussels. Fig. 44 is a section of a simple design for tapestry, which will serve the purpose of illustrating this manipulation of colours. Before leaving this part of the subject, it may be explained that, in certain cases, the balance of light and dark colours would be about even, that is, of course, if they were required to appear so in the woven fabric. Lines running upwards are treated in this manner, but diagonal lines, or those running across the width, would require more light than dark. The pattern, Fig. 44, has been drawn specially to illustrate these points.

THE SIZES OF DESIGNS.—The designer is restricted to certain sizes of designs. The full width of the standard quality is, as before stated, 216 ends. It has been mentioned that the index upon the printing drum has divisions numbered from 1 to 648. Any division of 648 can be utilised for the length of a design. Thus—324, 216, 162, 108, and so on, can be used, but a good and useful size is 216. The illustration—Fig. 41—shows what is known as a half-print drum. There are also quarter-print and full-print drums. These terms denote the style of the design, and the style of design governs the particular drum upon which the yarn for that design is printed. A quarter-print pattern has four repetitions of the design in the width. A half-print has two repetitions in the width. These repetitions may be either straight across or “dropped”. The full-print pattern is, of course, one in which one repeat occupies the full width, *viz.*, 216.

Borders and stair carpets are, of course, made in tapestry. The borders mostly in use are woven two in the width of a piece. In stair carpets, half-yard, or, as they are technically termed, two-quarters, five-eighths, and three-quarters are mostly used.

DESIGNER'S COLOURS.—The tapestry designer is furnished

with a full range of all the colours he ever requires, and these are legion. They are, of course, mixed by himself, or by one of his assistants, by the aid of a glass or marble slab, a muller and a pallet knife. In the mixing of tapestry colours, a large quantity of gum is used, because the designs are all coated, when finished, with spirit varnish, to prevent the latter from smearing or otherwise spoiling the design. In Brussels designing, colours are usually mixed to shade for each separate design. In tapestry, as above stated, the designer has a range of colours of every conceivable shade, that he is continually using, and as they are finished, others exactly like them are mixed to take their places. The colours set hard in the saucers in which they are placed, but a little water is all that is required to make them usable again.

## CHAPTER IX.

### INGRAIN CARPETS.

THE fabric commonly known as "Scotch," "Kidderminster," and "Art Squares" is properly called "Ingrain Carpet". This differs widely from the two fabrics already described, as it is not a looped fabric. Many readers are conversant with double cloths for wearing apparel, and the ingrain carpet is a perfect type of a double cloth, for the decoration of the home, which may be worn on either side, with equal satisfaction from either a wearing or an ornamental point of view.

The fabric in an artistic sense does not compare in its effectiveness with the more expensive Brussels carpet, its clearness and beauty in design and its great adaptability for tasteful colour effects giving the latter the pre-eminence, but its wearing qualities are considered to surpass those of tapestry carpets. Being a double cloth, it is reversible, for whereas there may be upon one side light ornament on a dark ground, on the other there would be dark ornament on a light ground. There are varieties of the fabric made, and to touch upon all these would take up too much space, but in order to give sufficient particulars to enable the reader to learn something of the method of manufacture, attention is called to the extra super two-ply ingrain carpet, which is the standard quality made.

#### INGRAIN CARPET LOOM.

The illustration—Fig. 45—shows a loom for the manufacture of ingrain carpets, engraved from a photograph

supplied by Messrs. John Crossley & Sons. This loom in its general features partakes more of the character of a Jacquard loom for the weaving of fabrics for wearing

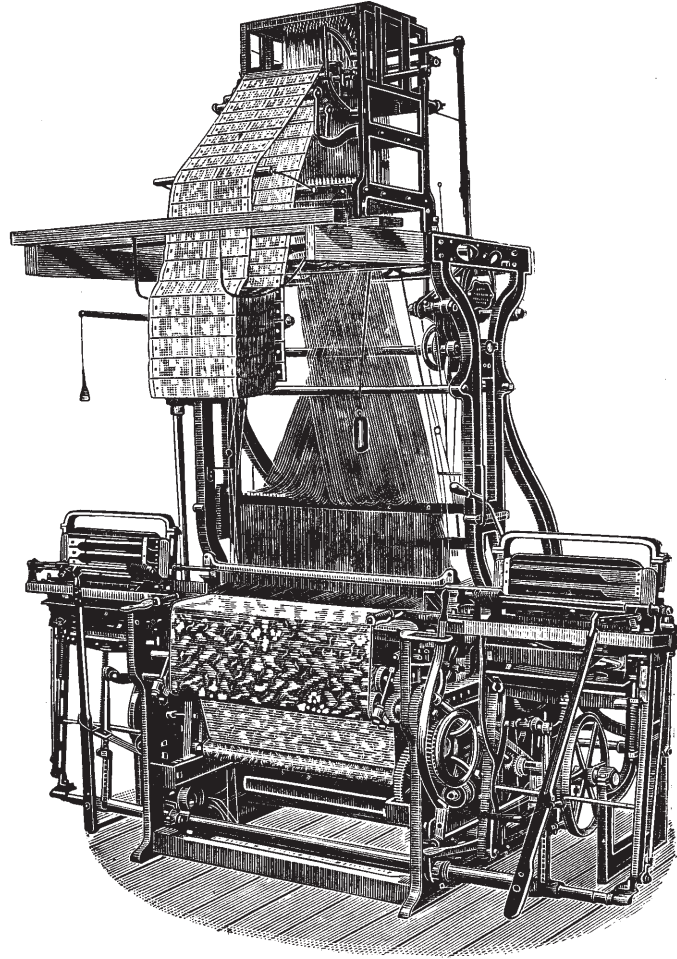


FIG. 45.

apparel than of the two previously described, *viz.*, the Brussels and the tapestry looms. The ingrain looms are generally of the kind known as vertical box-looms. They

are made up to six boxes. The illustration shows the Murkland type, which is an American invention, but has been improved in various particulars in this country. This loom is made with upright or circular boxes, the former being shown in the illustration.

WARP AND WEFT.—For the manufacture of extra super two-ply ingrain, four warps are required, which, however, really work as two. These are wound upon one beam. They are solely controlled by the Jacquard mechanism—no healds being required, as in the case of Brussels carpet. Through each dent in the reed, four warp ends are drawn. In any ordinary case, four wefts are employed, but in some, extra colour effects are produced, and, therefore, more shuttles are used.

THE JACQUARD.—The Jacquard machine employed is similar to that for the manufacture of Brussels carpets, but differs in important points from the machines ordinarily in use for the generality of fabrics. For the weaving of a piece of ingrain carpet, a Jacquard of 272 needles is employed; this produces one repeat of a design half a yard in width. Like the Brussels Jacquard, the majority of machines have cords worked by the needles instead of by wire uprights, as in the ordinary Jacquard. In some cases, wire uprights are in use, but the cords appear to be in greater favour. For weaving an art square, which is a most popular form of ingrain carpet, there would be of course a Jacquard of double capacity, *viz.*, 544 needles or two machines of 272 needles each. The needles in one of the single machines, or half the number of those in the double machine, would be utilised for the weaving of the body, the border and corner being controlled by the remainder of the needles. With the remark that the Jacquard is very similar to that used in the Brussels loom previously described, this portion of the subject may be dismissed.

THE HARNES.—The harness is constructed upon the principle generally in vogue. There are 272 needles, which would weave a repeat of half a yard. The full width of a piece of ingrain carpet is one yard. Therefore every needle is controlling two repeats of the fabric. The harness is, however, much more extensive when weaving an “Art Square,” because it would be required to control the warp threads for the borders and corners at each side of the carpet, and also a number of repeats of the body according to the width of the “square” being manufactured. But one point may be mentioned. There are four warps, really working as two, and, consequently, instead of 272 harness threads being required for each repeat of a pattern, there are 544 or 272 for each side of the double cloth.

THE CARDS.—In the manufacture of these fabrics, the Jacquard cards are an expensive item. The ordinary cards are employed, and in the making of an “Art Square” some idea of the cost may be obtained. For *piece goods*, of course, one set of cards only is required, but for the “square,” a set is necessary for the body, one for each of the two borders, and one for the corner, or four sets in all. For each change of the cards, the loom must be stopped, and the change effected by hand.

#### THE INGRAIN CARPET.

In the manufacture of ingrain carpets, four warps and four wefts are employed, as previously stated—two warp threads and two weft threads for the figure, and the same number of each for the ground. Extra effects of colour may be obtained, first, by ordinary means, and, second, by special means. By the ordinary method, a striped warp is employed, the proportion of the various colours being guided by the ruled paper design. The planting of colours has been described in the particulars given on Brussels carpets. This



planting is all done in the warp. In ingrain, extra effects may be got by planting or striping the warp, and, further, by employing extra shuttles. The result is not, however, perfection, as a fabric is obtained more or less one mass of stripes. The colours show up plainly in all places where they are intended to show, and, to produce this result, what are termed half-tone effects of the same colours show between, which cause the fabric to be stripey, and far from pleasing from



FIG. 46.

an artistic point of view. The special means adopted for producing extra colour effects are due to enterprising manufacturers, one of whom, in the Leeds district, shows some really beautiful specimens of ingrain carpets. By these special means, extra colours are placed in required positions, according to the nature of the design, without the objectional feature above referred to. By way of example, notice the design given in Fig. 46. In the upper right-hand corner are

three flowers. By the ordinary method of striping the warp, the centres of the three flowers could be got in different colours, but there would be a subdued stripe effect of the same colours running down the design, until same flowers appear again, and if it was required to bring up these colours in the small flowers which intervene, the largest of them striped would be in the two colours used for the centres of the large flowers immediately above. Here comes in a little lesson in designing. This design does not lend itself readily to this method of striped warps, as, in order to produce the best possible results, the designer must either refrain from bringing up extra colours again, that is, they would not appear again until the same flowers were struck in the next repeat, or he must alter his design in order to more effectively make full use of his extra colours. These remarks apply to all classes of textile fabrics, where planting of colours is an important feature. Under such conditions, the designer will generally see that flowers, leaves or portions of ornament, which can be utilised for the introduction of extra colours, are placed in relation one to another, so that the object to be attained shall be effected with the best possible results. The design—Fig. 46—would not be objectionable if special means were adopted for using extra colour effect. Manufacturers have been ready to recognise the objection to the striped effects in ingrain carpets, and, to avoid this, have hit upon the plan of a neutral shade of warp, or some union of warp threads which will harmonise with the weft colours introduced to give a pleasing variety to the design, the warp being of one shade for the figure and one for the ground only, throughout the fabric. In Brussels, almost any number of colours can be used, because they only show just where required on the face of the fabric, and, when not required, are hidden away at the back. In ingrain it is different—the stripes show on both sides of the cloth, and hence the great

improvement resulting from the efforts made by various manufacturers to overcome what were, to any one with taste and artistic feeling, objectionable fabrics. Where these striped fabrics are manufactured, the objection to them is not so forcible as was formerly the case, where large geometrical designs were employed, and stripes of from four to six inches of one colour were displayed throughout the length of a piece. Truly, the taste displayed in the manufacture of ingrain carpets has made vast strides during the last generation.

INGRAIN DESIGNS.—In designing for ingrain carpets, there is much scope for the skilful draughtsman, who should always bear in mind the nature of the fabric for which he is designing. In other words, he should endeavour to have the fabric growing in his mind's eye as he proceeds with his work. He should be ready to fully estimate what the effect of any portion of the work upon which he may be engaged will be upon both sides of the fabric. The illustration given in Fig. 46 shows a good specimen of a design for an ingrain carpet. The bordered designs which were given earlier would also adapt themselves readily for this purpose. Referring to Fig. 46, the large figure lends itself readily for the introduction of extra colour, which might be placed in its centre portion. The same colour could come in the three small flowers at the edge of the scroll above. Then the centres of the three flowers at the top, to the right hand, could be in the same colour, which might be also utilised for the smaller flowers below. Floral or ornamental designs are very popular, but large geometrical figures of the class already named are out of date. The patterns should not be too crowded nor too much cut up, as a mass of detail is objectionable. When it is considered that the full repeat of a design is half a yard, it is seen that the designer has much scope for his powers. The same size is allowed for a border

and for a corner, and thus the designer, with a ready conception, can produce effective and artistic patterns. But here an observation may be made which is applicable to any form of border designing, *viz.*, whilst a border should harmonise with the body, it should not partake too closely of the *motif* of the body pattern. Let the border be bold—if possible, bolder than the body, and whilst in full harmony with it, let the ornamentation be different. In the majority of cases, the result will be most satisfactory, as variety is thereby obtained, and variety is pleasing. The width of a repeat has been mentioned. The most suitable length for a design is the same, *viz.*, half a yard, because it enables the manufacturer the more easily to utilise a design, either for piece goods or for a “square”. The length of the repeat being equal to the width enables the same ornamentation of the border to be used at the sides of a fabric that appears at the top and bottom, this being a desirable feature, producing a full carpet square of the most harmonious character. It may be taken for granted that a manufacturer having an eye to his interests will be ready to supply any pattern, either in piece goods or in the form of the “Art Square,” so popular in ingrain carpets.

RULED OR POINT-PAPER PATTERNS.—In order to show the method employed for drafting designs upon ruled paper, a portion of Fig. 46 has been worked out as an example, Fig. 47. This takes in one of the flowers shown at the top, to the right hand, in Fig. 46, with portions of the ornament immediately surrounding it. The design—Fig. 47—shows four colours, two for the figure and two for the ground. The first figure thread, which is white, mates with the first ground thread, black. So that in weaving, white figure appears on the face, and black figure on the back. The same occurs with the next thread, and so on throughout the pattern. A further colour effect might be obtained by shading

a design, where possible. By shading a design, the introduction of a half-tone is meant. This might be produced by indicating upon the ruled paper alternate picks of the figure and ground, as shown in the centre of the flower in Fig. 47. This is useful, not only in this case but also in the shading of large leaves or scrolls; in fact, it may be employed where it is not desired to use extra colours, or even in conjunction

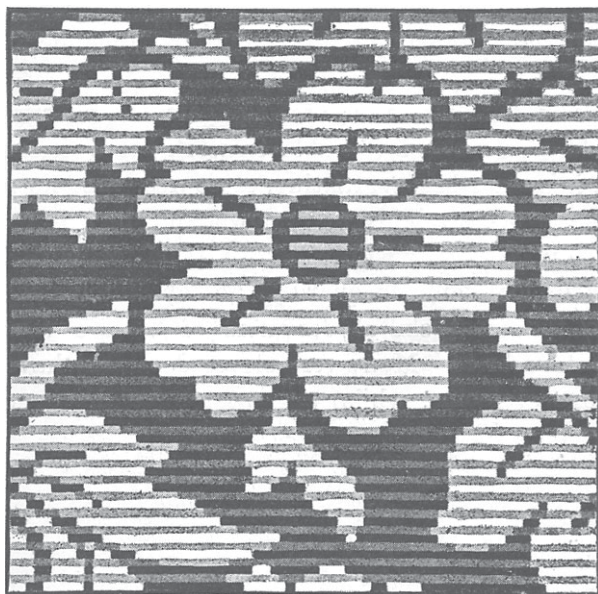


FIG. 47.

with them. Taking Fig. 46, this half-tone would be used in the centre portion of the large or principal figure and in one or two other places, which might be found suitable by the designer, as he worked out the pattern upon ruled paper. Where extra colours are used, they would be placed in similar positions to those indicated for the half-tone effect. The example given in Fig. 47 should supply any additional information upon ruled-paper drafting required by those

interested, and we, therefore, consider further particulars unnecessary—beyond the fact that design paper, having an equal number of *ords* or squares each way, is used for the drafting of extra super two-ply ingrains ; thus  $8 \times 8$  paper may be used. The full repeat of a ruled paper is 272 *ords* or squares in width, this being the standard for the cloth here described. In the drafting of patterns for ingrain or “Art Square,” four ruled papers are required—one for the body, two for the end and side borders, and one for the corner.

If the student carefully notes the particulars here given, he should, with practice, be able to work out a design suitable for ingrain fabrics, granting, of course, that he is possessed of the necessary inventive power and the skill required in the way of freehand drawing. A good technical knowledge of the loom and Jacquard is not absolutely necessary, even to the most skilful designers of a large variety of ornamental fabrics. Many very clever designers have little knowledge of looms, whilst a great number have none at all.

## CHAPTER X.

### AXMINSTER CARPETS.

INFORMATION has been given on Brussels, tapestry and ingrain carpets; a most important variety, namely, Axminster, must now be dealt with, as these chapters would not be complete without some notice being taken of this really beautiful fabric. It is with no little difficulty that this portion of the subject is taken up, as there are many varieties of Axminster, and to treat upon all would be almost an impossibility; therefore, those particular cloths which will, from their importance, prove the most interesting and instructive will be considered.

#### THE AXMINSTER CARPET.

The fabric is constructed of hank-dyed yarns, as in the case of Brussels and Wilton carpets, but they differ widely in the process of manufacture. The Wilton is really a Brussels with the pile cut. An Axminster is also a cut-pile fabric, but the pile is formed in a totally different manner from that of the Wilton, besides which, it is much thicker. The Wilton is woven on wires—the Axminster is not. It will be seen later how this is done. In the former, there are certain limitations to the use of colours, as described in a previous chapter. All colours used above a certain number require to be planted—that is to say, in the weaving of a “five-frame” there may be ten colours (any reasonable number may be used), and, if there are four full frames, six colours would be planted in the fifth frame. These six

colours would run in rows, lengthwise of the piece. In Axminster, there is no limitation to the number of colours employed, but the means by which this is accomplished will be mentioned in proper order. As before remarked, there are many varieties of the fabric; for instance, "hand-made," "patent or chenille," "royal" and "aristo," the two latter being the same fabric, differing only in "pitch".

One of the main difficulties in the treatment of such a subject as the present is its proper illustration. Firstly, as to illustration by designs—no good service would be done by giving a "ruled-paper pattern" of each class, therefore only one has been drawn, and, even in this case, an imperfect result is obtained, consequent upon the inability to show in a black and white engraving a necessary number of colours. Notwithstanding this drawback, the pattern will be found useful for the proper elucidation of one or two points. This design is for a three-quarter yard fabric, only half this width being shown. It is a reverse or centre pattern of the same type as that explained in Figs. 9 and 10 in the chapters given earlier upon "Hints on Designing Fabrics". The "royal" is a cloth which has attained much prominence in the trade, because it is woven upon a power loom of unique construction, the original patent for which lapsed some time ago. The illustrations given in the patent specification are of too complicated a nature to be of service in a treatise written in the simplest manner possible.

Axminster carpets are continually gaining in popularity. The fabric is beautifully effective—is thick, and at the same time soft to the tread, whilst it is also durable, and, what is most important to the purchaser, it has come down greatly in price.

HAND-MADE AXMINSTER.—Briefly, this is made without a loom, and something after the following manner: Two wood rods run parallel with each other. In the manufacture



of a three-quarter yard fabric, these rods would be such a distance apart as to accommodate that width of cloth. The pile is constructed of tufts of yarns, each one of which is separately tied into the warp, and, when a full row has been fixed, the weft is introduced, and thus the process proceeds until a complete piece results, which then requires to be cropped and finished. In the case of a "square," the procedure is much the same.

THE PATENT AXMINSTER.—There is a great difference between the making of the "patent" and the "royal" Axminster carpet, but, at the same time, if these carpets in their finished state were laid side by side, it would, in some cases, be difficult for an inexperienced person to distinguish between them. There is also a very wide difference between the making of the patent Axminster and the tapestry or Brussels, and while one might be deceived with the patent and the royal, no one, not even the most inexperienced, could fail to discover the difference between these two and the tapestry or Brussels. There are two processes of weaving in the patent Axminster, while in the others, there is only one, and, moreover, in the former, there is really no limit to the number of colours or shades that may be used, and, what is of more consequence, carpets may be woven in one piece, without seam or join, to fit any room, hall, landing or stair. The advantages of this are very apparent to all, even to those who know little or nothing about carpets, inasmuch as users know well that all joined carpets wear at the seams, and at the mitres at the corners. Of course, some Brussels are now made to do away with the mitres at the corners, and tapestries and Brussels are also being manufactured in squares without seam, but the fact remains that, for beauty, and, what is infinitely of greater value, durability, there is nothing to excel the Axminster. As a proof of the favour in which Axminsters are held

by the community, it is only necessary to mention such names as Richard Smith & Sons (The Carpet Manufacturing Co., Limited), Tomkinson & Adam, James Templeton & Co., and John Lyle & Co., who are so closely identified with this particular make of carpet, and when the thousands of workers they employ are considered, some idea of the demand for the fabric can be formed.

In making a patent Axminster carpet, the first thing a manufacturer has to consider is the quality wanted, and the qualities that can be made are legion. Having determined this, he then proceeds to put the design on point or ruled paper, according to the quality determined upon. These papers are then cut into strips or shots, and from them, the weft cloth is woven, according to the design, in looms specially built for the purpose. From the weft loom the cloth passes on to the cutting machines. These machines cut the webs of cloth, which are woven on what may be termed skeleton warps, into strips, which, on being closed or twisted, as the case may be, form the chenille fur shots, which go to make the surface of the carpet. The next process of manufacture is the making of the back of the carpet and the setting of the face thereon. This also is done on an elaborately and intricately built loom. The warps having been set in the loom—in some cases there are four or five warps—the formation of the back begins, either with a fine jute thread or with a heavy woollen one, as desired, and on this the chenille fur, which has previously been prepared, is set, while the back is being made. It will be readily conceived that as each consecutive chenille fur shot, which is woven in the necessary colours to the previously painted papers, is set, it will form and produce a pattern in the cloth, the same in every respect as that originally painted on the paper. From the setting loom, the carpet passes to the cropping machine, where the sur-

face is cropped of all the loose fibre or fluff, and, finally, it is steamed and finished, from whence it issues a beautiful and durable article, ready to adorn our homes.

## ROYAL AXMINSTER LOOM.

Amongst the several inventions for the manufacture of

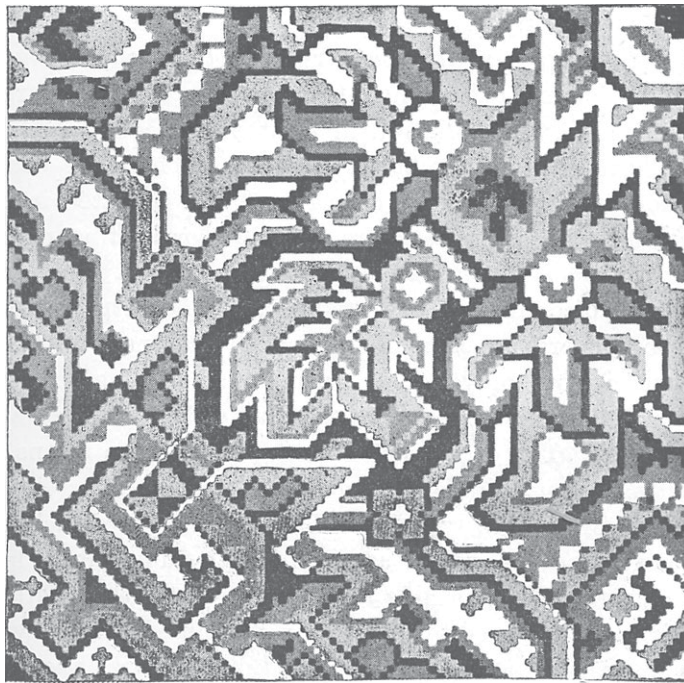


FIG. 48.

this cloth there are two which contain so many points of similarity that we shall endeavour to treat upon both, showing the reader in what manner one differs from the other, but, in the end, accomplishes the same result. The first of these is an invention by A. Smith and H. Skinner, and the second by C. E. Skinner and E. Tymeson, all four of whom have their homes in the United States of America.

Reference has been made to the hand-made cloth and how each tuft in a row requires to be tied separately into the warp. The object of these inventions is to perform this process by mechanical means, and, at the same time, to bind them into a perfect and durable fabric. There is no necessity to enter fully into the subject of the whole loom, as certain parts, which are in reality the essence of the inventions, are only necessary to give the reader a good idea of the method of manufacture. Briefly, there are a breast beam and cloth roll in front of the loom and also warp beams as in any other carpet loom. There are healds too for forming the shed, constructed and operated in the usual manner, and means are provided for beating up the warp threads. In Brussels and ingrain carpet looms the Jacquard machine is an essential portion of the mechanism, but in the present case this is entirely dispensed with, the various colours of yarns, or tufting materials as they are called, being arranged upon spools, each of which is operated as desired. This is a most important point, the means for effecting it being similar in the two inventions.

THE SPOOLS AND TUBES.—The spools upon which the tufting material is wound are of a length sufficient to hold the yarn required to form a row of tufts across the width of the fabric. Attached to the spool and running parallel with it is a bar fitted with as many short tubes or nozzles as there are tufts in a row across the fabric. Each spool turns upon journals held in a spool frame. A separate spool is required for each row of tufts in the whole pattern, thus in weaving a pattern of 100 rows, that number of spools is required, each one being brought into its proper position to form the necessary row of tufts.

Four illustrations are given. Fig. 49 shows an elevation of the spool and tubes. Fig. 50 is a plan view of the same, and Fig. 51 an end elevation. In Fig. 52 we give a tube in

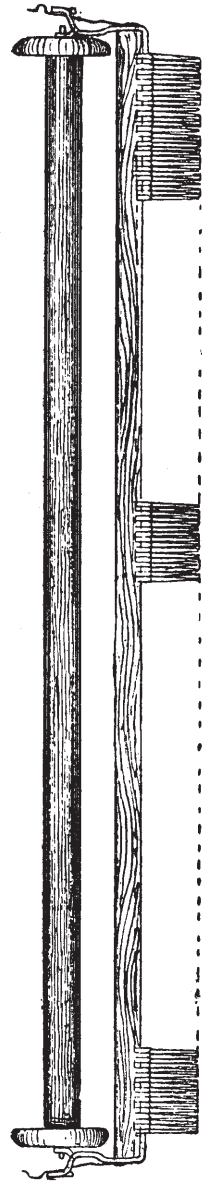


FIG. 49.



FIG. 50.

its actual size. Of course the tubes reach from end to end of the spool, although they are not shown in the drawings.

The material for each tuft is wound on the spool in a belt or zone. By referring to the design given in Fig. 48, and taking the bottom row of the pattern, sufficient of each of these colours should be arranged on a spool, in the exact order here given, and these colours would come up in the carpet in positions exactly as shown on the design.

Fig. 53 is a rough drawing, representing a portion of a spool with different coloured yarns upon it ready for use. This shows clearly the manner of "setting" the yarns. Sup-



FIG. 51.

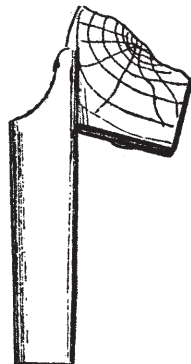


FIG. 52.

posing that in a single row of design there are four brown, succeeded by four black, six blue, three black, six red, two white, two green and so on ; these yarns are wound upon the spool, as shown in the illustration, the four brown being represented at A, the four black at B, the blue at C, the black at D, the red at E, the white at F, and the green at G, to be followed by other colours to the end of the row, as indicated upon the design.

The use of spools gives much the same effect as that produced by a Jacquard, but whereas the Jacquard can manipulate only a certain number of colours running in line with each other by the system of spools, each succeeding tuft in

the length of the pattern might be of varying shades. The absence of restriction in the manipulation of colours forms a distinct advantage over Brussels and Wiltons, enabling colour effects to be easily produced, which in these cases could only be attained with imperfect results, even after the exercise of great care and ingenuity on the part of the designer.

When tubes are prepared for use, the ends of the tufting materials from the spools are passed through and protrude sufficiently from the tubes, H, as indicated by the dotted lines in Fig. 53, usually for about an inch—ready to be engaged by the warp of the fabric.

THE SPOOL CHAINS.—In order that the spools may be

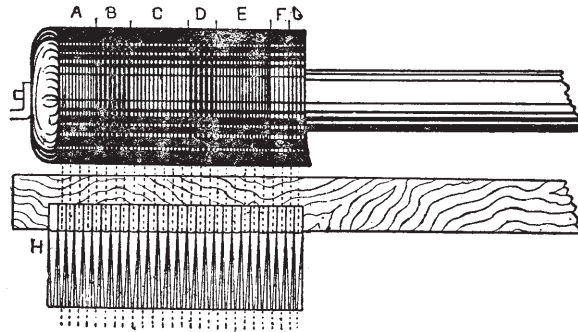


FIG. 53.

held and presented in their proper order to the mechanism which takes them and introduces the ends of the tufting materials between the warp threads, two parallel chains are provided. These chains are endless, and pass round sprocket wheels, secured to a shaft supported by the frame of the loom. These chains are long enough to hold as many spools as are required in the weaving of any particular pattern. Each spool is taken from the chain in succession by the aid of transferring arms, and placed in position over the warps, and, after use, is returned to its original place upon the chains.

WARP AND WEFT.—The spools are presented to the

warps with, in the case of the first invention, their tubes in horizontal position, and are then rocked so as to turn the ends of the tufting yarn down between the warp threads. After the ends of this tufting yarn have been introduced between the warp threads, a shot of fine filling is introduced into the shed to secure and fasten the ends of the tufting materials, after which these ends are turned backwards and upwards by means of a comb, previous to the introduction of a shot of coarse filling. In the case of the second invention the spools take a slight sideway movement, which lays the tufts across the spaces between the warp yarns; hooks then protrude through the warp from underneath and draw the tufts down through it, when a binding shot is introduced. The tufts are next turned upwards by the aid of a brush, and another binding shot is introduced.

Returning to the first invention, the filling is wound upon two bobbins or cops. These are set at opposite sides of the loom, in convenient positions, to permit the filling to pass to the devices which act upon it. It is passed across the loom through the open shed by means of a reciprocating weft carrier. Two loops of weft or filling, one from each side of the loom, are passed through each shed that is opened. Thus both selvages are made secure, although the weft is introduced in the form of a loop. The same weft carrier passes the weft from both sides of the loom. There are two warps—one fine and one coarse—and, by a suitable arrangement, these are presented to the weft carrier in the order required. There are fine and coarse fillings—the former being used after the insertion of the tufting material, so as to fasten it, and the latter at other times. In order that the weft thread introduced by the weft carrier, while moving in one direction across the shed, may not move back with the carrier when it moves in an opposite direction, a spring weft finger is provided at each end of the lay to hold the end of the loop (warp).



When the lay retrogrades after beating up the filling, the weft fingers withdraw from the loop.

CUTTING THE TUFTS.—In the “Smith and Skinner” invention, the cutting of the tufts is performed by a disc-cutter, which turns upon its central axis as it moves backwards and forwards across the loom. This disc-cutter operates in connection with a fixed blade, having a long cutting edge, so that it may perform the double object of cutting and supporting the tufting material for the action of the disc-cutter. The latter and the fixed blade are so arranged as to enable them to be moved out of the way of the spool frame at the time the latter is moved to the warp, and to be returned into position again after the spool frame has been moved back. The fixed blade and disc-cutter are so connected with the loom frame as to have a reciprocating movement towards and from each other, and the position of the tufting yarns is intermediate between the positions of the two cutting implements, when they are farthest apart.

In the “Skinner and Tymeson” invention, a different method of cutting the tufts is employed. The cutters consist of two shear blades arranged crosswise of the loom above the warp. The front or upper cutter has a straight edge and is arranged at right angles to the warp. It has a simple backward and forward movement. The back cutter, which has preferably a curved edge, has a peculiar movement, having the effect of causing a small portion of each one to be in action at any time.

AXMINSTER DESIGNS.—The principal features of the royal Axminster carpet loom have now been described with the spools, the tubes, the spool chains, the warp and weft, and the cutting of the tufts; with the shearing and finishing of the fabric, the carpet is complete. In reference to the arrangement of colours nothing can be said more than has been already stated. There is much scope for the skilful

designer with a taste for colour effects, to produce really beautiful patterns, as is evidenced by the tasteful fabrics one sees exhibited in the windows of carpet stores. The design given in Fig. 48 is defective, from inability to introduce more colours in a black and white engraving.

The particulars as to the "pitch" or size of patterns vary greatly, as patent Axminsters are made with four, five, six, seven and even up to twelve shots to the inch, in both three-quarters wide carpeting and bordered squares. Royal Axminster is woven with five and seven shots to the inch, and with seven reeds to the inch in both qualities, the latter quality being known as the "aristo". The example—Fig. 48—is designed for this fabric.

## CHAPTER XI.

### DAMASK AND TAPESTRY FABRICS.

IN preceding chapters, various classes of carpets, namely, Brussels, tapestry, ingrain and Axminster, have been dealt with ; the consideration of other fabrics of an ornamental nature now claims attention. Equally as important as those already treated upon is a variety of beautiful cloths for upholstery and general decorative purposes. In this class, first worthy of notice are damasks and tapestry fabrics. Worsted damasks were at one time much used for hangings, table covers and furniture upholstery, but they have been superseded by what are considered more effective fabrics, although there is still an extensive trade done in them. Linen damasks for table linen, towels, etc., have not, so far, encountered a rival, neither have the beautiful and delicate silk damasks, which will always meet with a steady demand, their extremely rich appearance and general excellence for hangings and upholstery purposes ensuring them favour with those able to afford high-priced fabrics. There are also damasks of low quality, such as those composed entirely of cotton.

Worsted damasks appear to have given way in popular favour to the more effective cloths known as tapestry, in which, owing to the fondness of the public for colours, a large trade is done in window curtains, table covers, furniture coverings, etc. The skilful use of colours assists the designer in his work, and, by their aid, he is able to produce patterns

of a striking character, and, in this particular class of fabric, every possible means is adopted in order to utilise them to their fullest extent. In Brussels carpets, the designer is restricted to the planting of colours in the warp, but in tapestry



FIG. 54.

fabrics both warp and weft are often so treated for this purpose. These fabrics have held the field for a great number of years, but have, of course, been subject to the fluctuations of fashion and to competition with other cloths. When the popularity of Paisley shawls became a thing of the past,

many manufacturers turned their attention to tapestry fabrics, large quantities of which were manufactured in the Paisley factories. But, in time, the same manufacturers deemed it advisable to make another change. It is not intended, however, to give the history of the trade in these cloths, but to deal with them as occupying a prominent position amongst ornamental textile fabrics, and for which there is and always will be, from their high decorative character, more or less of a demand.

Linen damasks, as every one is aware, are prominent fabrics for household use. It is impossible to conceive anything more suitably adapted for the purposes for which they are employed. Their purity of appearance, combined with their durability, renders them indispensable for table use, and the possibility of their being superseded by any other fabrics in the estimation of the million is remote.

In this chapter, a few particulars of use to the designer and student will be given, first, upon damasks, and, secondly, upon tapestry fabrics, illustrating the remarks in a suitable manner, as in previous chapters.

#### DAMASKS.

In treating upon damasks, it is not necessary to enter fully into the subject of the loom and Jacquard, as this has already been done in the chapter upon the "Jacquard Machine". The remarks will therefore be confined to the fabrics themselves, and illustrations will be given so that the learner will be able to thoroughly understand the observations.

Some seven centuries ago, fabrics were extensively manufactured in Damascus, and were in great demand in all countries. But these textures were composed of silk, and ultimately the trade came to recognise any silken fabric as a damask. In the present day, the name is applied not only to those of silk, but also to those of worsted, linen, cotton,

etc. The design given in Fig. 54 is specially suited for a damask, but more particularly for those of linen and worsted. In the chapters on "Hints on Designing Fabrics," the patterns Figs. 10, 14 and 15, are specially suitable for silk damasks.

## DAMASK DESIGNS.

In working out the design given in Fig. 54, the first consideration is, of course, the size which it must assume when woven, this being regulated by the fineness of the reed, etc. Having decided this question, sketch the design upon ruled paper and carefully paint it in, after which, bind the figure and ground in a suitable manner. This might be done by means of a twill, such as the one given in Fig. 55, wherein

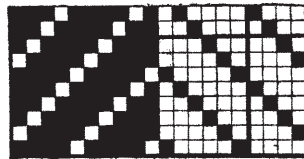


FIG. 55.

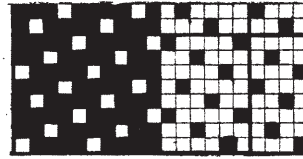


FIG. 56.

the weft intersects the warp at every fifth thread. But twills produce a diagonally lined appearance of the cloth, more or less minute according to the coarseness of the twill, it is true, but sufficiently noticeable to be objectionable for regular use. Hence recourse is had to the use of broken twills or satins. In these, the warp threads intersect the weft threads in irregular succession, thus producing the smooth, even face so admired in satin and damask fabrics. Those most commonly in use are from five to eight shafts, shown in Figs. 56 and 57. When weaving the pattern given in Fig. 54 in a common quality, the figure and ground should be dotted with a five shaft (Fig. 56), but if for a good quality the eight shaft would be used (Fig. 57), because, the yarns being much finer, a closer dotting is not necessary. In these

figures, the white dots represent the figure and the black dots the ground. The next consideration is the prevention of floats in the veins of the leaves and flowers and in the fine lines in the ornament. This may be done wherever required by a special dotting, which will fit in nicely with the figure and ground satin.

FANCY EFFECTS.—Having briefly referred to the most simple method of drafting a ruled paper, this in combination with fancy effects must be considered. In Fig. 58 is a

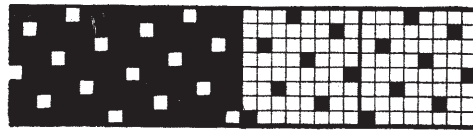


FIG. 57.

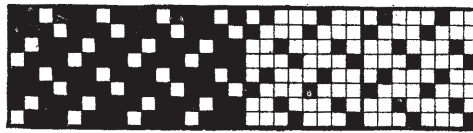


FIG. 58.

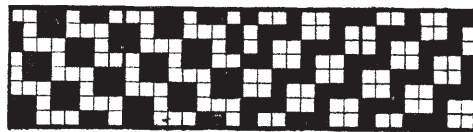


FIG. 59.

weave known as a Swansdown crêpe, which might be used independently for figure and ground, or in combination with a satin effect—for instance, a five shaft satin figure and a crêpe ground, or *vice versa*. Taking Fig. 54, the crêpe dotting could be introduced within the scroll, which comes between the flowers.

In Fig. 59, another fancy weave is given, which might be employed alone for figure and ground, or in combination with one of the others. The weave shown in Fig. 60 produces a very pretty fabric, when used with a satin. Sup-

posing a designing for a linen damask was claiming attention, and a scroll pattern was employed such as that given in Fig. 14 ("Hints on Designing Fabrics"), a five shaft satin might be used for the scroll, and this fancy weave (Fig. 60) for the ground. In this case the scroll must be edged completely round, that is, must have an outline. This forms a cut-off between figure and ground, and at the same time adds to the effectiveness of the fabric. This weave could be suitably employed within the scroll between the flowers in Fig. 54. Should another pattern consist of a large leaf within a circle, this being, of course, repeated at intervals to form the full design, we could have the fancy weave, Fig. 60,

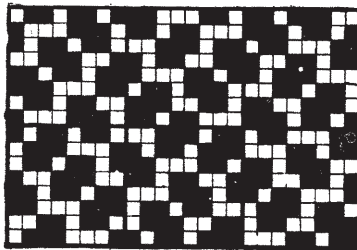


FIG. 60.

for the ground, and the leaf dotted a five shaft satin, whilst the ground of the circle would also be dotted a five shaft satin, the leaf and ground being treated as ordinary figure and ground dotting. To be more explicit—the leaf should be painted in colour, the ground of the circle being left white, and the fancy ground weave in the colour used for the leaf.

There is an almost endless number of combinations which may be used in designing for linen, worsted and silk damasks, but they must be left for the consideration of the intelligent student. One point that may be mentioned relates to the manner of drafting, so as to produce the best possible effects, apart from combinations of weaves. If there is a scroll