

## Stitched Figuring Weft Constructions

In extra weft fabrics (see Chapter 2) the figuring weft is usually displayed in full float, i.e. it is not broken on the surface by any regular binding lifts of the warp. As a result its colour stands out clearly and the figure formed by it is sharply defined, but, in certain uses the existence of an unbound float on the surface may result in faults due to plucking, cutting, etc. This is liable to occur particularly when the ground cloth is very open or when the fabric demands frequent and severe laundering or other form of cleaning treatment. The damage is also more prone to take place when the figuring weft is considerably thicker than the ground materials so that in such a case it will tend to stand proud from the level of the base cloth. In such circumstances the figuring weft requires to be stitched at frequent intervals and several standard methods have been developed to bind the figuring material firmly yet unobtrusively. Two such structures dealt with in this chapter are the figured book muslin and the patent satin. In both of them the effect is achieved by displaying a comparatively coarse figuring weft on the surface of a much finer plain ground fabric. The figuring float is bound-in by the use of fine stitching or ground warp which, being of the same colour as the figuring weft, does not disturb the solidity of the figure. In the book muslin structure the figuring weft is clipped outside the bound-in portions, whilst in the patent satin it is continuous, interchanging between the face and the back, and thus forming a reversible cloth. The two structures, although quite different in appearance and in the manner in which the extra weft is bound-in, are constructed according to somewhat similar principles. At one time they were produced on special harness mountings described in Appendix I and, indeed, the term 'book muslin' derives from the harness of that name.

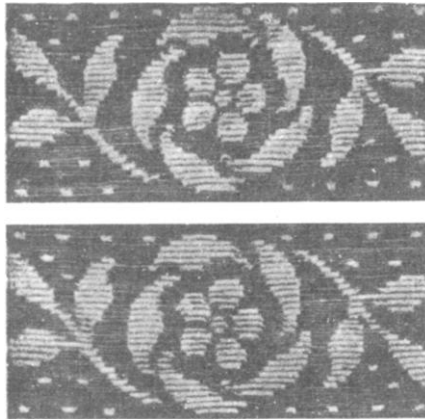
### FIGURED BOOK MUSLIN FABRICS

In the book muslin structure a light plain foundation texture is ornamented with extra weft, in the manner represented in *Figure 5.1*, which shows the appearance of a typical fabric as viewed from opposite sides. The extra weft is thick and soft spun, and in the figured portions of a cloth it is, as a rule, inserted in 2-and-2 order with the plain ground picks. As the cloth is woven,

the figuring picks are floated loosely on the surface between the parts in which they are incorporated in the ornament, but in the finishing process the loose floats are cut away so that an opaque figure appears upon a semi-transparent ground. The cloths are practically reversible, but, as shown in *Figure 5.1*, the uncut side—represented in the lower portion of the figure—is neater in appearance than the cut side, which is shown in the upper portion, as on the latter side the severed ends of the figuring picks impart a rough edge to the figure. The textures are used as window curtains, and in small designs for skirtings, blouse, and dress fabrics.

### *Structure of the cloth*

In *Figure 5.2*, A shows a simplified design which is represented in full at B, while C illustrates the interlacing of the threads to correspond with B as viewed from the cut side (the face side as the cloth is woven). The design A is condensed by 2 warp-wise, each vertical row representing two ends, and by 4 weft-wise, each horizontal row representing two ground picks and two figuring picks. On the ground picks plain weave is produced as indicated by the diagonal marks in design B. On the extra picks the odd ends are left down, but the even ends are raised where figure is required to be formed—i.e., the marks in the design B in *Figure 5.2* indicate warp up.



*Figure 5.1*

In the most usual structure of the figure the extra picks float over only one end at a place on both sides of the cloth, as shown in the spot on the left of B and C in *Figure 5.2*. On the uncut side of a cloth a longer float than over one end is not produced, because all the odd ends are depressed on the figuring picks. On the cut side the even ends may be operated in any desired order, but if long figuring floats are made they are liable to be cut away in the shearing process along with the floats which extend between the figures. It is therefore, customary in a figure to leave down not more than one even end at a place, which gives a float of three ends in the cloth on the cut side, as shown in the central spot in B and C, *Figure 5.2*. The weave development of a figure is thus

limited to floats of one and three in the cloth, but a further variation of the structure is made by interweaving both figuring picks of a pair in one portion and only one pick in another portion, as shown in the spot on the right of B and C in *Figure 5.2*. An effect is obtained which, being between the semi-transparent ground and the opaque figure, is useful in shading a design.

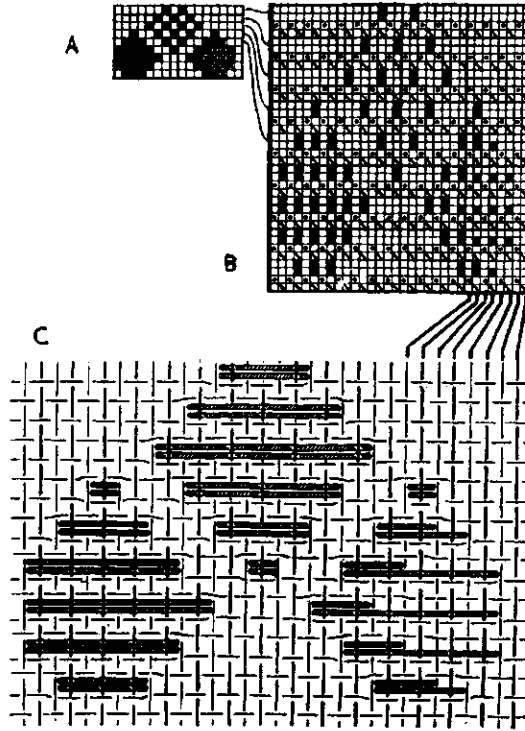


Figure 5.2

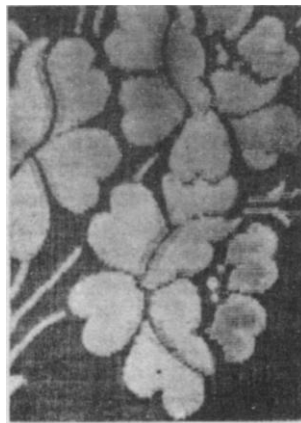


Figure 5.3

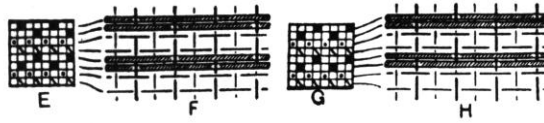


Figure 5.4

The three methods of interweaving the figuring picks, illustrated at B and C in *Figure 5.2* are extensively used, but as both picks of a pair are inserted into the same shed, adjacent pairs are distinctly separated from each other by the plain ground picks. The running of the figuring picks in pairs is clearly shown in *Figure 5.1*, and generally, this is considered a feature of the structure. Sometimes, however, this formation is avoided, and in *Figure 5.3* a fabric is represented in which a fuller and more solid figure is obtained by floating the picks of each pair alternately in 3 up, 1 down order. The 3-and-1 floats may be arranged as shown at E and F in *Figure 5.4*, in which the last figuring pick of one pair is in the same shed as the first pick of the next pair, or as indicated at G and H, in which they run continuously in alternate order.

#### Method of designing

The plan given at K in *Figure 5.5*, which corresponds with a portion of the design represented in *Figure 5.3*, will serve to illustrate several features in the preparation of designs for these fabrics. It is a rule to separate two portions of figure—between which the light ground texture is required to show distinctly—by at least two vertical spaces of the design paper. Otherwise the weft floats between the parts will not be long enough to be engaged by the shears, and by being retained in the cloth will make the two portions of figure appear to join up. Frequently, in the finer set cloths three consecutive vertical spaces are left blank to ensure that the light ground texture will show clearly between the separate parts of a figure.

The design K is shown painted in four colours and paper indicating the existence of five different structural areas. The blanks (paper) indicate the ground area in which no extra weft material is incorporated, whilst the solid marks, the alternate diagonal marks and dots, the diagonal marks alone and the dots alone represent respectively four different orders in which the extra picks are bound-in. The detailed weaves for each of the five structural areas are shown at K1 and K5 in *Figure 5.5*. It will be noted that the bulk of the figure is produced in the weave K3 which results in the formation of alternate 3 up, 1 down figuring weft floats exactly as shown at F in *Figure 5.4*. Floats of one thread only are made in the remaining portions of the design—by both figuring picks where the solid marks are indicated, K2; by the odd figuring picks where the diagonal marks only are shown, K4; and by the even figuring picks where only the dots are inserted, K5. The two last orders of marking are for shading the figure and it will be seen that where two shaded effects are made close together, one is formed by the odd picks (the diagonal marks) and the other by the even picks (the dots). The object of this is to get as great a length of float as possible between the separate parts of the figure, so that the floats will be

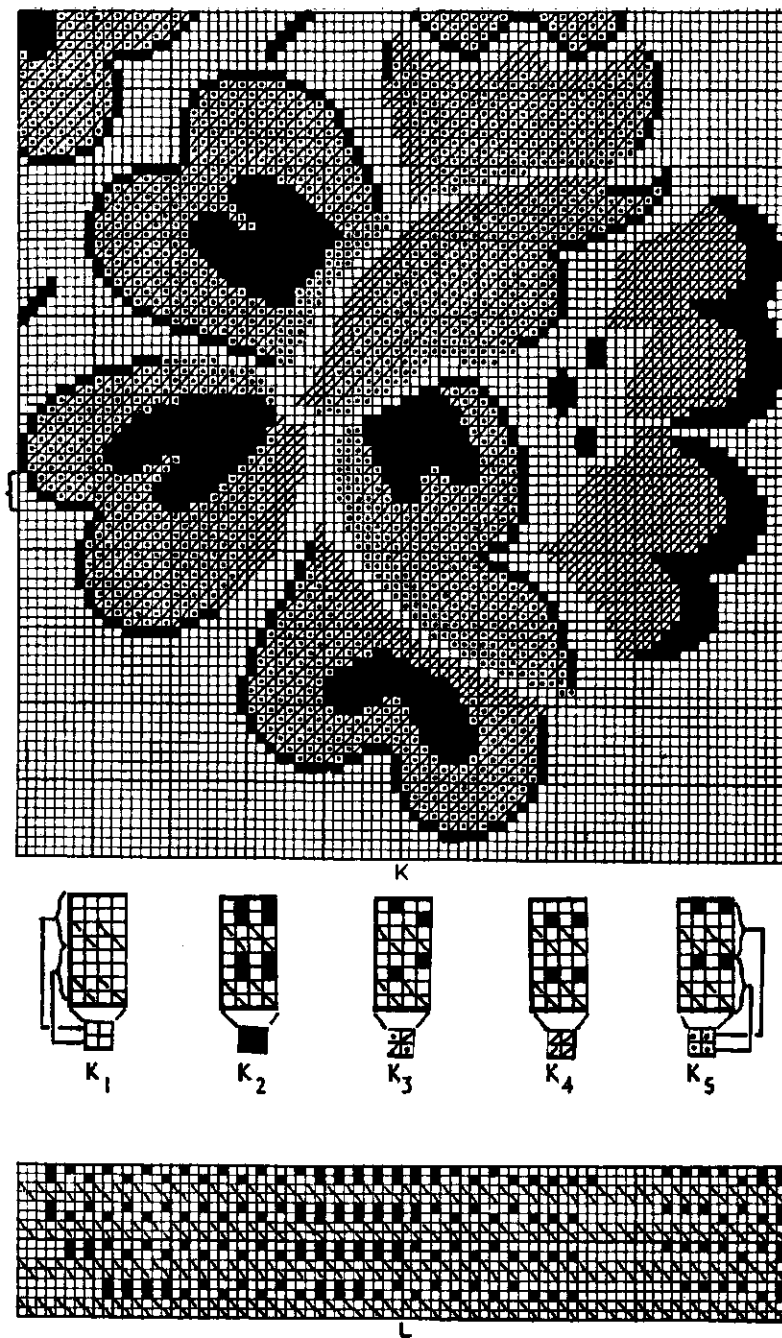


Figure 5.5



Figure 5.6

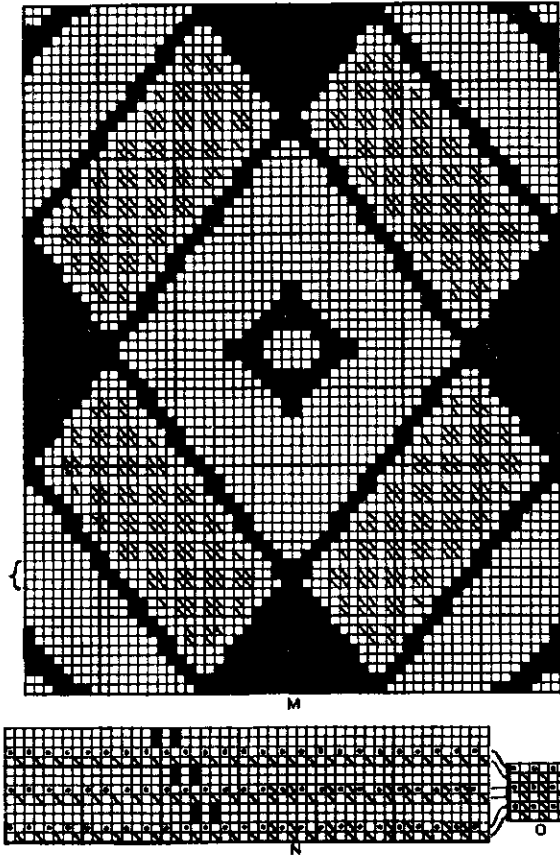


Figure 5.7

effectively cut away during shearing; while the arrangement also helps to equalise the lifts of the harness. In order that comparisons may be made, the complete weave of the horizontal rows 37 to 40 (indicated by the bracket at the side of K) and the vertical rows 1 to 40 is given at L in *Figure 5.5*, assuming that the weaves K1 to K5 are employed.

#### *Ground weave variation*

In the cloth shown in *Figure 5.6* a useful variation of the plain ground texture is illustrated in the form of a 5-and-1 imitation leno weave, which is used in these fabrics to a considerable extent. The corresponding complete design, condensed as before is given at M in *Figure 5.7*; the solid squares result in the same structure as K2 in *Figure 5.5*, and the diagonal marks represent additional lifts of the even ends on the even ground picks. The complete weave of the horizontal rows 12, 13, and 14 (indicated by a bracket), and the vertical rows 1 to 25, is given at N, while the plan O, which corresponds with the last six ends of N, with the figuring picks omitted, shows the imitation leno weave that is formed in the ground.

Other modifications of the ground weave may include the introduction of extra cord ends which may be interwoven with the ground structure continuously or only intermittently. However, as the introduction of extra ends requires modification of the harness, discussed in connection with extra warp figuring, it is only rarely attempted. More frequently cord effects are achieved by substituting thick ends for the fine ground ends at intervals which, when combined with a suitable extra weft figure, results in pleasing stripe effects without any need to disturb the existing harness arrangements.

#### *Weaving particulars of book muslins*

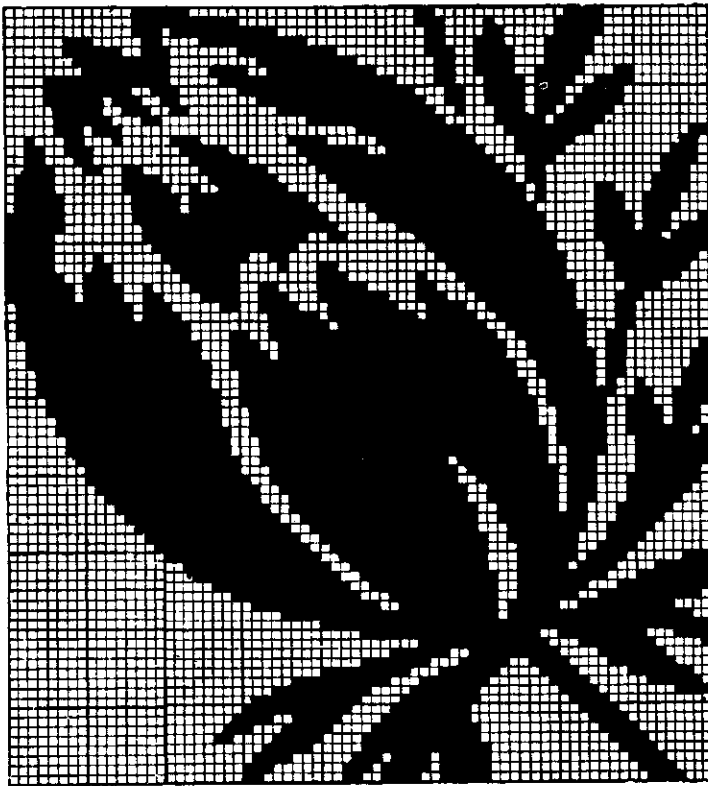
The number of ends per cm with which the cloths are woven traditionally ranges from 18 to 24 and the number of ground picks from 16 to 22; the warp yarns range from 8 to 10 tex cotton, and the ground weft yarns from 6 to 8 tex cotton; while from 30 to 38 tex soft spun figuring weft is used. The average number of figuring picks per cm varies according to the order in which they are inserted, and the cloths are classed as 'full cover', in which the extra picks are inserted continuously with the ground picks, or one-half, two-thirds, two-fifths cover, etc., in which the extra picks are inserted intermittently. The proportion of the cover can be obtained by finding the number of horizontal spaces of the design upon which the extra figuring picks are indicated in relation to the total number of horizontal spaces in the repeat. The design paper should be ruled in the same proportion as the ends per unit space are to the ground picks. Thus, for a cloth that counts 24 ends  $\times$  21 ground picks per cm  $8 \times 7$  paper is suitable. In most cases the yarns are white, but occasionally a coloured figure is made upon a white ground and sometimes, by chintzing, a figure is woven in white and a colour, or in two colours.

More recently the book muslin structure has been adapted for such uses as hangings and fancy shirtings, and as a result the transparent ground has given

way to a much more solid structure and the cloth looks different although it uses exactly the same principle of binding the extra weft as the more open structures. Shirtings have been woven in cotton or cotton/polyester blended yarns with 24 ends and 26 picks per cm using 28 tex warp and 34 tex ground weft yarns.

### PATENT SATIN STRUCTURE

The 'patent satin' structure has developed from the Mitcheline quilt which was similar, but wefted pick-and-pick, as opposed to the two ground, two figuring wefting of the former. As the structure was employed mainly for bed covers it required large design repeats and this led to the development of a special harness mounting including healds and working comber-boards. This is described in Appendix I. The structure, being originally dependent on regular lifts of the special shed-forming elements, is very rigid and consists essentially of a stout plain weave ground fabric upon which a coarse figuring weft is floated to form the figure. The extra weft is continuous and when not floating on the surface is



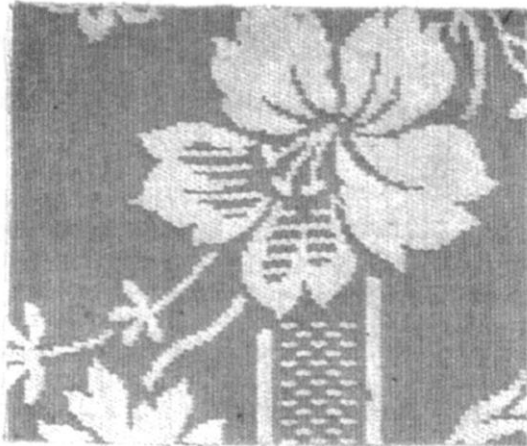
*Figure 5.8*

displayed on the back thus producing a perfectly reversible construction. The coarse figuring weft is stitched at frequent intervals on the face and on the



back by a fine stitching warp. The term 'satin' is a misnomer as no satin weaves are employed and it probably derives from the somewhat flat appearance of the figure.

The structural unit in this type of fabric consists of three ends, arranged 1 ground, 1 stitching, 1 ground, and four picks, inserted 2 ground, 2 figuring and this corresponds to the usual degree of condensation of 3 warp-wise and 4 weft-wise normally employed in design painting. A small portion of a design, condensed as indicated above, in which the solid marks represent the figuring weft on the face is shown in *Figure 5.8*, whilst the appearance of a patent satin cloth is illustrated in *Figure 5.9*. The quality of these fabrics varies considerably and the following are the weaving particulars of a medium quality cloth: Ground warp 34 tex cotton, stitching warp 18 tex cotton, 16 ground and 8 stitching ends per cm; ground weft 15 tex cotton, figuring weft 74 tex soft spun cotton, 18 picks of each weft per cm. The ground warp contracts about 2 per cent and the stitching warp, which is placed on a separate beam, from 20 to 25 per cent, while the contraction in width varies from 10 to 15 per cent.



*Figure 5.9*

The cloths are mostly woven grey and then bleached, but sometimes the ends which form the ground are all coloured or are arranged in stripes of white and colour; a white figure then being formed upon a coloured or a striped foundation.

#### *Method of designing and structure of the cloth*

Taking the order of wefting as 2 picks fine and 2 picks coarse the order of shedding is as follows: The ground ends lift in alternate order on the two fine picks, and form the plain weave represented by the dots in the plans A and B in *Figure 5.10*. The stitching ends lift in 2 up, 2 down order alternately and produce the weave shown by the crosses in A and B. The figuring lifts of ground ends occur on the coarse picks and the ground threads in pairs (one on each side of a stitching thread) form the design that is required by lifting in one portion

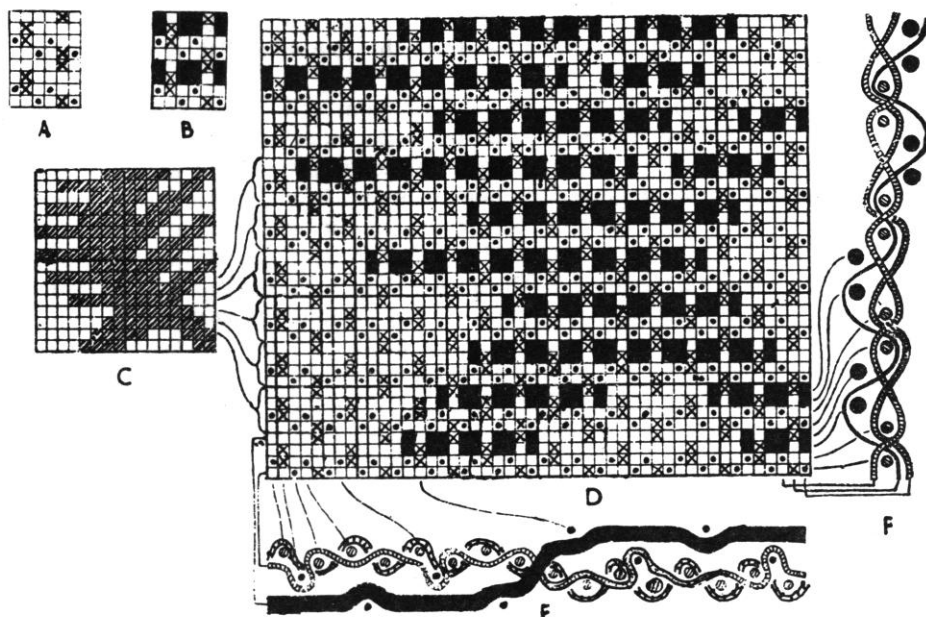


Figure 5.10

and remaining down in another portion of the cloth. The figure is formed by the floats of the thick weft, and in weaving the cloth right side up the marks in the design given in *Figure 5.8* indicate ground ends down, or weft float on the face. Taking the marks in *A* and *B* in *Figure 5.10* also to indicate weft, the former shows the full ground weave and the latter the full figure weave in the cloth. The stitching ends bind the figuring weft to the plain ground cloth very firmly by working alternately 2 up and 2 down and changing places between the two fine picks and, again, between the two coarse picks.

Variations are not produced in a design by altering the structure of the cloth, but a subsidiary effect can be achieved by shading either as shown on the left of the small plan given at *C* in *Figure 5.10*, or, as indicated on the right of *E*. The complete weave, to correspond with the horizontal rows 1 to 10 of *C* is given at *D* in *Figure 5.10*. Taking the marks to indicate weft, the warp section *E* shows how the picks 1, 2, and 4 of *D* interlace with the ends 1 to 24, while *F* represents the interlacing of the last three ends of *D* with the picks 1 to 16. In *E* and *F* the figuring picks and the stitching ends are shown in solid black, in order that they may be clearly distinguished, and connecting lines are indicated to enable the threads to be easily traced.

The count of design paper for a cloth with 24 ends and 32 picks per cm is in the proportion of  $(24 \div 3)$  to  $(32 \div 4) = 8 \times 8$ . On account of each horizontal space of the design representing two thick picks, the figure in coarse cloths has a steppy outline, and in order to avoid this, sometimes the figuring lifts of the ground ends are different for each one of the two coarse picks in which case the degree of condensation of the design is reduced to 2 weft-wise.