MASTER WEAVER

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MASTER WEAVER

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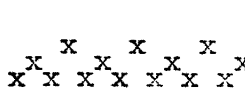
ANALYSIS OF PATTERNS

The method which we have described in "Analysis of Fabrics" in the last issue is universal. It can be used with any two-dimensional fabric. But in certain cases it is a very long and laborious method. If we take for instance an overshot coverlet with one repeat of 300 ends and as many picks, the very first step will prove to be a Herculean task. Here the draw-down of a single repeat will take nearly a square yard of graph paper, and hours if not days of work.

Fortunately there is no need to perform a detailed analysis of very large patterns. Once the weave is established by analysing a small sample, the pattern can be drawn directly in a short draft.

Thus the first stage in analysis of pattern weaving is to find the weave. This is done in the way described in "Analysis of Fabrics" with the difference that instead of a full repeat only a small part of it is taken. The sample should contain at least two blocks of the pattern, and at least 12 threads in each block - in other words not less than 24 ends and 24 picks. After analysing it and arranging the draft it should be quite easy to see the weave.

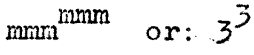


draft

x x - 1-st unit, x x - 2-nd unit.

Fig.1

Even if the weave is an unfamiliar one (Fig.1) we can distinguish the units corresponding to the pattern blocks, and from now on to work with graphical short draft (profile) by replacing each unit with a single square on the graph paper. In this way the draft in Fig.1 becomes a short draft in Fig.2.



or: 3^3

Fig.2.

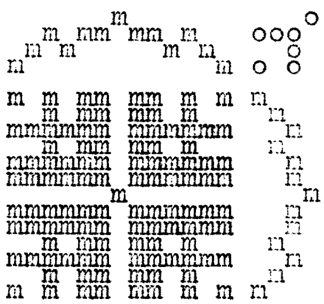
Once the weave and consequently its units are known, we count the number of units in each block of one repeat of the pattern. The counting of units is quite easy in such weaves as crackle, summer-and-winter, lace etc. because each unit produces a distinct float or combination of floats. It is more difficult in damasks, where floats form a more or less uniform surface.

Instead of counting the units we can measure the blocks. For instance a damask based on 1:4 satin has all units of 5. If the sett is 30 to the inch, each unit is 1/6" long. Thus a block which is $1\frac{1}{2}$" long will have 9 units.

In most cases we can tell the weave at a glance without any analysis. Then what remains to be analysed is the pattern. On the other hand we may analyse the pattern without being interested in the

weave. For instance when looking for new ideas in patterns we may take one not from a woven piece but from embroidery, painting, leather work, or just from our own imagination. Then we have to find out first how many blocks the pattern has, so that we can decide in what particular technique we can weave it if at all.

The procedure here is very similar to the one used in fabric analysis. First of all we make a draw-down of the pattern (fig.2).

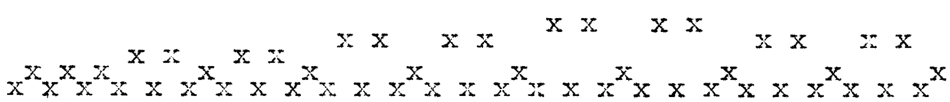


abcdefghijklm

Fig.2

One square on the graph-paper corresponds to one unit of the weave, if a woven piece is being analysed, or to the smallest element of the pattern if this is taken from a different source. Then we get first the graphical short draft of the threading, and from this - the short tie-up draft, and short treadling draft. Here as in fabric analysis we examine the vertical columns in the draw-down, and group the identical ones on the same line of our threading draft: a and m on one line, b,d,j, and l on the second, c,e,f,h,i,k - on the third, and finally g on the fourth. Which gives us four blocks. The tie-up and treadling are found next exactly in the same way as in fabric analysis. Since all these drafts are short they have to be developped into full drafts by replacing each square or "o" with a corresponding unit of weave.

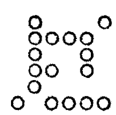
In our example the blocks are used in combinations (1-st and 3-rd pick), and the pattern cannot be woven either in overshot, plain crackle, or plain spot. Supposing that we shall weave it in lace, the draft will be developped as follows:



etc.

border a b c d

The tie-up will become:

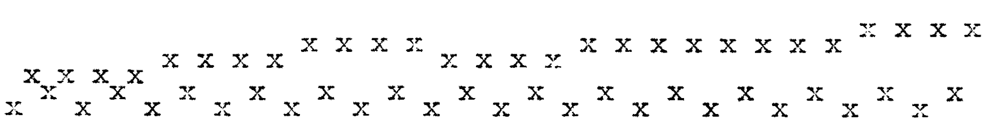


654321

and the treadling:

565656 - border
545456545456 - 1-st + 3-rd block
535356535356 - 3-rd block
525256525256 - 1-st, 2-nd, 3-rd bl.
515156515156 - 4-th block.

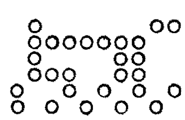
The same pattern developped in Summer-and-Winter will be:



etc.

a b c d e f g

The tie-up:



ab87654321

and the treadling:

8a7b8a7b6a5b6a5b4a3b4a3b
6a5b6a5b4a3b4a3b4a3b4a3b
2a1b2a1b - etc.

Exactly the same technique is applicable to most weaves, with the exception of overshot, crackle, and spot.

Neither overshot nor plain spot have a definite unit of weave. This is the reason why graphical short drafts are not used in connection with these weaves. Since there are no units, each square on the graph paper would have to represent one thread, and the "short" draft would not be any shorter than the full draft. Here we use short

numerical drafts. We shall start with an all-over-spot pattern as an example. Fig.3 shows a draw-down of a part of a pattern without ground, just the floats. We do not make this draw-down actually, it is used here instead of a sample. What we do is to select on the woven piece a place where all blocks of pattern (3 in our case) lie near each other, and then we go all across one repeat noting down their length and relative position. If we work between "a" and "b" on fig.3 the first block to the left is 3 ends long and lies on the lowest line. The second is one of 5 and higher up. The third - one of 7 and still higher, and so on. The numerical short draft of this part of the pattern will look as follows:

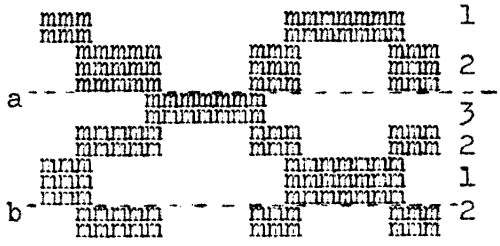


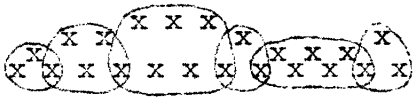
Fig.3

$3\,5\,{}^{7}3_{7}\,3$

The counting of the length of the floats is not very difficult here since all floats skip an odd number of ends.

If we want to get a full threading draft, we assume that the lowest line of the short draft corresponds to the heddle-frames 1 and 2, the second to 1 and 3, and the third to 1 and 4. Thus:

$3\,5\,{}^{7}3_{7}\,3$ =



Since the floats in the fabric overlap each other by one warp end, the corresponding parts of the draft must overlap as well.

The situation in case of overshot is more involved, but the principle is the same. If we analyse four block overshot, we have to select on the sample four rows, each from a different block, and lying close together. It is a good idea to cover with paper everything below and above these four rows, particularly if the pattern is a long one. Then we go across one repeat marking the length of floats and their position. This will give us:

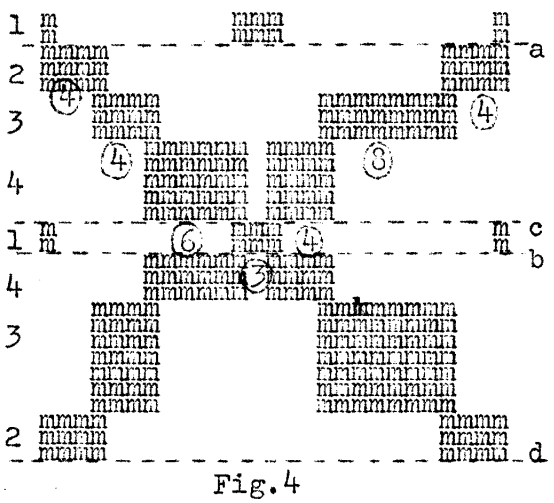
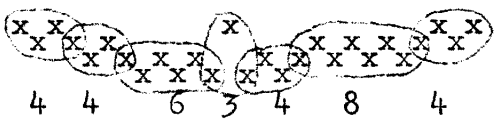


Fig.4

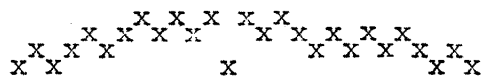
$4\,4\,6_{3}\,4\,8\,4$

If we want a full threading draft, we assume that the highest line in the short draft corresponds to the blocks written on frames 3 and 4, the next - on 2 nad 3, the next - on 1 and 2, and the lowest - on 4 and 1. Since the floats overlap by one as in case of spot-weave, the draft will be:



Here one might object that this draft is valid only when we analyse the part of our sample between "a" and "b", but that we shall get a different draft analysing it between "c" and "d" for instance. This is quite true. In the latter case the short and full drafts will be:

$4\,4\,{}^{6}3_{4}\,8_{4}$ =



but both these drafts give us exactly the same pattern, and it is of no consequence which one we shall use. In all there are 8 different

ways of writing any four block overshot draft in an orthodox manner, and as many as 24 if we use less orthodox arrangements. The same applies of course to any weave with a draft written on four frames.

If we observe carefully the length and position of floats in overshot, we shall soon notice that they follow two simple rules: as long as they lie on one diagonal (going either up or down) they skip an even number of warp ends (blocks 2, 3, 4 in fig.4), but in the "points" where the diagonal changes direction they have an odd number in length (block 1). Thus when taking down the short numerical draft from a sample it is not really necessary to mark the different blocks on different lines - they may be written all in one row, e.g.: 4,4,6,3,4,8,4. However in the first method it is much easier to detect mistakes should there be any. Thus a short draft (fig.5a) has a mistake and it would be quite impossible to develop it, because of the block "7". Should however be the same draft written all in one row: 3,4,6,8,7,9,8,6,4,4 the mistake could not be found out, and the draft would be wrongly interpreted as Fig.5 b.

$3^{4^{6}}_{8^{7^{9}8}_{6}}{}^{4}_{4}$ a Fig.5 $3^{4^{6}}_{8^{7}_{9}8^{6}}{}^{4}_{4}$ b

The best method of developing short overshot drafts is to mark off spaces for blocks on a piece of graph paper, and fill them with marks for heddles later on.

Crackle can be analysed as an overshot, but then even the short numerical draft is quite long:

$$\begin{matrix} 3\ 3\ 2_{3}3_{3}3_{2}3_{3}3_{2}3_{3}3 \\ 3\ 3 \end{matrix} = \begin{matrix} x_{x}x\ x_{x}x\ \blacksquare\ x_{x}x_{x}x_{x}x_{\blacksquare}\ x_{x}x_{x}x_{x}x_{\blacksquare}\ x\ x \\ x\ \ x \end{matrix}$$

or in the same way as Summer-and-Winter with two reservations however: first that a graphical short draft will be only approximate due to the connecting ends (■ in our draft), and second that the blocks as seen on a woven sample are overlapping each other by half of their length, and consequently appear much longer on the sample than on the draft. Fig.6 shows a part of the draw-down of the above draft. The first block as seen extends from a to c, when actually it is written only from a to b. The second block reaches from b to d, but is drawn from b to c. Thus when writing a short draft directly from the sample we should get for these two blocks 2_2 and not 5_5 or 4_4. Then the whole draft will be: 2_{2_2}.

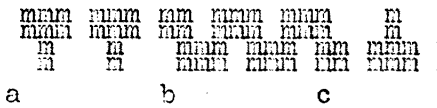


Fig.6

Theoretically the graphical short draft should be then as on fig 7 a, but such a draft would be useless for making the draw-down, and it is much better to write it as in Fig.7 b. In other words one principle should be adopted for numerical short drafts, and another for profiles.

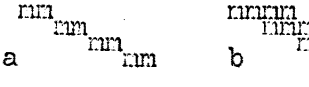


Fig.7

Should this technique of working with units of crackle prove to be rather confusing, it may be better in case of doubt to resort to the technique used for overshot, which is absolutely reliable ever if longer.

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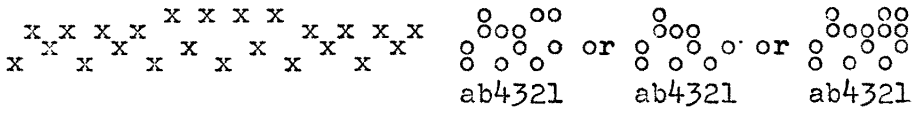
SPOT WEAVES - 3

DOUBLE : SUMMER-AND-WINTER, PAPER SPOTS.

Any spot weave which uses two heddle-frames for the ground (fore-leaves) belongs to this family of weaves. The best known of them is Summer-and-Winter developped probably in America during the colonial period. Another weave rather neglected by handweavers is the old English or perhaps Scottish "Paper Spots". Finally there is one double spot weave used in Finland. We are not aware of any other variations of this weave known to the handweavers, although it is easy to develop a number of them working on the same principle.

Summer-and-Winter

This weave is too well known to describe its theory at any length. It can have blocks of any size, because the two ground frames divide the blocks into a row of floats of equal length of 3. Fig.1 shows a typical draft:



or or Fig.1

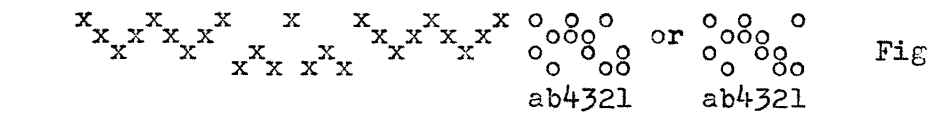
treadling: 4a3b4a3b2a1b2a1b4a3b4a3b.

With more blocks the tie-up gets rather involved, and often a direct tie-up is advisable.

As a rule the yarn for binder (treadles: a and b) is finer than the pattern yarn, and of a different colour. But S+W may be woven with one shuttle only, on the condition that the weft and warp are of two decidedly different colours. The treadling then is as follows (with any of the tie-ups in fig.1):

1-st block: 1212ab1212ab 2-nd block: 3434ab3434ab
or: 12a12b12a12b 34a34b34a34b

It happens that a weaver who works mostly with so called "standard" tie-ups does not like the idea of changing it when occasionally weaving S+W. Then the draft on Fig.1 may be transcribed into a continuous one of the diamond-twill type, by exchanging frames 1 and 4:



or Fig.2

The treadling with the first tie-up will be the same as in fig.1. With the second the treadle 2 becomes 1, and 1 becomes 2. Thus: 4a3b4a3b1a2b1a2b4a3b4a3b.

The S+W draft when written in its "twill" form shows that there is a very great similarity between S+W, crackle, and twill, and as a matter of fact all three can be woven on the same threading, and tie-up. Summer-and-Winter can be quite logically called "crackle on opposites" i.e. crackle which uses only two blocks (with four frames), and in which the blocks do not overlap one another. Consequently real crackle can be woven on any S+W threading by changing the treadling. In our example on fig.2 second tie-up the treadling will be: 1a1b1a1b3a3b3a3b1a1b1a1b, or 2a2b2a2b4a4b4a4b2a2b2a2b.

If we want to weave S+W as tiny diamond-twill, all we have to do is to follow the diagonal, or weave as-drawn-in. Blocks of 2 are taken once, and blocks of 3 twice: 4a3b3a4b4a3b3a4b1a2b2a1b1a2b2a1b 4a3b3a4b4a3b3a4b.

Although in all three cases we shall have the same pattern, the texture will be quite different. Perhaps the most interesting is the last treadling, but it requires a lot of attention, since a single mistake will change the texture of the remaining piece of weaving, exactly as in all twills with binder.

S+W is particularly satisfactory in "bound" weaving, i.e. in weaving on opposite sheds. Since the floats are all of the same length, and the alternate rows are staggered, there is a possibility of obtaining a uniform and very smooth surface. The technical requirements of this weave such as strong and open warp, and soft and heavy weft are generally known. Less clear to many weavers is the fact that in bound S+W the <u>treadling is always the same</u> regardless of pattern. On this condition depends smooth texture of the fabric. When changing from one block to another we change only the order in which come the colours, but not the order of the treadles. The treadling in case of fig.1 will be (b - black, w - white): 1b, 3w, 2b, 4w - as many times as necessary to square the first block, then for the second block: 1w, 3b, 2w, 4b. In this case after the last white line of the first block comes the first also white line of the second block which makes a more or less distinct mark across the fabric. We can get rid of it only at the expense of the uniformity of texture by omitting one of these two picks. As a rule what we do here is to select the least striking colour for joining the blocks. In our case it would be white, and the treadling should be accordingly: (4w,1b,3w,2b) x N, 4w, (1w,3b,2w,4b) x N, 1w, (3w,2b,4w,1b) x N, 3w, (2w,4b,1w,3b) x N, 2w. "x N" or times N means as many times as necessary the whole combination of four treadles, then comes just ones a treadle with white, and the next group.

This difficulty does not arise when four colours are woven at the same time. For instance two light colours (w - white, g - grey) for one block, and two dark ones (b - black, n - navy) for the other block: 1b,3w,2n.4g - for the first block, and: 1w,3n,2g,4b - for the second.

The same principle will be applied to a larger number of blocks and colours (compare "Information Service" in our 2-nd issue).

Paper Spots

This weave as all double-spot-weaves has two frames (usually but not necessarily the front ones) reserved for the ground. But in addition it requires 2 frames for each block of pattern. Consequently only small square spots can be woven on a 4 frame harness. It has been called "paper" because of unusual smoothness of the "spots" which have twice as many floats per inch square as the plain spot weave of the same count. As an example we shall examine a 6-frame draft (fig.3). It is obvious from the draw-down that the floats in warp and weft are not interlacing on the whole area

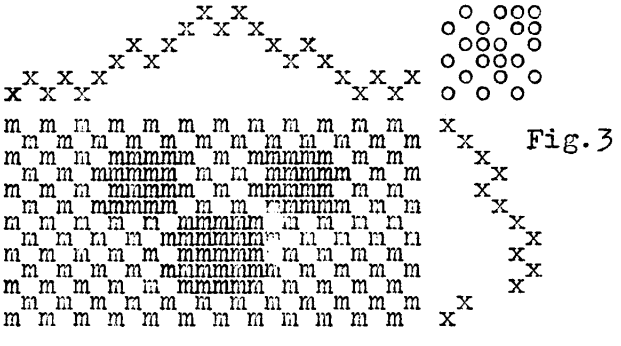


Fig.3

of a spot. Consequently the spots must not be too large, and there should be not too many of them or the fabric will be rather loose.

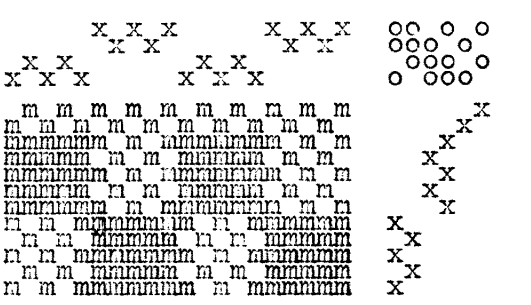


Fig.4

Theoretically the paper spots can be woven as "all-over-spots", and then the weave can be executed on 4 frames (fig.4), but the edges will be wavy and the whole fabric not too firm. Much better results from a purely technical point of view will give just one block, particularly if the tabby part is widened, as in fig.5. This is the only satisfactory way of weaving Paper spots on four heddle-frames.

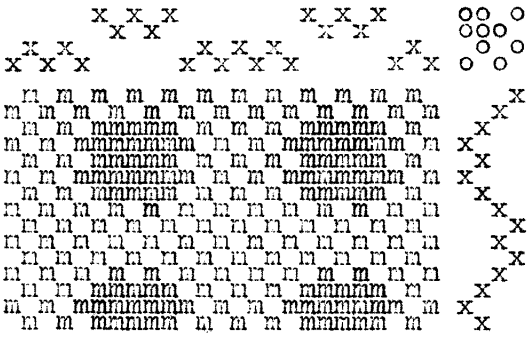


Fig.5

This weave can be "turned" in exactly the same way as lace, or plain spot weave i.e. by changing the tie-up. For instance if we want one block (fig.3, 2-nd block) with vertical floats, we turn the corresponding ties (fig.6). The same can be done for the other block so that either of them can be woven with vertical or horizontal floats. Then however the total number of treadles will be rather high (10 in our case).

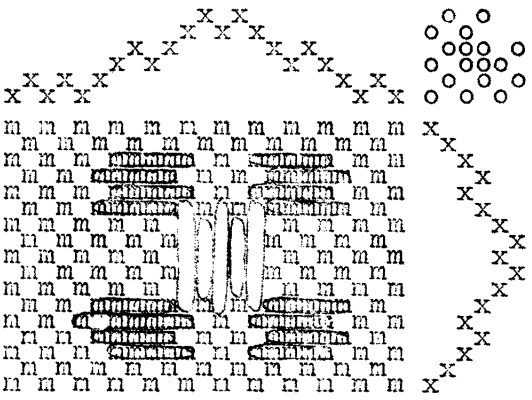


Fig.6

The blocks of pattern (or spots do not need to be as close together as in fig.3 or 6. They may be separated by the ground as in fig.7.

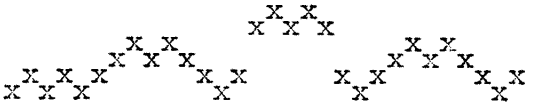


Fig.7

Since the floats in spots cover completely the fabric, so that only weft or warp are visible, interesting colour combinations may be obtained by using one colour for the weft and another for the warp. In turned paper spots we shall have two pure colours in the spots, and a third (being the mixture of these two) in the ground.

The weave may be used in the same way as lace, i.e. for place mats, table covers etc., with the exception of all-over pattern (fig.4). Drafts 5 and 7 give the strongest fabric, drafts 3 and 6 a little more open in the spots, when 4 must be reserved for curtains and light woolen shawls - even then it would be advisable to make samples first trying different yarns and sett of warp, before attempting any larger project.

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PLEASE SEND US YOUR COMMENTS AND REQUESTS FOR SPECIAL TOPICS

NOTES ON WEAVING TERMINOLOGY

MASTER WEAVERS

Who is a Master in our trade?
Who has the right to use this title?

I have been discussing this subject with quite a few outstanding weavers of our continent, and they all declined to apply this distinction to themselves. Who then is a Master?

The misunderstanding arises from the fact that we have adopted some two centuries old terminology to our present circumstances, and assumed unconsciously that a Master Weaver must obviously know everything about weaving.

The 18 century weavers were not so ambitious. In these times every weaver, not only master, specialised in one particular branch of weaving, usually in one medium only, be it wool or cotton, or linen - and in a very limited number of weaves. Thus they achieved by years of studies and experiments a perfection, which seems to us difficult to attain. But not only were they so highly specialised - they were professionals working at nothing else but weaving at least twelve hours a day. To match their education in nothing else but in the time involved we would have to live several times longer than we usually do.

Knowing "all about weaving" theoretically as well as practically is an absolutely hopeless proposition. It takes weeks to get acquainted with a new weave in all its aspects. It may take years with some pattern weaves. Now, there are hundreds of weaves, which can be divided into several groups, and each group asks for a special equipment. This equipment alone would take more space than most of us can afford. How then can we aspire ever to learn all about weaving?

In my opinion everybody who knows his line of weaving is a master. If you know just one thing so well that you do not fear competition in this particular field, you are a master. If you know all patterns of the Colonial period, you are a master. If you can weave tweeds as well as anybody else, you are a master. If your linen towels are as good as the 19-th century Dutch, or Irish ones - you are a master. If you can set up a loom better than most people, if you can throw the shuttle faster, if you can teach others more efficiently, if you know all there is to be known about colour or texture - even if you never heard about honeysuckle - you are still a master. A master in your own line.

S. A. Zielinski

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CAPE - part of the loom frame. It is <u>not</u> however one of the vertical beams supporting the top-castle. Capes are horizontal beams on both sides of the upper part of the frame. Only looms with hanging battens have Capes, on which rests the Rocking Shaft of the batten. The cover of the Raddle, and the Hand-tree of a batten (the grooved part which rests on the reed) are also called Capes, or Caps

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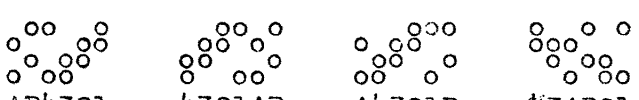
THE LOGIC OF TIE-UPS

To many weavers who can read at a glance a threading draft, and can follow easily most involved treadling directions, the tie-up is still something like a magical formula to be learned by heart. The tie-up is as logical as any other part of a weaving draft, but for various practical reasons it is seldom used in its pure and clear form. Thus we might discern between "theoretical", easy to understand tie-up which we would expect to accompany every draft, and its more "practical" variation, often obscure and enigmatic which we actually find in most cases.

A theoretical tie-up can be used in practice, provided that we have a sufficient number of treadles, but it seldom will be an easy one to work with. Thus it must undergo certain modifications, such as shifting the position of treadles, or distributing the work of one "theoretical" on two "practical" treadles. To understand the principle of a tie-up we must study it in its pure form, but if we want to work with it, we must in addition take under consideration all the different factors which influence the efficiency of treadling.

The first tie-up which we shall discuss is so called "standard tie-up". It is really standard only on counterbalanced looms with a 4 frame harness. Such a loom works most efficiently when the same number of frames is tied to each treadle. Tying two frames to a treadle we get the highest possible number of sheds (or combinations of frames) namely six, and this is why c.b. looms with 4 frames are supplied with 6 treadles. These 6 combinations are: 12, 13, 14, 23, 24, and 34, but we seldom tie the treadles in this particular order. For weaves which use a continuous threading (twills, overshot, and crackle) the tie-up may be one of the following:



where A and B are ground or tabby treadles, and 1, 2, 3 and 4 - pattern treadles.

Since the pattern treadles can be arranged in 16 different ways, and the tabby in two ways, the total number of possible variations of a "standard tie-up" is onehundred and eight. This number does not contain all less logical arrangements of treadles, which are still more numerous.

Weaves using a not continuous threading draft *) such as Summer-and-Winter have a different arrangement of treadles, but always the same two groups: one for the ground and one for the pattern (fig.1).

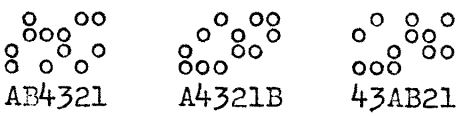


Fig.1

Here the pattern treadles have two kind of ties: one operating the pattern proper (frame 3 or 4) and the other bringing down one of the front frames which do not influence the pattern, but which cut large blocks into short floats of equal length. To understand the logic of this particular arrangement of ties we may visualise what would happen if we disconnected one of the ties. By removing the upper tie we shall get no pattern whatsoever on one side, and one continuous row of floats on the other side of the fabric.

*) a continuous draft is one which does not "jump" from frame 1 to 3, or 2 to 4, and vice versa.

By removing the lower tie we shall have tabby alternated with very long floats where the blocks of pattern should be. Thus the tie-up has really three parts: a (fig.2) binder, b - pattern, and c - which gives the texture peculiar to the weave. The same division of the draft will apply to all spot-weaves. Of these three parts a and c

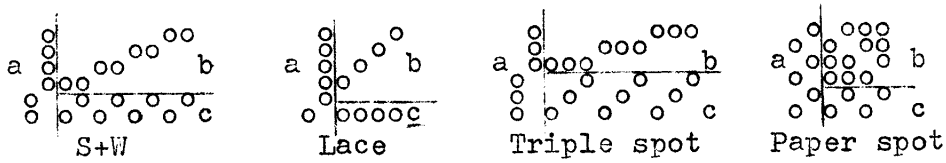


Fig.2

remain always the same, or rather the same in principle, when b changes according to the pattern woven. Let us suppose, that an anlysis of pattern (see "Analysis of patterns" in the same issue) gave us a short tie-up draft which looks like the one on fig.3. To develop it into a full S+W tie-up we first double the ties since each block of pattern

Fig.3

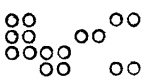


Fig.4

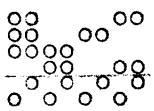


Fig.5

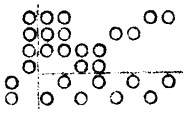


Fig.6

requires two treadles (fig.4). Then we add the ties for the front frames which give the proper texture (fig.5). Finally we complete the tie-up by adding tabby treadles (fig.6).

The tie-ups for diamond twills even when woven on as many as 16 frames are quite clear, as long as they are drawn in their "theoretical" form. E.g. in the tie-up on fig.7 except for the two tabby treadles, we can see an exact reproduction of one quarter of the pattern. This is true at least for twills threaded in plain diamond, not in double-point of M or W type, where the pattern will be more involved than the tie-up. From the tie-up we can judge also what kind of texture the fabric will have, whether it will be firm or rather loose. In the tie-up on fig. 7 the right hand lower corner gives a firm fabric with floats of from 1 to 3, when the left hand upper corner has floats from 2 to 7. Thus we may expect a fabric of uneven texture with one part of the pattern raised.

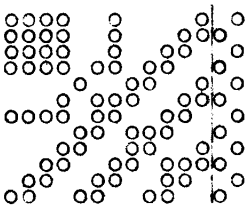


Fig.7

Turned twills (diapers, dornicks, damasks) have only two basic components in each tie-up, each of them being a tie-up for a simple twill, and one just the reverse of the other. This basic tie-ups are repeated in the main tie-up as many times as there are blocks in the pattern both in the horizontal and in the vertical direction. For instance if we weave a pattern with a short tie-up draft as on fig.3 in 1:2 twill, then we shall use the two following tie-ups as the basic ones:  and  To develop the short draft into a full tie-up we replace each "o" on the short draft with the second basic tie-up, and each empty space with the first. These two basic tie-ups are satisfactory only when they can be placed one beside another in any position, without having any ties lying opposite each other across the dividing line. Then we say that the blocks in the draft are properly "cut", i.e. have a clean outline. If this condition is not fulfilled (fig.9) we shall have long floats crossing the line between two blocks of the pattern.

Fig.8

Thus the tie-ups in fig.10 are right, and those in Fig.11 are wrong.

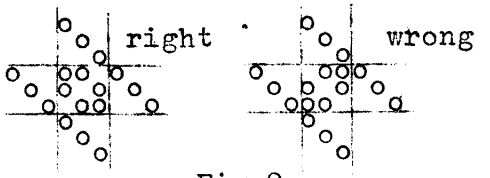


Fig.9

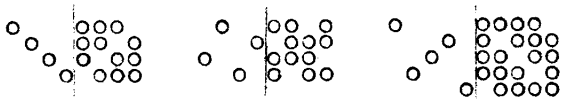


Fig.10

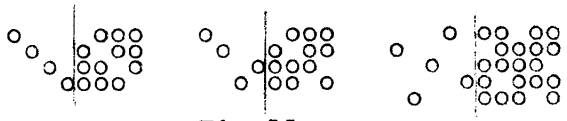


Fig.11

What we said about the turned twills applies to the double weave as well. Here also we have two basic tie-ups and they are part of the main tie-up. However the condition concerning the "cut" of blocks does not apply here. As an example of a tie-up for a four block pattern in double weave we shall take again the short draft on fig.3 and we shall replace each "o" with the basic tie-up a on fig. 12, and each empty space with tie-up b. The whole is quite clear (fig.13) as long as we have the lines dividing the 16 basic tie-ups. After these lines are erased it becomes a puzzle, except perhaps for experts.

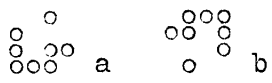


Fig.12

We cannot discuss here all possible weaves, but as far as the tie-up is concerned the above ones are the most typical, and the same principles will apply to any other weave with an exception of tie-ups for the two-harness method, which we shall take separately later on.

So far we have been speaking about tie-up drafts in their "theoretical" form. But most of them would not be very suitable for actual weaving. This is beaause we have to use both feet alternately to achieve rhytm and efficiency in weaving. Now, for instance, the tie-up on fig.7 requires a continuous treadling from the left to the right and back, which is a slow process.

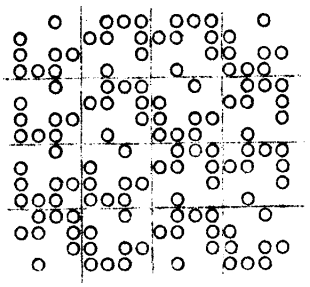


Fig.13

Much more practical tie-up will be the one on fig.14. Here the treadling is much easier and faster but all similarity between the tie-up and the pattern is gone.

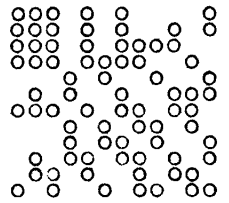


Fig.14

Very often the theoretical tie-up must be rearranged, because there are not enough treadles, to use it in its original form. For instance: a triple spot-weave requires 3 treadles for each block of pattern. Thus a 3-block pattern which can be woven on 6 frames asks for 11 treadles at least, or for 26 if all combinations of blocks are woven. In such a case we have to simplify the tie-up and use two or more treadles simultaneously. For instance treadle marked "x" on fig.15 must be replaced with two treadles on fig.16. Even so certain combinations will be impossible ("y" on fig.15), and either the pattern or the tie-up must be changed. Since every loom has too few treadles (4-frame one should have fourteen) the weaver must often develop a lot of ingenuity in adapting tie-ups to his limited technical means.

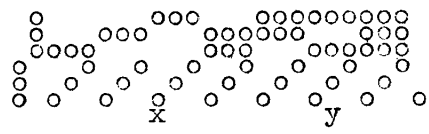


Fig.15

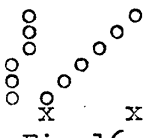


Fig.16

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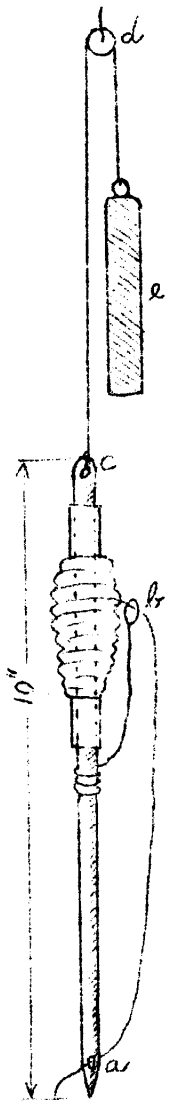
What is Lappet Weave?

Lappet (or true embroidery weave) is unique in this respect that besides the warp and the weft there is a third thread or set of threads which weave the pattern. This third thread may be considered as warp in the same way as the Whip is part of the warp in Net Weaves, and it is sometimes wound on a separate warp beam.

In its classical form Lappet requires special equipment, rather difficult to make at home, and not to be found on the market. This equipment is indispensable for production, but may be replaced with simpler tools by an amateur who does not need to take into consideration the time element.



The only accessory which one has to make at home is a Lappet Needle (see fig.). It is made of 3/16 or 1/4 brass or iron rod. Both ends must be flattened and small holes (1/16) drilled in them. Then one end (a) is sharpened. A piece of No.14 wire is wound around the middle of the needle and soldered. Then its end is bent as in the sketch and made into an eyelet, which will serve as a guide for the yarn. Now the needle should be polished with emery cloth, and it is finished.
A small quill with yarn is placed on the needle and the yarn passed first through the guide (b) and then through the lower hole in the needle (a). The needle must be hung above the batten and in the centre of its width, more or less. If we have a hanging batten a screw-eye may be driven in the rocking shaft; if not - in the ceiling. A length of string is tied to the upper end of the needle (c), passed through the screw-eye (d) and its other end tied to a sinker (e) slightly heavier than the needle.

Now we open a tabby shed, push the needle through the warp near the batten, so that its lower point penetrates below the shed, and throw the shuttle. Then lift the needle (which should remain suspended above the batten), beat, open the other tabby shed, insert the needle again not too far from the first place, lift the needle and beat. We shall have now a float nearly horizontal. Its length and position depends entirely on where the needle has been inserted, and its angle - on the number of shots of the ground made between two "stitches".

As a rule more than one needle must be used to get even a simple pattern. Each needle may be operated separately, or a row of them stuck in a strip of wood - thus making several identical patterns at the same time.

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4 - If the question is of such a nature that it cannot be answered in 500 words, we may either give you information about books or other publications discussing your problem, or advise you what would be the cost of a complete answer.

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