# Crackle Weave, Part 1: Designing with Blocks and Motifs

Crackle weave, a version of point twill, offers many possibilities for interesting patterns and, if done in the standard manner, has maximum floats of three and makes a strong cloth.

Block Design

Blocks

Conventional crackle weave design is based on blocks with 3 shafts and 4 ends. For 4 shafts, the blocks are

A   1, 2, 3, 2

B   2, 3, 4, 3

C   3, 4, 1, 4

D   4, 1, 2, 1

Adjustments at Block Boundaries

Blocks can be arranged in any sequence, although some sequences produce better results than others. Examples of block sequences are

AAABBBCCCDDD

and

ABCDCBABCDCBA

Incidentals are inserted or ends removed to meet the structural requirements of crackle weave. Berta Frey [1] lists these rules (abbreviated and paraphrased here):

1. An odd/even progression of shafts must be maintained.

2. The 3-shaft character must be maintained; incidentals can be added or ends removed to achieve this.

3. There may be no more than three threads on two adjacent shafts (for example, 2, 1, 2, 1 is not allowed).

4. There may be no more than 4 shafts before direction changes.

Although incidentals can be inserted and ends removed in various ways, the rules established by Harriet Tidball [2] are logical, systematic, and now generally used in crackle weave design. If an incidental is needed after a block, it is put on the shaft that is one less than the last thread of the block:

A   1

B   2

C   3

D   4 (wrapping around from 1)

If the same block is used in succession, as in AAA, no incidentals are required. Going from one block to the next, as in AAABBB, however, there is a problem:
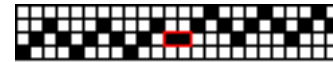
The adjacent duplicates are outlined in red. There are two choices. One is to delete one of the duplicates:
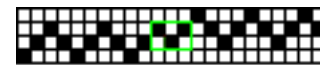
The area where the duplicate was removed is outlined in green. The other choice is to insert an incidental, shown in yellow:

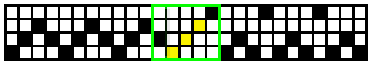If a block is skipped, as in AAACCC, Frey's Rule 3 is violated:

Incidentals for block A and the skipped block B need to be inserted

The same principle applies for skipping two blocks, as in AAAADDDD:

where the incidentals for blocks A, B, and C need to be inserted:

It is worth noting that only four essentially different situations occur at block boundaries:

 Either an end can be deleted or an incidental inserted

 No change is needed.

 An incidental is needed to connect the shafts.

 Two incidentals are needed to connect the shafts.

There are, of course, the horizontal reflections of these, to which the same rules apply.

More Shafts

Crackle weave is not limited to 4 shafts; more shafts can be used. For example, for 6 shafts, there are six blocks:

A	1, 2, 3, 2
B	2, 3, 4, 3
C	3, 4, 5, 4
D	4, 5, 6, 5
E	5, 6, 1, 6
F	6, 1, 2, 1

The same rule for incidentals applies.

Crackle also can be woven on an odd number of shafts.

If more that 4 shafts are used, there are more different situations that may arise at block boundaries.
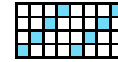
Motif Along a Path

There is another way to view the design process for crackle weave.

Note that blocks B, C, and D are simply successively upwards shifted versions of block A, with wrap-around from top to bottom. There

is only one *motif*, which can be taken to be block A.

This motif can be placed as successive points along a *path* to give the same result as using different blocks in succession. For example, if the path is a straight draw, as in

the result is the same as using the block sequence ABCDABCD:
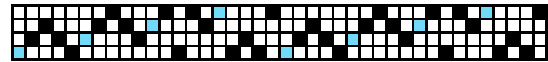
The first threads of successive motifs are shown in blue to emphasize the path.

Incidentals are, of course, handled in the same way as for blocks.

The advantage of motif-along-a-path design is that different motifs and paths can be tried independently. For example, the motif 1, 2, 3, 2, 1, 2, 3, 4, 3 is equivalent to the block sequence AB with the required incidental. But by using the combination motif, design can be done in terms of a single motif.

If a motif not corresponding to combinations of blocks is used, such as 1, 2, 3, 4, 3, 2, the result may be floats longer than 3 and not true crackle. But many more patterns are possible and if care is taken, the resulting cloths will be sound.

Future Articles

Topics for future articles include tie-ups and treadlings, motif and path design, and the algorithmic generation of crackle weaves.

References

1. *Designing and Drafting for Handweavers*, Berta Frey, Macmillan, 1958.

2. *The Weaver's Book*, Harriet Tidball, Macmillan, 1961.

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