

CRACKLE OLD & NEW.

From the point of view of traditional, conservative weaving, crackle is one of the best weaves for a four harness-frame loom ever invented. Compared with overshot it is stronger and more uniform in texture. Compared with summer-and-winter it has four blocks of pattern instead of two. Any overshot pattern can be copied in crackle.

Crackle is a logical development of a 2:2 twill, particularly of the diamond twill. The direction of threading changes so often that most of the floats skip three warp ends (in plain diamond twill most floats skip 2 ends). No float is longer than 3 unless a mistake has been made in drafting.

Although primarily a pattern weave, in modern weaving crackle gives very good results with mixed warps (warps with yarns of different count and material).

The theory of crackle is a little involved. The threading draft has four distinct units, each unit of four warp ends:

1-st: $\begin{matrix} & x & x \\ x & x & x \end{matrix}$; 2-nd: $\begin{matrix} & x & x \\ x & & x \end{matrix}$; 3-rd: $\begin{matrix} x & x & \\ & x & \end{matrix}$; 4-th: $\begin{matrix} x & & \\ & x & x \end{matrix}$;

Each unit gives one block of the pattern, and can be repeated any number of times. For instance if a block of pattern must be 200 warp ends long, one of the units is taken simply 50 times. But when we change from one block to another the units do not match, and therefore one or two additional heddles (and warp ends, of course) must be inserted between the two blocks. The choice of these incidental heddles must be made in such a way, that the sequence of threading is not interrupted (i.e. it will give tabby on harness-frames 1+3, against 2+4), and that it won't produce floats longer than 3. For instance between the first and the second unit we could insert a heddle on frame 4 (fig.2 A), but it would spoil the tabby. Then if we place

$\begin{matrix} & \textcircled{x} & & \\ x & x & x & x \end{matrix}$ A; $\begin{matrix} & \textcircled{x} & & \\ x & x & x & x \end{matrix}$ B; $\begin{matrix} & & \textcircled{x} & \\ x & x & x & x \end{matrix}$ C; $\begin{matrix} & & & \textcircled{x} \\ x & x & x & x \end{matrix}$ D; Fig.2

the third frame, it will produce a float of six (fig.2 B). On the frame No.2 it will give 3 heddles on the same frame (Fig.2 C). Then the only place which remains is on frame No.1 (fig.2 D). This general rule can be kept in mind for all combinations of units.

If you prefer ready formulas here they are (for drafts read from left to right): between unit 1 and 2 - incidental on 1; between 2 and 3 - on 2; between 3 and 4 - on 3; between 4 and 1 - on 4. Between 1 and 4 - on 1; between 4 and 3 - on 4; between 3 and 2 - on 3; between 2 and 1 - on 2; between 1 and 3 - two accidentals: on 1 and 2; between 2 and 4 - on 2,3; between 3 and 1 - on 3,2; and

between 4 and 2 - on 4,3. These are all the combinations possible.

Regardless of the threading draft, crackle can be woven in three basic ways. First as traditional crackle, which means one treadle

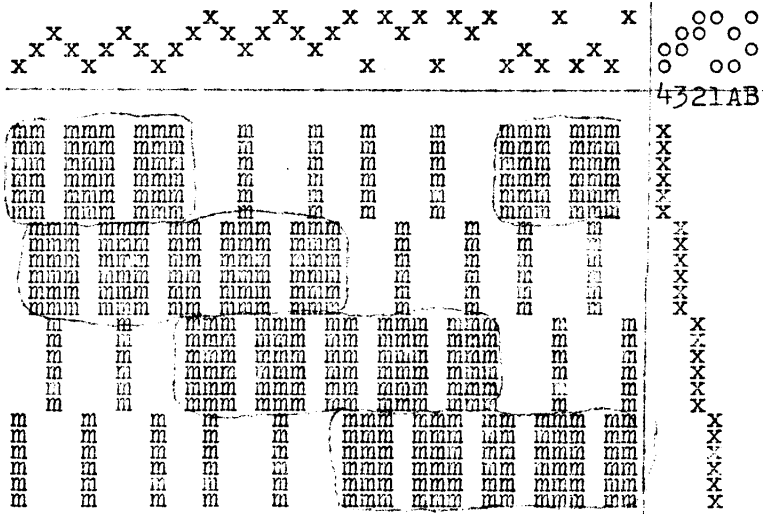


Fig.3

for one block of pattern. Picks of pattern alternate with binder in all following examples, but the binder is not shown on the draw-downs. Traditional crackle is shown in fig.3.

Or it can be woven as plain summer-and-winter, i.e. two treadles alternating all the time, so that the first block is woven on treadles: 4, and 3; the second - on 3 and 2; the third - on 2 and 1, and the fourth: - on 1 and 4, as in Fig.4.

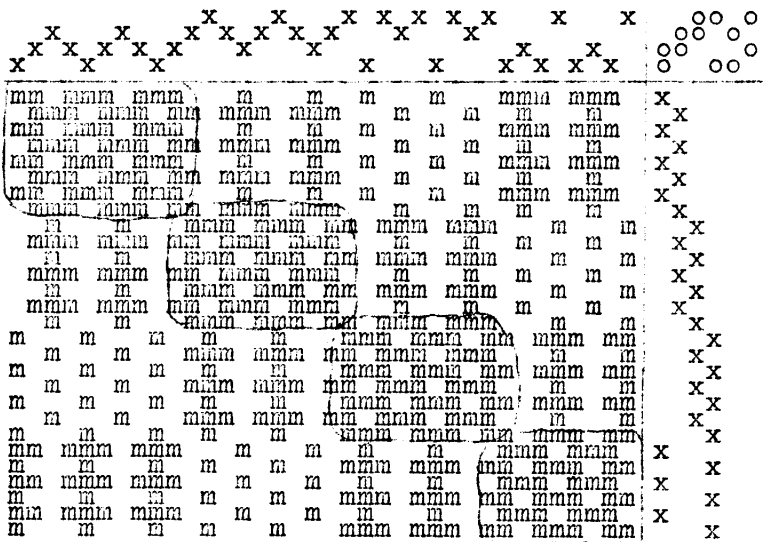


Fig.4

Finally it can be "woven-as-drawn-in", i.e. as traditional overshoot or diamond twill (fig.5).

When we compare these three treading, we may observe that they influence not only the structure of the fabric, but the pattern as well.

In the first treading (fig.3) the blocks of pattern overlap each other by about one half of their length, and there is nothing we can do about it, unless we use only two blocks instead of four; for instance the first and

the third, or the second and the fourth. As far as structure is concerned, this is typical for classical crackle with floats forming vertical columns.

In the second treading (fig.4) the blocks do not overlap. The structure of the blocks is identical with summer-and-winter. Besides the blocks (outlined on the draw-down) we have half-tones corresponding closely to the half-tones in overshoot, but of a different structure.

The third treading (fig.5) gives an effect similar to the second, but the general appearance of the fabric is much more satis-

factory. There is a fine diagonal running across all blocks of pattern, and if the draft is woven as drawn in, this diagonal will cross the whole fabric. However this treading is the most difficult to follow.

How to treadle?

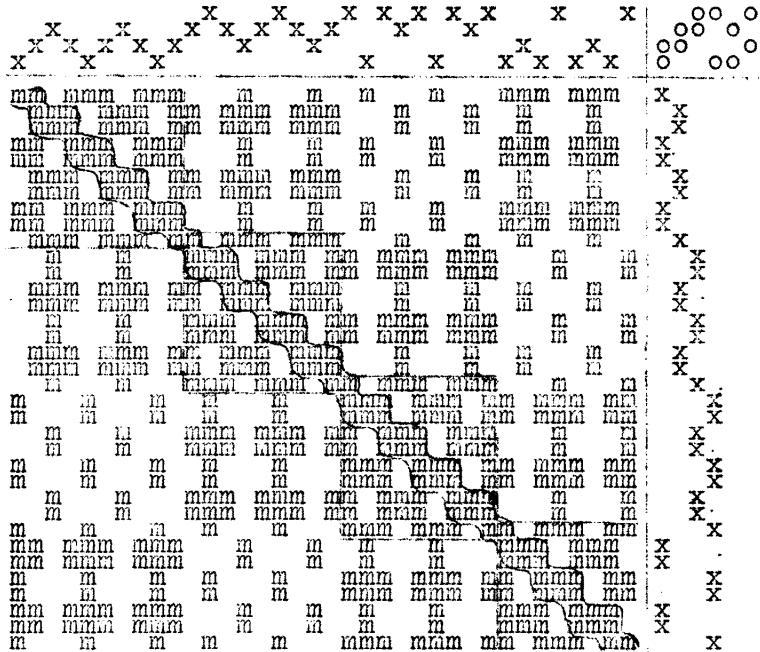


Fig.5

In the first case (fig.3) the depth of blocks or the number of shots of the pattern weft in each block may be any, but it is advisable to use even numbers: 2, 4, 6, etc. Then the units of treading are as follows:

- 1) 4A4B, 2) 3A3B,
- 3) 2A2B, 4) 1A1B.

Each unit can be used any number of times.

In the second case (fig.4) the number of pattern shots should be odd. Otherwise we shall have two shots in the same shed, between two blocks. The units of treading are:

1) 4A3B, 2) 3B2A, 3) 2A1B, 4) 1B4A. But at the end of each block we must repeat the first half of the unit. For instance if the first block is supposed to have 5 units, it will really have 5 and a half: 4A3B4A3B4A3B4A3B4A3B4A. Only then it will match the second or the fourth block.

However if we weave block 3 after 1, or 4 after 2, or 1 after 3, or finally 2 after one - we do not repeat the first two shots of weft. E.g. 4A3B4A3B2A1B2A1B. This sounds a little involved and so it is.

In the third case (fig.5) the units are:

- 1) 4A3B3A4B, 2) 3B2A2B3A, 3) 2A1B1A2B, 4) 1B4A4B1A.

Here as in the former case at the end of each block we must repeat the first two shots of the unit. E.g.: 4A3B3A4B4A3B3A4B4A3B2A2B3A etc. But again, when we go from the first block directly to the third or from the second to the fourth, we do not add these two shots.

When the pattern is woven as drawn in, the weavers with good eyes may forget about the units and all rules of treading, simply by building a straight diagonal on the fabric. When this diagonal comes to a float of 2 the corresponding treadle is used only once, when the float is of three - we make two shots on the same treadle (with binder in between, of course). The relationship between the length of floats and number of picks is well illustrated on fig.5. In fine pattern, where there are several diagonals, one should mark with a pin the one to be followed, and move the pin forward when the weaving progresses.

We may also follow the threading draft on paper, as is often done in case of overshoot, and read the treadling in terms of combinations of harness-frames. For instance in fig.3 reading from the left we shall have: 12, 23, 23, 12, 12, 23, 23, 12, 12, 23, 34, 34, 23, 23, 34, 34, 23, 23, 34, 14, 14, 34, 34, 14, 14, 34, 34, 14, 12, 12, 14, 14, 12, 12, 14.

These three treadlings are the basic ones. They can be used with any threading draft. But they are not the only ones.

When a fabric is used for upholstery, there is no objection to long floats on the wrong side. Therefore we can use a tie-up as in fig.6, which will produce long floats on one side and tabby texture on the other. The pattern will be faintly visible only because of the difference in colour between the pattern weft and the ground.

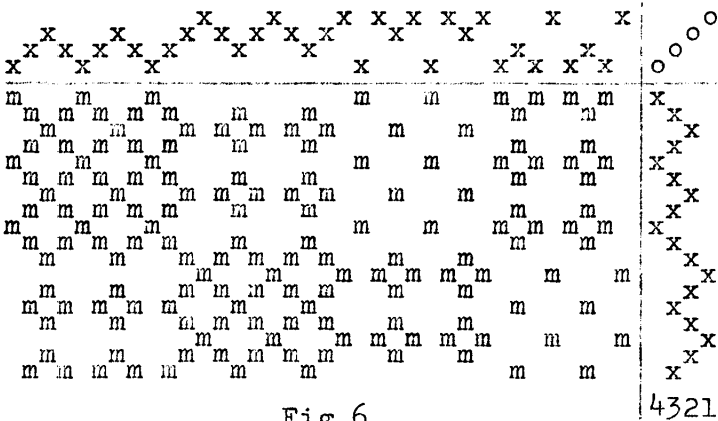


Fig.6.

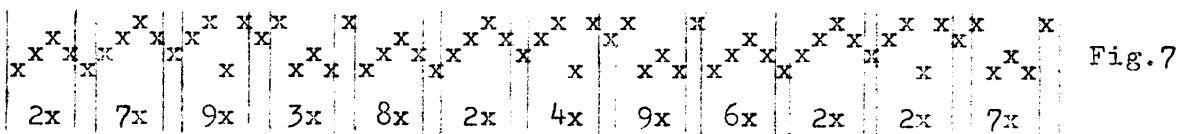
The treadling here is identical with the threading draft, but we do not use tabby for binder. Instead, after

each shot of pattern weft, which must be of a contrasting colour, we make one shot of binder (same colour as warp) on the opposite treadle. I.e. binder on 3 after 1, on 4 after 2, on 1 after 3, and on 2 after 4. Thus complete treadling for the above draft is:

4 2 3 1 2 4 3 1 4 2 3 1 2 4 3 1 4 2 3 1 2 4 1 3 2 4 3 1 2 4 1 3
2 4 3 1 2 4 1 3 4 2 1 3 2 4 1 3 4 2 1 3 2 4 1 3 4 2 3 1 4 2 1 3
4 2 3 1 4 2 1 3;

The underscored treadles are used for pattern, and the remaining ones for the binder. Both wefts for the pattern and the binder should be of the same count.

Further experiments can be made with the texture of the fabric. Strangely enough the threading draft is here of secondary importance, but large blocks of pattern should be avoided. It is much better to use a "hit-and-miss" pattern as in fig.7.



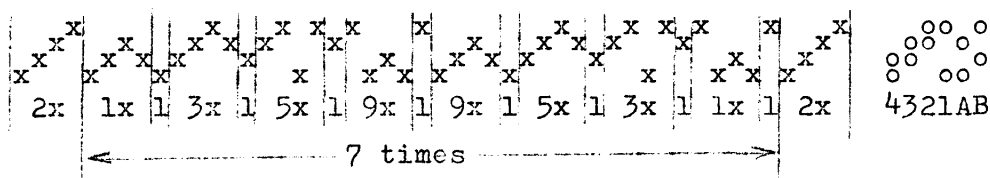
We shall use standard tie-up as in fig.3. The following treadlings can be tried with different yarns:

- 1) 1,2,3,4. 2) 1,3,2,4. 3) 1,2,3,4,3,2. 4) 1,2,1,3,1,4.
 5) 1,2,3,4,2,1,4,3. 6) 1,2,3,2,3,4,3,4,1,4,1,2.

First experiments should be made with uniform yarn, both in warp and weft. Then we can introduce different counts of yarn in weft, and finally in warp as well.

A practical project in Crackle.

Upholstery fabric in small unsymmetrical pattern. Natural single linen No.16 for warp, set at 30 ends per inch. Reed No.15, two ends per dent. The width of warp - 36 inches. The total number of warp ends: 1080. The first and last 4 ends (at the selvages) may be made of 10/2 or 12/2 cotton. The threading draft:



Treading (one repeat): 4A3B3A4B4A - once, 3B2A2B3A - 3 times, 3B - once, 2A1B1A2B - 5 times, 2A - once, 1B4A4B1A - 9 times, 1B - once, 4A3B3A4B - 9 times, 4A - once, 3B2A2B3A - 5 times, 3B - once, 2A1B1A2B - 2 times, 2A1B4A4B1A1B - once.

The weft should be half-bleached single linen No.16. The same shuttle for pattern and binder. Do not use different colours in weft and warp, because the pattern is "dynamic", which simply means that it is moving in one direction and should not be stressed. If soft, natural linen is available for weft, it will do as well as the half-bleached. The pattern will be faintly visible in oblique light, and this is all we want. Those unfamiliar with single linen will find necessary information on this subject in MW No.1 (1951).

