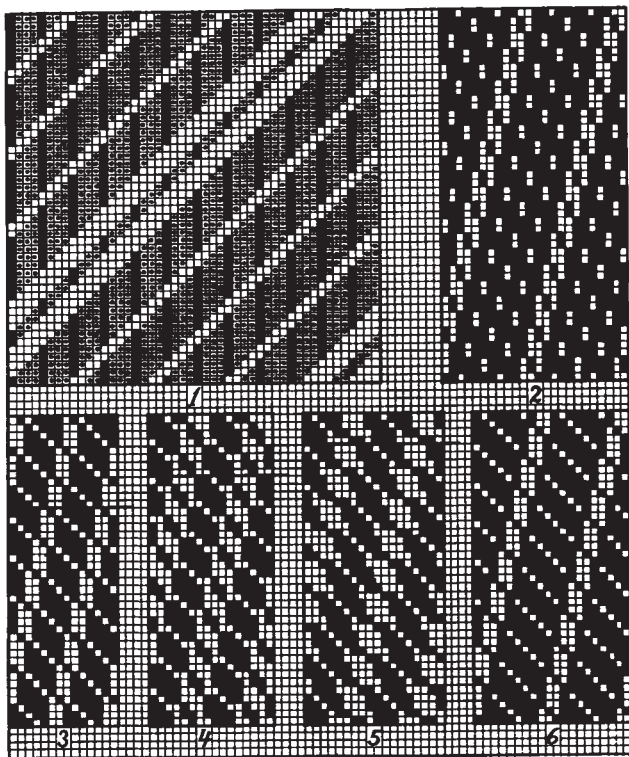


Steep-Twills, Having a Grading of 75°.

Weaves of this sub-division of the regular twill of 45° grading, are derived from the latter by using every fourth warp-thread in rotation. In constructing 75° steep-twills out of regular twills having a number of harness for their repeat which can be divided evenly four, only one-fourth of the harness are required; for example:

12-harness "regular"	=	3-harness "75° steep."
16- " "	=	4- " "
20- " "	=	5- " "
24- " "	=	6- " " etc., etc.

Again, in constructing 75° steep twills out of regular twills having for their repeat an even number of



harness not called for in the previous rule, the number of harness required is lowered one-half; for example:

14-harness "regular"	=	7-harness "75° steep."
18- " "	=	9- " "
22- " "	=	11- " "
26- " "	=	13- " " etc., etc.

These two given rules will readily a third, as follows:

Every regular twill of an uneven number of harness for its repeat, if used for the construction of a steep-twill of 75° grading, requires every warp-thread of the former used; or in other words: Steep-twills of 75° grading, constructed out of regular having an uneven number of harness for their repeat, require an equal number of harness for the former; for example:

9-harness "regular"	=	9-harness "75° steep."
11- " "	=	11- " "
13- " "	=	13- " "
15- " "	=	15- " " etc., etc.

To give a clear understanding of the construction of the 75° steep twills, Diagram 1 is designed illustrating one repeat 38 × 38 of a regular twill — shown in 2 kinds of type.

The arrangement of the warp threads of this regular twill is shown in two kinds of type:

One-warp thread shown in *black* type—to alternate with

Three-warp threads shown in *dot* type.

12 repeats of the repeat are given.

Using the *black* type warp threads only (i. e. omitting the *dot* type warp threads) produces the required *Steep-Twill* shown in Fig. 2.

In a similar way Weave Fig. 3 is produced from the regular 45 degree twill: 4 up 1 down 4 up 1 down 4 up 1 down 4 up 4 down 1 up 4 down (28 × 28 regular twill) 28 ÷ 4 = 7 harness used in the steep twill shown in Fig. 3, having a repeat of 7 warp threads and 28 picks.

Weave Fig. 4 is produced from the regular 45 degree twill: 3 up 1 down 4 up 1 down 4 up 1 down 3 up 4 down 2 up 3 down 2 up 4 down (32 × 32 regular twill) 32 ÷ 4 = 8 harness used in the steep twill shown in Fig. 4, having a repeat of 8 warp threads and 32 picks.

Weave Fig. 5 is produced from the regular 45 degree twill: 3 up 2 down 4 up 1 down 4 up 1 down 4 up 2 down 3 up 3 down 1 up 4 down 1 up 3 down (36 × 36 regular twill) 36 ÷ 4 = 9 harness used in the steep twill shown in Fig. 5, having a repeat of 9 warp threads and 36 picks.

Weave Fig. 6 is produced from the regular 45 degree twill: 5 up 1 down 4 up 1 down 4 up 1 down 4 up 1 down 4 up 1 down 5 up 4 down 1 up 4 down (40 × 40 regular twill) 40 ÷ 4 = 10 harness used in the steep twill shown in Fig. 6, having a repeat of 10 warp threads and 40 picks.

Determination of the Finishing Materials in a Cotton Fabric.

The analysis of a finished cotton fabric containing no mineral matter includes the determination of,

1. The percentage of filling materials. A weighed sample of the fabric is boiled consecutively in distilled water, 1% caustic soda solution and 1% hydrochloric acid; each operation should be continued for about one hour. If the sample be finally washed and dried to constant weight at 105° C. the result will give the amount of absolutely dry fibre present. Add 8% to obtain the *normal* air-dry weight.

2. The percentage of moisture in the air-dry fabric is determined by drying to constant weight at 105° C.

3. The percentage of fats and waxes is determined by extraction in the Soxhlet apparatus.

4. The percentage of starch, etc., is determined by difference as shown below:

Total filling materials	22%
Moisture	12%
Fats, etc.	5%
		17%
Starch, etc.	5%

The qualitative test for mineral matter in the fabric is the ash which remains after ignition of the fabric in a crucible. The filling material may be soluble in water, i. e., the chlorides of zinc, calcium, magnesium and sodium. The insoluble portion may consist of China clay, barytes, gypsum, chalk, talc, lime or aluminium soaps. These latter compounds will, of course, be decomposed on heating.