

*Filling:* 85 picks per inch. Of the same 100 ends, each  $4\frac{1}{2}$ " long, *i. e.*, 450". weigh 4.664 grains. Hence

$$\frac{450 : 4.664 :: x : 7000}{36} = 18,760 \text{ yards}$$

of this single cotton filling weigh 1 lb., and  $18,760 \div 840$  (cotton standard) = 22.33, or 22's single cotton (on the light side) is the filling used in the construction of this fabric.

#### A SIMILAR FABRIC STRUCTURE BUT USING LESS SILK.

The analysis of this fabric gives us more warp threads used, but this of a finer count. The fabric is also slightly heavier.

*Weave:* 8-leaf satin, warp effect for face.

*Texture:* Finished, 386 warp threads and 85 picks per inch.

*Finished width:* 36 inches.

*Weight of one Yard:* 1432.51 grains (exclusive selvage)

*Warp:* 13,896 ends exclusive of selvage. Of the same 150 ends  $7\frac{1}{4}$ " long, *i. e.*, 1087.5" weigh 0.57805 grains. Hence

$$\frac{1087.5 : 0.57805 :: x : 7000}{36}$$

Answer: 365,530 yards of (boiled-off) silk required to balance 1 lb. Allowing 25 per cent for the boil-off gives us 274,147, or practical 275,000 yards to the lb., thrown. Take-up of warp in weaving  $2\frac{1}{2}$  per cent. Reed 94 with 4 ends will bring fabric 37" wide in reed. Reed 62 with 6 ends =  $37\frac{1}{3}$ " wide in loom.

*Filling:* 85 picks per inch. Of the same 100 ends, each 6" long, *i. e.*, 600" weigh 6.3578 grains. Hence

$$\frac{600 : 6.3578 :: x : 7000}{36} = 18,350 \text{ yards}$$

of this single cotton filling, weigh 1 lb., and  $18,350 \div 840 = 21.84$ , or 22's single cotton (on the heavy side) is the filling used in the construction of this fabric.

#### IMPROVEMENTS IN THE METHOD OF FINISHING ARTIFICIAL SILK.

To avoid the necessity of drying artificial silk under tension in its manufacture, J. Hübner treats the same with some hygroscopic substance before drying. Glucose and glycerine are two of the bodies suggested.

*Example.*—The fibre is formed as usual and washed, and finally treated in a luke-warm bath of Marseilles soap or Turkey Red oil, and then treated for a few minutes with a 1 per cent solution of glycerine or glucose, with the addition of a small quantity of a weak acid, such as acetic or tartaric acid. The fibre is then wrung out (but not washed), and dried at a low temperature. The glycerine bath may be neutral, in which case a treatment with a dilute acid bath follows.

This process produces on the fibre a soft characteristic *scroop* of natural silk.

## DESIGNING AND FABRIC STRUCTURE.

### POINTED TWILLS.

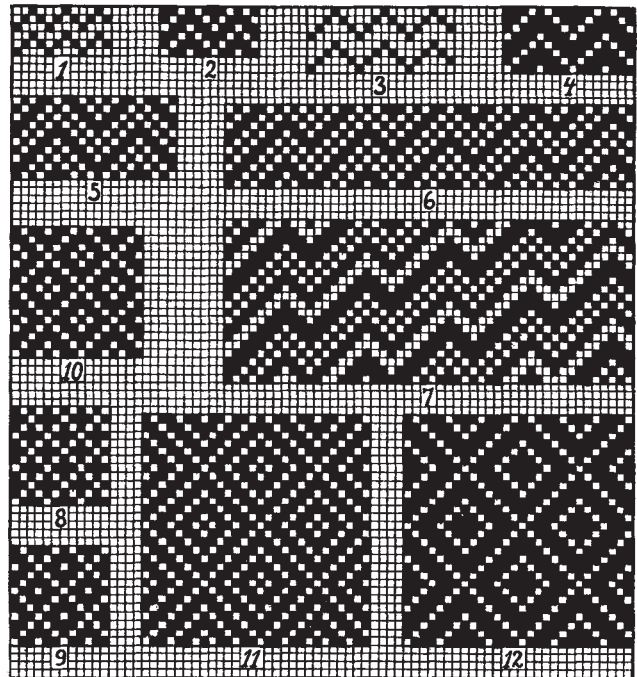
This subdivision of twill weaves finds extensive use in the manufacture of all kinds of figured cotton fabrics, also for union as well as all-worsted dress goods, and various silk fabrics. A few of the smaller weaves, like for instance the  $2-1$  3-harness pointed twill, find use in the manufacture of woollen and worsted fabrics for men's wear, chiefly on account of their adaptability for producing special color effects, such as hair lines, etc.

This system of weaves is subdivided into:

- such as point warp ways and
- such as point warp and filling ways.

#### Pointed Warp Ways.

*Rule:* Run foundation twill for a certain number of warp threads from left to right, and reverse direction of drafting for a certain number of warp threads, using the last warp thread of the one direction of



drafting as the first warp thread of the reverse direction of drafting. Continue this alternate drafting, one way and then the other, until repeat of weave is obtained. Warp threads thus claimed by either direction of drafting are known as the *point threads*.

This feature indicates that in calculating the repeat of a pointed twill, said point threads are to be considered only once.

*For instance:* Drafting 8 ends from left to right, to alternate with 8 ends drafted from right to left, and which drafting on account of being balanced will result in a repeat of the weave, we then find

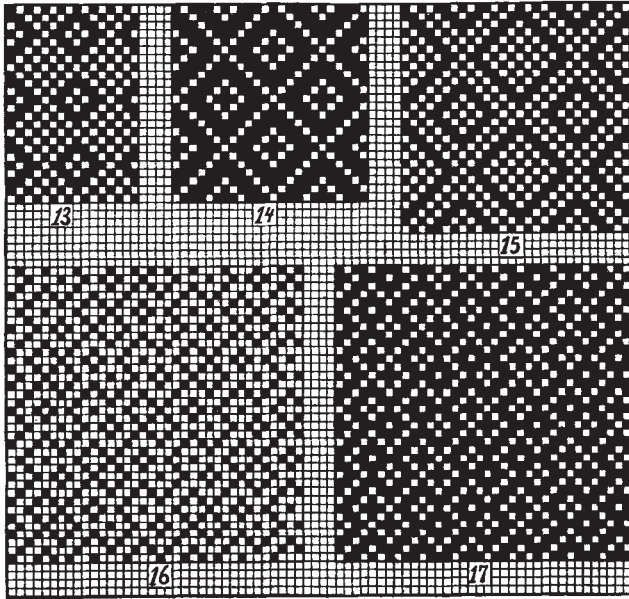
$$8 + 8 = 16 - 2 (\text{points}) = 14$$

*Answer:* The weave will repeat on 14 warp threads.

With reference to the repeat of the pointed twill

filling ways, the same is identical to that of the foundation twill.

If drafting irregular, the repeat of the pointed twill is obtained when the amount of threads drafted in one direction equal those drafted in the reverse way.



*Example:* Drafting alternately 8, 5, 4 and 7 will repeat, since

$$8 + 4 = 5 + 7, \text{ i. e., } 12.$$

The repeat of the weave then will be:

$8 + 5 + 4 + 7 = 24 - 4 \text{ (points)} = 20 \text{ warp threads.}$

Weaves Figs. 1 to and inclusive 7, are given to illustrate the construction of these weaves.

Fig. 1 shows us a most simple pointed twill, having for its foundation the 3-harness twill, filling effect, drafted for 3 ends from left to right to alternate with 3 ends drafted from right to left. Repeat of weave 4 warp threads and 3 picks.

Fig. 2 has for its foundation the 3-harness twill, warp effect, drafted alternately for 4 ends in one direction and for 4 ends in the other direction. Repeat 6 by 3.

Fig. 3 has for its foundation the 4-harness twill, filling effect, drafted alternately 4 and 4 ends. Repeat 6 by 4.

Fig. 4 shows us the 4-harness twill, warp effect, drafted alternately 5 and 5 ends. Repeat 8 by 4.

Fig. 5 illustrates the  $\frac{2}{1} \frac{1}{1}$  5-harness twill, drafted 6 and 6 ends. Repeat 10 by 5.

Fig. 6 has for its foundation the same twill as the preceding example, the drafting in this instance being 8 and 4.

The repeat in this instance is:

$$8 + 4 = 12 - 2 \text{ (points in one draw)} = 10$$

times 5 changes in starting drafting always one pick lower, = 50.

*Answer:* Repeat of weave 50 warp threads and 5 picks.

Fig. 7 has for its foundation the  $\frac{3}{2} \frac{2}{1} \frac{1}{1}$  10-harness twill, drafted 8 threads from left to right to alternate with 4 threads drafted in opposite direction, and what,

considering the 2 points less, gives us 10 threads for each draw. Five changes in starting them (on picks, 1, 5, 9, 3 and 7) gives us 10 times 5, i. e., 50 warp threads for the repeat of the weave, with 10 picks (the repeat of the foundation twill) for the filling.

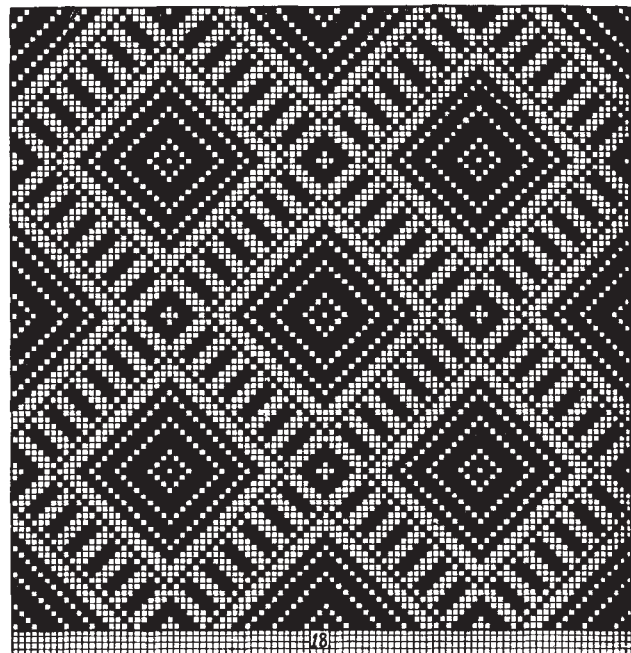
In a few instances these pointed twills may be used *pointed filling ways*. Turning examples given 45 degrees, i. e., changing position of warp threads to that of picks, and that of the latter to warp threads, will explain subject.

#### Pointed Warp and Filling Ways.

In connection with this subdivision of pointed twills, the drafting as is previously done in connection with the warp threads is in this instance also extended to the filling. In most instances the arrangement used is balanced; again the drafting for the two systems of threads may be varied. In the first instance the repeat of the weave, warp and filling ways, is the same; in the latter instance it is different.

Weaves Fig. 8 to and inclusive 18 are given to explain subject.

Figs. 8, 9, 10 and 11 have the same foundation twill, i. e., the 3-harness, warp effect twill. The drafting in either example is different, using in Fig. 8 a drafting of 3; in Fig. 9 a drafting of 4; in Fig. 10 a drafting of 5, and in Fig. 11 a drafting of 8 ends in either direction, both warp and filling ways. These four examples of pointed twills given, repeat respectively (considered in rotation quoted) on 4, 6, 8, and 14 warp threads, and a corresponding number of picks.



Weave Fig. 12 has for its foundation the 4-harness (warp effect) twill, drafted for 8 ends alternately **one** and then the other way, both, in warp and filling. Repeat of weave is 14 warp threads and 14 picks.

Weave Fig. 13 has for its foundation the  $\frac{2}{1} \frac{1}{1}$  5-harness twill, drafting alternately 5 ends in one direction and 5 ends the reverse, warp and filling ways. Repeat of weave 8 warp threads and 8 picks.

Weave Fig. 14 has for its foundation the 4-harness (warp effect) twill, the same being drafted alternately for 7 ends in one direction and for 7 ends in the other direction, warp and filling ways. Repeat of weave 12 warp threads and 12 picks.

Weave Fig. 15 has for its foundation the same 5-harness twill as was used in constructing weave Fig. 13, the drafting in this example being for 8 ends in each direction. The repeat is 14 warp threads and 14 picks.

Figs. 16 and 17 illustrate two neat, well broken up, pointed twills, produced by drafting an irregular number of ends.

Weave Fig. 16 has for its foundation the 3-harness (filling effect) twill, drafted for 5 ends in one direction and for 3 ends in the other direction. 3 repeats of this drafting are required to produce one repeat of the weave thus:

$$5 + 3 = 8 - 6 \times 3 = 18$$

Answer: Weave Fig. 16 repeats on 18 warp threads and 18 picks.

Weave Fig. 17 is the mate weave to Fig. 16, being its warp effect, produced by using the warp effect of the 3-harness twill for the foundation. Both weaves can be woven with a fancy drawing-in draft, if so required, on 3-harness.

Weave Fig. 18 shows us a fancy effect in a pointed twill, using for its foundation a portion of a 45 by 45 fancy twill. 25 ends of this fancy twill are drafted one way and the same number of ends the other way, both, warp and filling way; hence repeat of pointed twill

$$25 + 25 = 50 - 2 = 48$$

Answer: Repeat of weave 48 warp threads and 48 picks, calling for a 25-harness point draw on the loom.

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