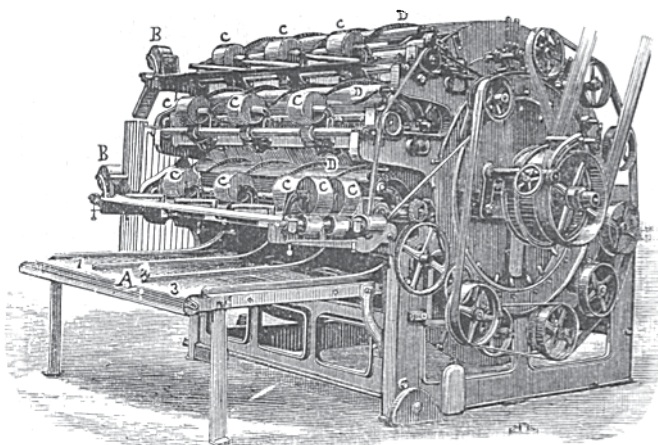


Whether one or two cards be employed, the finished-card sliver passes to the drawing. As a rule three drawing frames are used in flax-tow preparing, but very fine tows require four, and in exceptional instances five have been employed. These machines are made with feed rollers, fallers, and drawing rollers, and are similar in their action to those used for long line, but with such differences as are necessary for working the shorter-stapled and more tangled material. The rollers are smaller in diameter and the faller pins shorter, so the fallers may be brought as close as possible to the nip of the rollers and prevent the shorter fibre from dropping out and making excessive waste.



COMBINATION, I. E., BREAKER AND FINISHER CARD:
A Feed Table; C Front Conductors; E Sliver-plate.

In flax-line preparing, as previously noted, the drafts run from 10 to 15 on the drawing frames and roving, but in tow, owing to the much shorter fibre, the drafts are much shorter and usually run from 6 to 8. After the drawing there is one roving process, and then the spinning, which is wet for fine tows and dry for coarse.

For very coarse, heavy yarns, in which cheap production is the main point, only two drawing-frame processes are used, being preceded, however, by double carding. For work as coarse as 40 pounds per spindle a rotary gill roving is sometimes used without any regular spinning process.

Tow yarns, being made of shorter fibre than line yarns, require more turns twist per inch. The number varies according to the strength and grade of the material, but is ordinarily the square root of the lea multiplied by about 2 for filling and 2.2 for warp.

Preparing the Yarn.

When flax has been spun into yarn, dried and reeled, it is a finished article of commerce, but before it reaches the loom it has frequently to undergo considerable changes, such as scouring, boiling, bleaching, and possibly dyeing.

Unbleached yarns are known as gray, or green yarns, and in the weaving trade cloth made from such yarns is known as green linens while that made from boiled yarn is known as boiled linens.

Flax yarn contains a remarkably large percentage of impurities, including a considerable quantity of gummy substances, as well as much dirt and woody matter, amounting in most cases to fully a fourth of its weight. If this yarn is woven green and the cloth subjected to thorough bleaching, the shrinkage in the diameter of the yarns will leave the cloth looking more

or less bare. To prevent this and to enable the weaving of a tighter and firmer cloth, yarns that are intended for fine white linens are usually boiled in soda lye, which not only reduces their bulk but also makes them softer and more workable. Creaming, in which the yarn is partly decolorized, is usually employed for fabrics to be sold in that condition. As a rule, yarns that are bleached are those intended for grass cloths, cream damasks, apron dowlas, huckabacks, towels, etc., which are not bleached after weaving. However, for various reasons some articles made from bleached yarns are also bleached in the piece. The proportion of loss in weight of the yarns through boiling, etc., varies not only with the extent to which the bleaching process is carried but also with the quality of the material. The approximate loss in weight caused by the various processes to which the yarn may be subjected is usually as follows: Scoured, 2 to 6 per cent; boiled, 4 to 8 per cent; twice boiled, 7 to 10 per cent; one-fourth bleached (creamed), 8 to 12 per cent; one-half bleached (high creamed), 10 to 15 per cent; three-fourths bleached, 12 to 20 per cent; full bleached, 15 to 25 per cent.

FABRIC ANALYSIS.

(Continued from January issue.)

When to Pick Warp Out of Filling.

With a great many fabrics, like corkscrews, diagonals, etc., it will be found advisable to pick out the warp from the filling in place of picking the filling out of the warp-threads, as was previously explained. It will make work easier, on account of the less frequent change of the interlacings met with in a given number of ends.

When picking warp out of the filling, whether we deal with single or double cloth, remember that you obtain in your pick-out sinkers where there should be risers for the warp-threads in the weave, and vice versa, you have risers where there should be sinkers. For this reason, while picking out, indicate filling ends up with *dots*, or leave squares empty, and indicate filling ends down with *crosses*, or paint the squares *full*, or use whatever mark you are accustomed to make for indicating risers in a weave. After pick-out is completed, turn the same 45 degrees and your weave for the loom is obtained.

The procedure will be readily explained by considering weaves Figs. 3, 4, 5 and 6.

For instance, consider weave Fig. 3, the 11-harness corkscrew. Examining in this weave the filling, we find the same to interlace with the warp as $\uparrow\downarrow\uparrow\downarrow$ for each pick, whereas if considering the interlacing of the warp-threads with the filling, for a similar number of threads in the weave, we find it to be $\downarrow\uparrow\downarrow\uparrow$; in other words, in connection with picking filling out of warp, we have four changes from risers to sinkers, in every eleven threads of the repeat of the weave, whereas when picking the warp out of the filling we only find two changes from risers to sinkers, in every eleven threads of the repeat of the weave.

This explains that picking the warp out of the filling in this instance is the easier plan, since there is nothing more bewildering in picking out, than any amount of 1 *up* 1 *down* in a high textured fabric. This is characteristic to the warp texture of the corkscrews, and other weaves in which the warp predominates to that of the filling. You will often not be sure whether the 1 *up* or the 1 *down* is the next thread to be considered, whereas the threads interlacing in sets of 2, 3, 4, or more, the ends will prominently rest side by side, when examined with the needle by the analyst.

In the same manner, the diagonal Fig. 4, repeating on 11 warp-threads and 11 picks, will be easier picked out warp from filling, it being easier to pick out $\uparrow\downarrow\uparrow\downarrow$ for every eleven ends in the repeat of the weave if picking the warp out of the filling, compared to picking out $\downarrow\uparrow\downarrow\uparrow$ respectively for every eleven warp-threads across each pick.

Weave Fig. 5, a skip-twill repeating on 16 warp-threads and 8 picks, will show that it will be easier to pick-out 3^2-1_1 compared to $1_1-1_1-1_1-2_3-1_1-2_2$, i. e., it will be found easier to pick-out the warp-threads from the filling than vice versa.

Double Cloth.

Having mastered picking-out of single cloth structures, the analysis of fabrics constructed with 2 systems warp and 1 system filling, 1 system warp and 2 systems filling, and 2 systems of warp and filling, or full double cloth, can be taken up.

Two plans of procedure may be observed, viz:

1st: Proceed the same as if dealing with single cloth, and which in many cases will be the best plan all around, although possibly more tedious for the analyst.

2nd: Get details of the fabric structure, each item separately. Shave off or singe, i. e., clear face and back of fabric, and:

(a) Ascertain weave for the back.

(b) Ascertain arrangement, i. e., proportion of face to back threads, inserting for this purpose, two pins about one inch apart from each other, into the fabric and counting the threads between, on face and back. This will readily indicate whether the arrangement is 2 face 1 back, or 1 face 1 back, the two most often met arrangements, or any other combination that might have been used.

(c) Remove the back warp, or

Remove the back filling, or

In connection with double cloth, remove back warp and back filling.

Lift these threads carefully out of the structure, gradually loosening them with the needle out of their interlacings. A pair of fine forceps may be found convenient to assist in their removal.

(d) You now have the face structure of the single cloth, and which then pick-out in the regular way.

(e) Construct now the complete double cloth weave by theory from facts obtained.

We will now deal with picking-out these fabrics in the regular way, i. e., treat them as single cloth.

2 Systems Warp, 1 System Filling.

The same will pick-out easier warp out of filling, on account of the high warp texture characteristic to these fabrics.

(a) Ascertain arrangement of face to that of back, i. e., whether 2 : 1, or 1 : 1 or any other combination.

(b) Prepare sample in the regular way for the picking-out.

ARRANGEMENT: 1 FACE 1 BACK.

Pick-out and record interlacing of the first face thread you can get hold of.

Pick-out and record interlacing of first back thread you can get hold of.

Pick-out and record interlacing of the next face thread.

Examine on your record on the design paper the position where the back warp stitches to face filling.

If the same stitches, i. e., is up between two face warp-threads rising at the same pick, you are under average circumstances proceeding correctly with your pick-out and may continue that way, taking alternately hold of one end back one end face, until the repeat of weave is obtained. If, however, you find on your record on the design paper that on said pick one of the face warp-threads is up and the other one down, you then have not struck the correct arrangement of face and back warp-threads to each other in the sample you are picking-out, i. e., you have liberated either the wrong face or back warp-thread ahead of the one you should have used, and what you then have to correct on your design paper, having then a guide where to hunt for a face or back warp-thread. If you deal with a face weave where a perfect stitching is not possible, you then have to pick-out more of the sample, possible the complete repeat of the weave, and then solve the question by theory.

Fig. 6 is given to explain the subject, showing three different ways how you may get hold of the two systems of warp-threads when picking-out. The face warp-threads are shown in the same position in all three diagrams. The pick-out is shown in the position as you will obtain it from sample, and after picking-out has to be turned 45 deg. for regular position of weave.

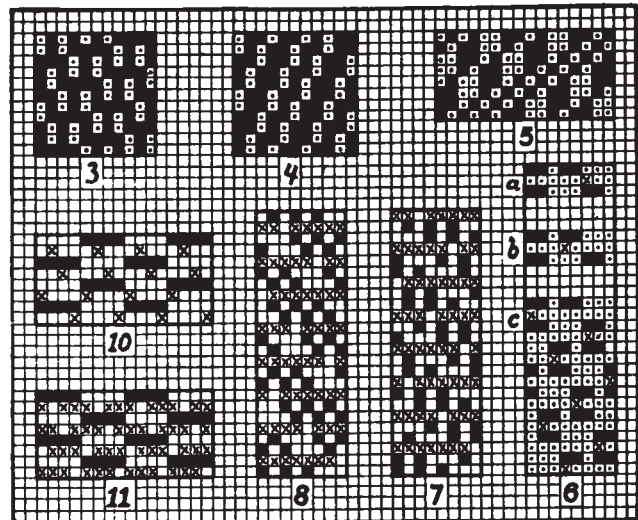
Filling up, in the pick-out is shown by dot type on all warp threads. Full type in the weave indicates face warp-

threads up in the weave. Cross type in the weave indicates back warp-threads up in the weave.

6^a shows that we have liberated from the sample one back thread too much previously to starting the picking-out. In this instance start picking-out for a perfect arrangement of face and back warp by taking a face thread next, in place of the back that you would have otherwise taken before, and when weave will come correct.

6^b shows that we left one back warp-thread in the sample that should have been pulled out, previously to starting picking-out. Pull out one back warp-thread from your sample without recording the same on the designing paper and when sample will then pick correct.

6^c shows the correct start, i. e., sample was prepared correctly for picking-out. This diagram also explains the advantage of picking warp out of filling in this instance, since picking-out $2^1_2^3$ and 7^1 is easier, compared to picking-out $3^1_3^1-1_1-7$, provided we picked the filling out of the warp-threads, and where you are always apt to mix face and back warp, which in this instance are most always of the same count.



ARRANGEMENT: 2 FACE 1 BACK.

Explanations previously given in connection with the arrangement of 1 face 1 back will fully explain how to proceed with the present combination of face and back, remembering that 2 face warp-threads are always picked out in rotation before using 1 back warp-thread. At the start, after having recorded the interlacing of your first face warp-thread, be careful and experiment if the back warp-thread or another face warp-thread is the next to be used by you. Careful consideration will guide you to start at once with the proper arrangement of face and back warp. Remember that you must master the subject of picking-out yourself, by actual work.

In practical work start and end these weaves with 1 end face warp, and not start 2 face 1 back. It will result in a better flannel from the loom, since the reed wires, if drawing three ends in one dent, will then come between two face threads and thus assist in hiding the back warp-thread from the face of the cloth, the reeding observed most frequently being 3 or 6 threads per dent. It will cover already in the loom more perfectly the interlacing of the back warp to the face structure, and which interlacings, with the back warp-thread working against the wires of the reed, would show them up more prominently, resulting, in turn, also in small openings, running the length of the fabric, technically known as reed marks, in the woven cloth.

Picking-out samples, constructed with 2 systems warp, it will be advisable to indicate upon the designing paper which are the face threads, and at the same time any fancy threads among them, also do the same with the back warp-threads provided a fancy arrangement is used: it will facilitate the work of picking-out, since you are able to compare pick-out as it is building up, with the sample under work; the picking-out will be made easier, besides you will be able, at any time to detect errors, which may happen even with the most experienced analyst, and be able to correct them at once.

(To be continued.)