

Figure warp #2 means warp used for ground effect in design on face of fabric; *cross* and *white dot* squares in diagram Fig. 6.

Figure means black on point paper design Fig. 4, or red in a corresponding mill design.

Ground in either case means white or empty.

Explanations given show the direction for cutting three cards from one horizontal row of the point paper design Fig. 4, the cards being marked respectively *a*, *b*, and *c*.

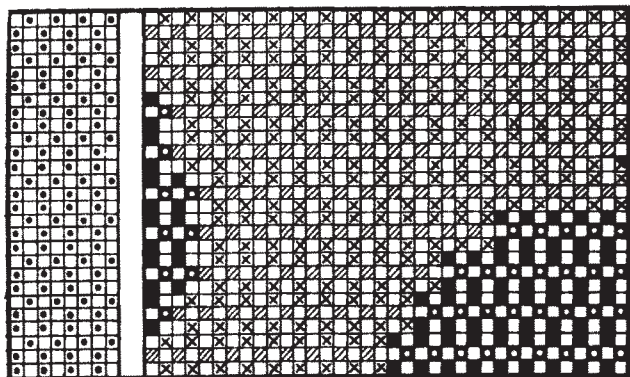


Fig. 6

Considering the pile warp analysis given in the right hand portion of diagram Fig. 6 and representing the interlacing of the two sets of pile warps, it will be readily seen that on any part of the design, where one system or set of the pile-warp-threads (see *full* squares) interlaces for 2 successive taken picks up, in order to produce the terry loop on top or the face of the fabric, the respective mate threads of the other system or set of pile-warp-threads (see *empty* squares) interlace always for the same 2 picks down, in order to produce the mate terry loop down or on the reverse side of the fabric structure. Both systems of pile warp-threads in unison, produce the face as well as the reverse side of the fabric, both exchanging positions as directed by the design.

Shaded type shows the interlacing when the figure pile warp forms loops on the reverse side, *i. e.*, indicates the hitching of these loops (not visible on the face) to the body of the fabric structure.

White dot type shows the interlacing when the ground pile warp forms loops on the reverse side, *i. e.*, indicates the hitching of these loops (not visible on the face) to the body of the fabric structure.

In connection with the headings of these fabrics, the same are, as a rule, woven smooth, *i. e.*, minus any terry pile. To accomplish this, cut cards thus:

FOR TWO-SECTION TIE-UPS.

<i>First Section</i>	<i>Second Section</i>
Ground Warp.	Pile Warp.
Cards <i>a</i> Cut: 1, 3, 5, 7 etc.	Cut: 1, 3, 5, 7 etc.
" <i>b</i> Cut: 1, 3, 5, 7 "	Cut: 2, 4, 6, 8 "
" <i>c</i> Cut: 2, 4, 6, 8 "	Cut: 1, 3, 5, 7 "

FOR ONE-SECTION TIE-UP.

Cards <i>a</i> Cut: 1, 2, 5, 6 etc.
" <i>b</i> Cut: 1, 4, 5, 8 "
" <i>c</i> Cut: 2, 3, 6, 7 "

FOR ONE-SECTION AND FRONT HARNESSES.

Cards <i>a</i> Harness 1 and 3	Jacquard: 1, 3, 5, 7 etc.
" <i>b</i> " 1 " 3	" 2, 4, 6, 8 "
" <i>c</i> " 2 " 4	" 1, 3, 5, 7 "

FOR THREE-SECTION TIE-UPS.

First Section

Ground Warp.

Cards *a* Cut: 1, 3, 5, 7 etc.

" *b* Cut: 1, 3, 5, 7 "

" *c* Cut: 2, 4, 6, 8 "

Second Section

Pile Warp #1.

All Taken

Missed

All Taken

Third Section

Pile Warp #2.

Missed

All Taken

Missed

In case of dealing with extra large designs and when tying up a new Jacquard harness, we can divide the Jacquard machine unevenly, allowing a greater number of hooks and needles for the design (pile warp) and a less number for the ground warp, the latter hooks carrying then proportionately more harness cords (heddles) than those for the pile warp.

FABRIC ANALYSIS.

(Continued from May issue.)

Ascertaining the Quantities of the Various Fibres in Union Yarns and Fabrics.

Results are based upon the fact that different fibres, under different reagents, are either dissolved or not. This principle forms the basis for separating one fibre from the other in union yarns or fabrics. For instance, caustic soda dissolves wool but not cotton; again, boiling in dilute or steeping in concentrated sulphuric acid dissolves (carbonizes) the latter, but not the wool.

In most cases, results near enough for ordinary purposes can be obtained by treating the yarns or fabrics in their ordinary state, *i. e.*, containing the same moisture as the surrounding air, but by far the most accurate determinations are obtained by first of all "conditioning" the material, *i. e.*, heating the same in an enclosed air space to 220 deg. F., until a constant is obtained, then basing all calculations on this conditioned weight.

TESTING FOR WOOL IN COTTON.

(a) Cut three samples of equal weight, say 50 grains; one of these samples keep for reference.

(b) Test samples 2 and 3 for sizing and dyestuffs by boiling them for about 15 minutes in either a 3 per cent solution of hydrochloric acid or 1% per cent solution of caustic soda. If liquid becomes strongly colored repeat procedure with a fresh acid bath. Next wash both samples thoroughly in several changes of water. It now depends on the estimated proportion of wool or cotton present which reagent to use; it being advisable to use the one which leaves the larger amount of refuse (in our example cotton, hence caustic soda the reagent to use).

(c) Test sample 3 for percentage of wool and cotton present, by boiling it in a 5 per cent solution of

caustic soda and which dissolves the wool in the sample. Then wash the latter thoroughly.

(d) Take samples 2 and 3, and dry them thoroughly and then keep all three samples for about a day uniformly exposed to normal atmospheric conditions.

Example:

All three samples originally weigh 50 grains each.

Sample 2 weighs 49 grains

Sample 3 weighs 40 grains

Question: Ascertain percentage of size and dyestuffs, as well as wool and cotton present in sample.

Size and Dyestuff:

50 grains weight of sample 1

49 " " " " 2

—

1 grain weight of size and dyestuff in every 50 grains of fabric (or yarn) tested, or 2 grains in 100 grains of material = 2 per cent.

Material:

49 grains weight of sample 2

40 " " " " 3 (cotton)

—

9 grains weight of dissolved substance.

The latter is chiefly wool, but it must be remembered that in the procedure, the caustic soda produces a loss of about 5 per cent to the cotton, hence:

$100 : 95 :: x : 40 = 42.1$ grains of cotton in sample, or

84.2 per cent cotton present.

9 grains weight of dissolved substance

2.1 " " " cotton it contains

—

6.9 grains weight of wool in sample, or 13.8 per cent wool present.

Answer: The sample in question contains:

2. per cent size and dyestuff

84.2 " " cotton

13.8 " " wool

TESTING FOR COTTON IN WOOL.

In this instance, proceed as in previously given example using dilute or concentrated sulphuric acid as the reagent. The process will destroy about 2 per cent of the wool fibre, and which must be taken care of in the calculations, the same as done in previous example with the cotton.

TESTING FOR SILK IN COTTON.

Since caustic soda and sulphuric acid have the same effect on silk as on wool, the test may be conducted as for wool and cotton.

Another analysis for cotton-silk fabrics is the treatment with ammoniacal nickel oxide. The cotton and silk are entered into the cold ammoniacal solution of nickel oxide gently heated. The silk dissolves in about three minutes. After washing with dilute hydrochloric acid and drying in an air-oven, the cotton will have lost only 1.2 per cent.

TESTING FOR SILK IN WOOL.

The weighed portion of wool-silk fabric, after being well dried, is entered into a solution of cold

concentrated chemically pure hydrochloric acid of about 40 per cent strength. The silk dissolves immediately; the wool is then filtered-off and thoroughly washed with a solution of sodium bicarbonate, and with water. The wool is not materially affected by this treatment, although it loses about $\frac{1}{2}$ per cent of its original weight.

Another Test. By using a concentrated solution of ammoniacal nickel oxide, using a cold solution, the silk is dissolved in two minutes, the wool fibres being only slightly affected. The weighed quantity of wool and silk is immersed in a cold solution of the nickel oxide of 0.95 *sp. gr.*, the temperature being gradually raised to about 110 to 115 deg. *F.*, and when the silk dissolves in about three minutes. The residue, consisting of wool, is then filtered off, washed with dilute hydrochloric acid solution, and after this with distilled water. When perfectly dry, the wool on being weighed, will have lost on an average of about 1.4 per cent. The washing with dilute acid prevents any precipitated nickel oxide from remaining in the fibre and so causing an increase in the weight.

WOOL — SILK — COTTON.

(a) Cut out four samples of air-dry fabric, of equal weight, and keep one for reference.

(b) Boil three of the samples in a 3 per cent solution of hydrochloric acid, decant and repeat with a fresh solution, until all size and coloring matter is removed. Wash thoroughly in order to remove all the acid. Keep one of the samples for reference.

(c) Two of these samples are then placed for from one to two minutes in a boiling solution of basic zinc chloride, or the samples are treated with ammoniacal nickel hydroxide solution in order to dissolve the silk. Wash well with 1 per cent hydrochloric acid and distilled water, and keep one of the samples for reference.

(d) The sample left has now to be treated for removing either the wool or cotton, using respectively either caustic soda or concentrated sulphuric acid. To remove wool, sample is boiled for 15 minutes with 5 per cent caustic soda after which wash thoroughly with water.

Take all four samples and dry them thoroughly and keep them for some time uniformly exposed to normal atmospheric conditions.

By then carefully weighing the four samples, each constituent is readily determined; the first loss represents sizing and dyestuffs; the second loss, silk; the third, wool; the last being cotton.

The final residue of cotton will be found to be somewhat below the actual percentage present in sample so that 5 per cent should be added to the weight of the residue and subtracted in proportion from the weight of the wool and silk dissolved.

TEST FOR COTTON IN FLAX.

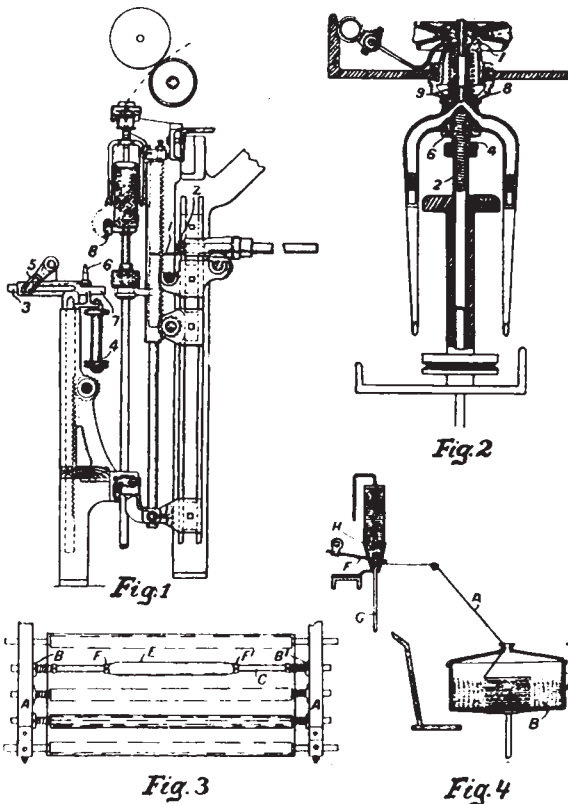
The sample after having been freed from any size or dye, by a suitable boiling in dilute hydrochloric acid or distilled water, followed by a thorough rinsing, is then dipped for one and a half or two minutes in

concentrated 66 deg. B. sulphuric acid, then rinsed out well, rubbed between the fingers and neutralized by steeping in dilute ammonia or sodium carbonate solution. After washing over again in water, the sample is pressed between blotting paper and dried and when flax fibres or threads will, as a rule, be found to have retained their structure while the cotton fibres or threads have dissolved after passing through a gelatinous stage in which they will tear like tinder.

RECENT FOREIGN IMPROVEMENTS IN TEXTILE MACHINERY AND APPLIANCES.

Doffing-arrangements.

The same refers to a doffing-mechanism for flyer spinning, twisting, doubling, and like frames, employing clips for holding the bottom flanges of full and empty bobbins, carried by a horizontally reciprocating



bar, co-operating with a vertically and horizontally moving frame carrying pegs, which receive the full bobbins from the clips, and carry the empty bobbins which are received by the clips and deposited on the spindles. The threads are severed between the flyers and the full bobbin.

As seen from illustration Fig. 1, the spindle is connected with the flyer, which is mounted in a neck bearing, by a cone and pin-and-slot coupling and is pressed into contact therewith, when the spindle-rail is in normal position, by means of a spring mounted beneath the foot-step bearing. Clips 1, adapted to engage a groove in the flanges of the bobbins, are mounted on a rail 2 reciprocated horizontally by means of a rack and pinion. Pegs 4, for holding the empty bobbins, are carried by a frame 7, which is reciprocated vertically by a rack and pinion and carries a

slide 3, which is moved horizontally by a slotted level 5 and carries pegs 6 which receive the full bobbins.

The threads extending between the flyers and the full bobbins disposed on the pegs 6 are severed, after a few turns have been wound on the empty bobbins, by means of a serrated bar and co-operating U-shape bars 8, which are pivotally mounted on the lifter-rail brackets so that they may be turned down into the operative position shown in the illustration, after the threads are severed.

Flyer for Spinning Machinery.

Fig. 2 is given to illustrate subject. The same shows a flyer elastically journaled in a spherical bearing, a hollow spindle being attached thereto by spring joint, so that the flyer will yield if struck by lumps in the yarn or dirt, wood, etc., in the sliver and so that the spindle can be moved freely in any direction when doffing the bobbin.

The neck of the flyer is journaled in a socket 1 and a spring-pressed bush 9, spherical surfaces, having their common centre at the intersection of a plane through the centre of the cord groove in the whirl and the axis of the flyer, being arranged between the hub of the whirl and a socket 1. Between the latter, a bearing 8 and the flyer. The bush 9 is provided with a conical flange which is pressed against a corresponding part on the bearing 8 by the spring so as to form a close joint. The spindle is hollow and has a spring 4 screwed on its upper extremity and held against a hollow cone by a socket 6. An internal spring 2, twisted oppositely to the spring 4, is secured to the hollow cone.

Condenser for Finisher Card.

In order to equalize the action of uneven rubbers in a condenser carding-engine, a sectional press roller is in the present instance introduced into the upper or lower rubber and applied at the required point.

Fig. 3 is given to illustrate the subject. In the new arrangement, a sectional roller *E* is mounted upon a shaft *C* carried in bearings *B*, *B'* in the condenser frame *A*, and is secured in position on the shaft by collars *F*, *F'*. The ends of the roller are tapered, and the bearings *B*, *B'* may be provided with adjusting set-screws. The sectional press roller may be used as a substitute for, or in addition to, the existing press rollers. Two or more rollers mounted upon the same shaft may be applied to different parts of the rubber.

Spinning with Twisting-arrangements at Delivery.

The object aimed at is to produce a soft, bulky yarn by lightly twisting together, in a cup spinning-frame, a sliver and a strong thread.

Fig. 4 is given to illustrate the operation. The thread is rubbed with the sliver in condenser rubbers to make them adhere together and the combination sliver *A* is drawn from a rotary can *C* and spun into a solid cop upon the spindle *G* encircled by the cup *H*. The yarn is traversed by an eye on an oscillating arm *F*.

Revolving Flat Cards.

In the new construction, the revolving flats are