demand for the low end silks. This demand is attaining such proportions, that makers of quality fabrics are even turning their attention towards manipulating the products with a view of obtaining some of the business.

Orders on spring business are coming in steadily, and better things than have been seen for some time, seem to be in line for the silk trade.

On the ribbon end, foulards and Persians, of the better grades in widths of 5 to 9 inches, are expected to be very much in demand for spring, as are also most of the ranges of fancies. At the present time, the supply of 5 to 9 inch widths, in navy and royal blue seem to be low.

Cravats made from foreign silks are in much demand for the holiday trade, and manufacturers of foreign silks are pushed rather strongly by the cravat makers.

Fancy knit tie silks are also in good demand, and are being shown in some of the foreign lines in high grade goods.

In connection with tie silks, it has been reported during the last few days, that satisfactory duplicate orders have been taken in two tone stripes and small neat figured effects in all combinations of colors and weaves for spring delivery.

Cotton Yarns and Fabrics.

The cotton yarn market is proceeding on a steady basis; spinners are quoting prices most satisfactory to the dealer, but the latter are conservative; finding a light demand for their goods, they naturally are slow at buying. Sales made, refer as a rule, to small lots with a three months delivery, although occasionally, we hear of a fair contract running well up into 1911.

With reference to cotton fabrics, staple prints have the call, and jobbers are filling their more or less depleted stocks, in that line of goods.

With reference to goods for export, inquiries have been made to mills regarding lowest prices on light weight sheetings for China, but so far no sales have resulted: heavy weights of Japanese manufacture are those selling in preference.

Owing to the colder weather during the latter part of October, the buying of staple lines of heavy cottons has been stimulated, and it is believed that the new season on this line of goods will open in a firm and promising way.

At present, there has been little or no demand for bleached cottons, but wide sheetings are holding their own.

Prices for cotton linings are being firmly maintained, and the demand for the same is growing rapidly. As a result of the interest that the retailers have shown in the better class of mercerized sateens, some good sized orders have been booked for prompt and future delivery.

The shortage of low count sateens, which has been noticed for several weeks past, is just as pronounced as ever, and just as fast as these goods are received from the finishers, they are being shipped by the converters, and thus no chance is given them to accumulate a surplus. Inquiries are constantly being made for low count sateens, by the shirt trade, but orders cannot be filled readily.

A demand for cambrics, percalines and sateens, in fair quantities, is being made by jobbers, and should this continue, it is most likely that the prices will advance. At the same time, some good sized parcels of sateens and cotton taffetas have been purchased by cutters.

International Cotton Statistics.

According to recent figures of the International Federation of Master Cotton Spinners' and Manufacturers' Association the total consumption of all kinds of cotton during the twelve months ending August 31 by all countries was 17,030,511 bales, as compared with 16,667,437 bales in the previous year. American cotton was consumed to the extent of 11,145,178 bales, against 12,098,280 bales in 1909. The number of spinning spindles in work throughout the world is estimated at 133,384,794. On August 31 the total stocks of cotton held by spinners throughout the world were 2,523,786 bales, as compared with 3,183,392 bales twelve months previously. The stocks of American qualities were 1,123,826 bales, against 1,887,600 bales on August 31, 1909. Owing to the depression in the cotton industry of Great Britain during the last two or three years, 26 firms, owning 688,705 spindles, have given up cotton spinning in the past twelve months, and the completion of several new mills has been postponed indefinitely. The depression has also been felt in India, where eight firms, representing 132.800 spindles, have stopped spinning.

Textile Institute Congress in Bradford.

The Textile Institute inaugurated at Manchester by the president of the British Board of Trade in April last, held its first congress in Bradford on September 8, 9, and 10. Already some 250 members have been enrolled from all branches of the textile trades of England and other countries; the president, Lord Rotherham, stated that *foreign* members are cordially welcome.

The Textile Institute plans cover a much wider scope than any existing textile societies. These objects were set forth in the invitation for the congress just held, the most important of which included constituting the institute as an authority for determining and recognizing technical and trade standards, usages, terms, definitions, and the like for the textile industry, also to foster the study of textile problems and appoint special commissioners to investigate and report upon economic textile problems and processes. As stated by the president, the aim of the institute is how best to increase the efficiency of the various textile trades; to which end cordial relations will be striven for between men of science and practical spinners, manufacturers, dyers and bleachers, and merchants.

The secretary and offices of the institute are: George Moores, 46a Market street, Manchester. Membership fee of the institute, including the right to attend all meetings and vote on all matters submitted to the institute, is £2 2s. ($10.22) per annum.

Cotton Growing in South Africa.

The government of South Africa has leased at a low rental for a term of thirty years the right to cultivate certain lots of ground situate at Port St. Johns, Pondoland, to a British syndicate, who proposes taking up cotton growing on an extensive scale. These lots, approximately 1,300 acres in extent, represent, however, but a fractional portion of the area which can be cultivated, and which they will obtain from private sources. The experiment, being carried out this year, should indicate definitely not only the suitability of the area for cotton growing, but also what is of much greater importance, namely, whether it will prove sufficiently remunerative to warrant it being undertaken on a large scale.

DESIGNING AND FABRIC STRUCTURE.

FANCY TWILLS.

(B) Twills Showing Basket and Granite Effects.

These twills form another system of weaves extensively used in connection with the bulk of our fancy textile fabrics; cotton, worsted, as well as silk dress goods, fancy woolen and worsted suitings, etc.

For constructing these twills paint on your point paper, two repeats each way of your main twill, running the same (as a rule) from left to right. After this, insert either your basket or your granite effects between the open spaces left between said main twill lines. Either warp or filling effect may be used for the main twill, the same refers also to the basket or the granite effects, again both effects—warp and filling effects—may be combined for a main twill as well as for the basket or the granite effects, according to what effect is desired in the construction of the new weave.

The accompanying two plates of weaves will readily explain the method observed in constructing them, also how any number of new weaves can be constructed by following explanations given.

Weave Fig. 1 shows us a 3-up, warp twill effect, used as the foundation twill, running from left to right; said twill effect repeating on 8 warp threads and 8 picks. The space between these main twill lines (8 less 3=) 5 ends in each direction, is filled up by a regular 2x2 basket, warp effect. As readily understood, the repeat of the fancy twill weave is 8 warp threads by 8 picks, as was planned when laying out the foundation weave.

Weave Fig. 2 shows us a $\frac{1\ 1}{1}$ 3-thread twill effect, used as the foundation twill, using the same basket weave as before, for filling up the space (5 ends each way) between said foundation twill lines; repeat of weave 8 warp threads by 8 picks.

Weave Fig. 3 shows us a 1-up twill effect, used as the foundation twill, the open space between said foundation twills, being filled up by means of a 2x2 basket, filling effect.

Weave Fig. 4 shows us a double twill, used as the foundation twill, *viz:* the $\frac{2\ 1}{1}$ warp twill effect. The open spaces (8 less 4 = 4 ends each way) between these foundation twills is filled up by means of *pieces* of 2-up twills, giving the affair a general broken up effect, resembling a granite.

Weave Fig. 5 shows us a 1-up twill effect used as the foundation twill, a granite effect—a warp and filling effect combination, showing in spots, as you might say—being used for taking up the open spaces between the foundation twills in the weave plan.

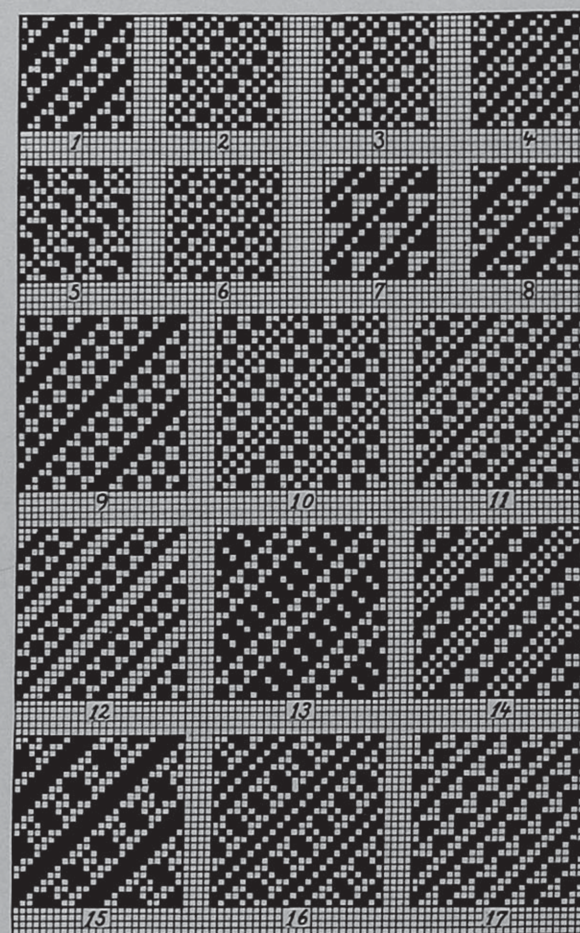
Weave Fig. 6 shows us a 1-up warp effect and a 1-down filling effect, taken alternately, used as the foundation twills. The open spaces (warp and filling ends) between these two twill lines are in turn interlaced by means of a small well broken up granite. Warp and filling effects in this weave are balanced, both in the twills as well as the granites.

Weave Fig. 7 shows us a $\frac{\ \ 2}{1}$ twill used as the foundation twill, with balanced granite effects inserted between these foundation twill lines.

Weave Fig. 8 shows us a $\frac{\ \ 3}{1}$ twill effect, used as a foundation twill, with a balanced granite effect introduced between said foundation twills in the weave plan.

Weaves Fig. 1 up to and including Fig. 8, all repeat on 8 warp threads and 8 picks.

Weaves Fig. 9, up to and including weave Fig. 17, show us weaves, of the present class of fancy twills, constructed with a repeat of 12 warp threads and 12 picks.

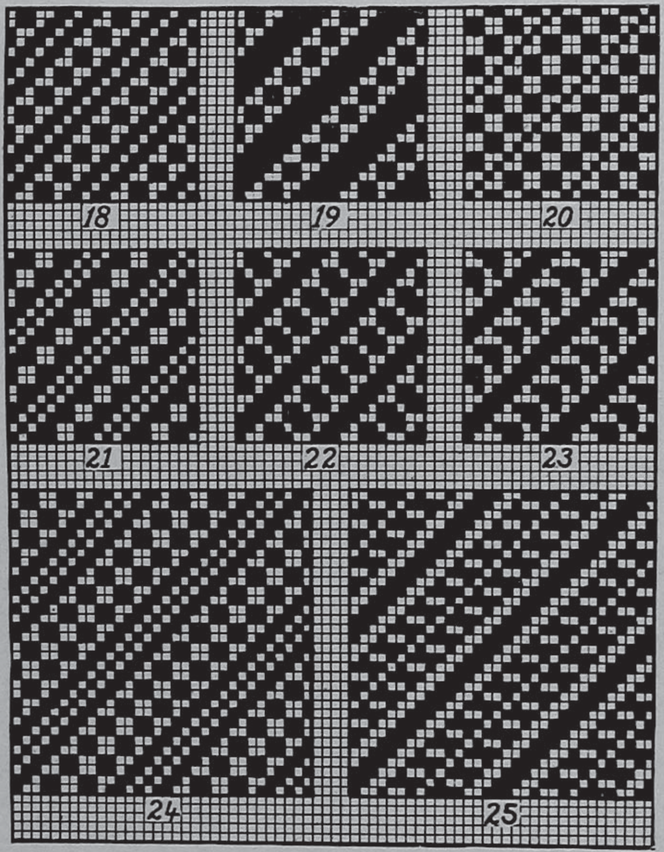


Weaves Fig. 9, 10, 11, 12, 13 and 14 show basket effects used for filling up the open space between the foundation twill lines. Weaves Fig. 9 up to and including weave Fig. 12 show clear effects of that class of weaves; whereas weave Fig. 13 shows a fancy twill effect used as the foundation twill, in connection with the regular 2x2 basket, warp effect, for filling up the space (5 ends in each direction) between the foundation twill lines.

Weave Fig. 14 shows us a 2x2 basket, filling effect, used for filling up the space (7 ends in each direction) between the foundation twill lines, which call for a $\frac{1\ 1}{1\ 1\ 1}$ foundation twill.

Weaves Fig. 15, 16 and 17 show us granite effects, used for filling up the open space between the foundation twills.

Weaves Fig. 18 up to and including Fig. 23 call for fancy twills of the present system, executed on repeat of 10 warp threads and 10 picks. Weaves Fig. 18, 19 and 20 call for basket weave, warp effects used



for filling up the space between the foundation twills; weave Fig. 21 shows us a 2x2 basket, filling effect, used for that purpose, whereas weaves Fig. 22 and 23 show the application of the granite effects.

Weaves Fig. 24 and 25 show two examples, repeating on 16 warp threads and 16 picks, of the present system of fancy twills. Weave Fig. 24 shows the application of our regular 2x2 basket, warp effect, whereas weave Fig. 25 illustrates the use of one of the most excellent granites, a weave which will always produce a nice, well broken-up effect in the woven fabric.

Studying these examples of fancy twills, it will be readily seen, by the reader, that any number of new ones can be obtained, in fact, the number, considering the average capacity of our harness loom, is what we might say unlimited.

Water-Proofing Fibrous Materials.

According to a late English patent, the fabric is immersed in a bath containing 2 oz. white castile soap per half-gallon of water, and then laid on the top of cotton cloths, covering the anodes of an electrolytic bath. A solution of alum is poured on the fabric, which is immediately enclosed by an aluminum cathode plate, and a current strength of 45 ampere seconds is applied. A fatty aluminum salt appears to be formed in the fabric.

DETERMINATION OF THE VALUE OF A SILK FABRIC.

Dr. Louis J. Matos, Textile Chemist.

In determining the value of any fabric, certain conditions must be continually kept in mind, or else all the work done in making tests will avail but little. The main point to observe in making such valuations is that the result obtained from tests made on one fabric must always have a direct bearing to exactly similar tests made on some other sample of goods, the exact value of which is already known. Simply to make an examination of one fabric, will throw but little light on its value; comparisons for values must always be made against a given standard of the same class of goods.

To properly make such comparisons requires that the person making the tests should have some empirical knowledge at least of certain specific chemical tests, besides having the necessary equipment, which should consist, besides a fairly delicate pair of scales and weights, of drying boxes of glass, (desiccator), certain chemical solutions, glass containers, exposing frames for light tests, etc., besides two or three heavy brass square plates, perfectly true, one measuring ten centimeters square, and the other three inches square. These plates, in connection with a good sharp knife are better than any other means for obtaining samples of cloth of the sizes indicated.

Determination of the Amount of Finish on a Fabric.

A sample of the cloth is cut with care, and placed in the desiccator to dry thoroughly, that is, until after it ceases to lose any further weight, the sample being weighed two or more times until the weight remains constant. This weight is then recorded.

The sample is then thoroughly soaked in a 3 per cent. solution of carbonate of soda, and allowed to remain immersed therein for 24 hours, after which it is removed, washed well, and boiled in a porcelain capsule for half an hour with a 3 per cent solution of hydrochloric acid; the cloth sample is then squeezed, washed in pure water, dried by pressing between two sheets of white blotting paper, and finally dried to constant weight in the desiccator.

The difference in the two weights (before and after boiling) gives the amount of removable substances, and which though not strictly correct, is regarded as *finish.*

Determination of the Fastness of a Color.

Generally two methods are employed for each sample, each method supplementing the other, and giving information which the other does not. The first method is called the *Dry Method.*

A small portion of the cloth is rubbed upon a piece of fairly rough white paper, or upon a piece of white muslin, and the extent to which color is removed is noted. This test requires some practice and considerable care, as a general rule it is done too carelessly to be of any value.

A second portion of each sample is cut to a convenient size, say 1½ by 3 inches, and pasted (ends only) on a strip of cardboard. Over the samples is placed a strip of thick cardboard, exposing only ½ to ⅝ inch of each sample. The strip is then exposed in one of the frames to the action of the sunlight for a few days. Then, if fading has commenced, the covering strip is moved back ½ inch more, and the exposure continued for a few days more, and so on.

If the silk is to be exposed to the weather, the covering strip is made of waterproof cardboard (stencil board is excellent).

Testing for Fastness by the Wet Way.

Parallel samples of cloth are immersed for 24 hours in 10 times their weight of cold water and then dried. Note whether the water is discolored by dye coming out. Sometimes the color is weakened by such an immersion without the water being more than slightly tinted.

Another sample of each piece of cloth is boiled for 5 minutes separately in a solution of Marseilles soap, made up in proportion of 1 ounce of soap to 1 quart of water. After boiling the samples, remove, squeeze, rinse well and dry. Make comparison of the color of the cloth against reserved portions of the original goods.

Determination of the Presence of Vegetable Fibres.

If the sample of cloth is white, the presence of cotton (or other vegetable fibre) would be shown plainly by remaining uncolored after the cloth had been immersed in a hot, feebly acidified bath of xylidine scarlet; Silk and Wool under this treatment would be dyed scarlet.

If by this treatment, the fabric is shown to be free from cotton, then boil a small portion of the goods (a portion ½ inch square will suffice) in a test-tube containing a small quantity of plumbate of soda, which, if *wool* is present will cause that fibre to assume a brown to black color.

If *artificial silk* is suspected, and wool and cotton are shown to be absent, dissect the fabric and place some of the filaments in *small,* clean, dry test-tubes, and heat over a bunsen flame, and note the odor emitted. If the odor is similar to burning horn or hair it indicates either natural silk or artificial silk made from gelatine. If a small piece of wetted *red* litmus paper is exposed to the fumes in the tube, and the red color is changed to blue, it confirms the presence of one of the two silks mentioned. On the other hand, if little or no odor is emitted, but wetted *blue* litmus paper is changed to red, the presence of cellulose or collodion silk is confirmed.

To confirm the presence of either natural silk or gelatine silk, take a few threads and immerse in a few drops of a solution of iodine in potassium iodide, to which is added a drop of sulphuric acid (make this test in a clean white butter dish or porcelain capsule). If the fibres change to a brownish red—the silk is artificially, made from gelatine. If the fibres are distinctly yellowish-brown, the silk is natural.

Of course, these tests require a certain degree of experience to carry out, in an orderly manner, but when a few trials are made, they are not forgotten. All such tests, to be of any value, should be carefully kept and recorded in a suitable book, and observations recorded alongside of each sample. Such a record in a short time will become of great value.

ARTIFICIAL SILK.

By W. M. Gardner, M. SC., F. C. S.

The silk fibre, consisting of the solidified fluid of the silk glands of the worm, is devoid of cellular structure. Wool and cotton, on the other hand, are highly organized fibres from the structural standpoint, being composed of a vast number of individual cells built up in a definite and orderly manner. It is thus impossible to conceive of the mechanical production of a fibre resembling wool or cotton in character; but in its broadest outline, the problem of the production of a fibre similar to silk is not a difficult one.

The problem involves two main features—first, the production of a viscous liquid analogous to that naturally existing in the silkworm glands, and, secondly, the mechanical conversion of this into thin fibres.

The second part of the problem offers no insuperable difficulties; in fact artificial silk fibres are now produced which are much finer than those of natural silk (*Thiele* silk).

The composition of the viscous liquid may be chemically similar to natural silk, or may be of an entirely different character. The first artificial filament which resembled silk in appearance was spun glass, from which fabrics of brilliant lustre and considerable softness may be produced. These are, however, of little value, since the fabric rapidly disintegrates on account of the brittle nature of the fibre.

Vanduara Silk is obtained by using gelatine as a basis, the threads, after spinning, being treated with formaldehyde to render them insoluble in water. It is a beautifully lustrous fibre, and fairly strong and elastic in the dry condition, but if wetted, it becomes extremely tender. It is now little, if at all, used.

Gelatine may also be rendered insoluble by the combined action of chromic acid and light, and this has formed the basis of an artificial silk process; but no practical success has been achieved on these lines.

Cellulose Silk.—All the commercially produced artificial silks are obtained by using some form of cellulose as a basis, and amongst these may be mentioned the *De Chardonnet, Pauly, Lehner, Vivier, Thiele, Stearn* and *Bronnert* silks, which are also known under such names as *"Collodion silks," "Glanzstoff," "Lustro-cellulose,"* and *"Viscose silk."*

Cellulose, the chemical basis of cotton, linen, wood, and the structural portion of vegetable growth generally, is chemically a very inert substance, and only two or three ways of dissolving it are known

(1) When converted into nitro-cellulose by treatment with nitric acid, it becomes soluble in alcohol-ether. The various *collodion silks* are thus produced.

(2) Cellulose is soluble in a concentrated solution of zinc chloride, or

(3) In a ammoniacal solution of oxide of copper.

(4) If cotton is mercerized with caustic soda and treated with carbon disulphide while still saturated with the alkali, it forms a new chemical compound (cellulose thiocarbonate) which is soluble in water

and is known as *"viscose."*

(5) Acetates of cellulose may be produced, which are soluble in various solvents.

Each of the first four methods of dissolving cellulose forms the basis of a commercial process for manufacturing artificial silk.

(1) COLLODION SILK.—This was the original artificial silk, and was first patented by De Chardonnet in 1886. After surmounting many difficulties, due chiefly to the inflammability and lack of strength of the fibre, the process is now a great commercial success, and it is estimated that the output of the various factories totals about 1,000 tons per annum. The chief names connected with this product are those of De Chardonnet, Lehner, and Vivier.

(2) BRONNERT SILK is made from a zinc chloride solution of cellulose, but this process has not made such rapid development as

(3) THE CUPRAMMONIUM PROCESS, which yields the *Pauly, Linkmayer,* and *Thiele* silks, which latter is, as regards appearance and handle, almost indistinguishable from natural silk.

(4) THE VISCOSE SILK of *Cross & Bevan* and *Stearn* is also of much interest.

Properties of Artificial Silk.—The characteristic properties of natural silk, which render it so much esteemed as a textile material, are its beautiful lustre, softness, elasticity, strength, and covering power, and the ease with which it can be dyed. With regard to lustre, the artificial silks exceed the natural fibre, some having almost an undesirable metallic lustre. In softness and general handle, most varieties of artificial silk are somewhat deficient, but this defect has recently been entirely overcome by building up the thread of a large number of fine filaments, so that a thread of 40 denier may contain 40 to 80 of such filaments. Such a product is now on the market (*Thiele* silk), and its softness and covering power equal that of natural silk. All the artificial silks are, however, somewhat difficult to manipulate in winding and in the loom.

In *elasticity and strength,* artificial silks are somewhat deficient, even when dry, and when wetted the defect is greatly accentuated. This renders careful treatment in dyeing very necessary.

Dyeing Properties.—The various artificial silks differ considerably in dyeing properties. *Collodion silks* dye for the most part similarly to natural silk, while *Pauly, Linkmayer,* and *Thiele* silks and *Viscose* silk behave much more like cotton.

The importance of artificial silk as a textile fibre is now recognized, but it is not widely known that the production already amounts to eight or nine tons a day, and is rapidly increasing. The price is from one-third to one-half of that of mulberry silk, but will undoubtedly decrease. Fabrics entirely composed of artificial silk have only recently been successfully produced, but it has for some time been largely used as filling yarn, and still more largely in the production of plushes, trimmings and neckwear, the latter more particular, since the introduction of the knitted neckties produced on the machines built by The *H. Brinton Co.,* of Philadelphia.

PREPARATORY TREATMENT AND WEIGHTING OF SILK.

Dr. Louis J. Matos, Textile Chemist.

(Continued from Page 89)

In the preceding portion of this paper, (see October issue, pages 88-89) I have directed particular attention to the necessity of properly treating the silk in skeins, preparatory to passing it on, for either weighting or dyeing. This careful treatment and handling will be at once apparent, when we remember that silk containing even traces of sericin will not take the weighting uniformly, and also, if we attempted to dye it, the results will be also uneven. It is a fact that large quantities of silk are dyed in the gum, but it is also an additional fact, that the dyeing of such silk is encumbered with difficulties which are not met with in dyeing silk entirely freed from gum.

The problem of weighting assumes a very important position in the silk industry at this time, and the best energies of manufacturers and dyers are constantly directed towards a refinement of the process, and at the same time to guard as closely as possible, every improvement, however slight and apparently trivial it may be, in order to keep it away from possible competitors. The most commonly employed weighting process is that making use of tin—the so-called *Dynamite* process, and the principal weighting agent is *Tin bichloride,* which is chemically not a *bi* chloride, but is the well known stannic *tetra*chloride, $Sn\ Cl_4$, and known throughout the silk trade as *dynamite.* To the older dyers this same solution was known under the not very exact name of *pink salt,* to produce which, there exist very many recipes—each differing slightly in the quantities of the ingredients—each believed by their originators to have certain good qualities not shared by the other recipes.

The advancement of technical chemistry is nowhere better shown than in the production of tin *tetra*chloride, which is now to be obtained in the open market, of great uniformity—both in liquid and in solid form.

Silk weighting with tin is a simple process, but to carry it out practically, on a mill scale, requires close attention to the minutest details, for should there be the slightest neglect of some one of the several points which *must* be given attention, irreparable results will be obtained. In the first place, the silk must be absolutely free from the natural gum—the boiling-off to be as nearly perfect as the workman can make it—and further, there should be absolutely no remaining traces of soap or soda salts, such as caustic soda or sal soda in the silk, because should they be present, there will be formed on and in the fibre, corresponding amounts of sodium chloride (common salt) which is extremely injurious to silk, causing it to rot quite rapidly.

If traces of fats or oils, from unwashed-out soap, remain in the silk, corresponding fatty compounds of tin will form, and which cannot be removed from the fibres by any technically practical process, and which will also cause the silk to rot in time, and also be the direct cause of uneven shades in dyeing. Such uneven spots or clouds do not appear during the dyeing, but show distinctly after the silk is dried.

Too much care cannot be given to the selection and care of soaps for the preparatory treatment of silk, and none should be used for boiling-off known to contain free or uncombined fat, or over 0.4 per cent of free alkali. To do so, is to run chances for claims after the silk has been in the warehouse for some time.

The weighting proper is simple: The silk, after having been thoroughly boiled-off and washed clean, is thoroughly dried, so that—when the skeins are immersed in the tin bath—no additional water will be introduced, thus weakening the bath correspondingly. From the tin bath, the skeins are washed, and passed through a bath of phosphate of soda, washed, then through a bath of sulphate of alumina, washed, then through a bath of silicate of soda, washed, and then the entire series of operations repeated until the proper degree of weighting is obtained. In practice however, the operations are not so easy to carry out.

Preparation of the Tin Bath.

This should stand at from 28° to 30° *Bé*, and is made by diluting the commercial product, or by dissolving the crystals of stannic chloride, which are now quite common. Commercial *Dynamite at* 60° *Bé* contains between 23 and 25 per cent of metallic tin, and the control of purchases of fresh supplies should always be made by occasional determinations of the actual quantity of metallic tin, rather than with the hydrometer (or Beaumé glass). Commercial samples should not be accepted if they have a yellow coloration, to use such is to say the least, risky. Only colorless and perfectly clear samples should be accepted.

The following table giving the strength of solutions of *dynamite* at various degrees *Bé*. will serve to check up fresh baths, and also show the amount of actual metallic tin in solution at any *strength*. This table will also prove of use where spent baths are sold back to the chemical works.

Specific Gravity.	*Degree Beaumé*	*Per cent Tin.*	*Per cent* $SnCl_4$. (*Anhydrous*)	*Per cent* $SnCl_4\,5H_2O$. (*Crystal product*)
1.195	25	10.24	22.5	30
1.210	26.5	10.93	24	32
1.227	28.2	11.61	25.5	34
1.242	29.7	12.28	27	36
1.259	31.3	12.86	28.5	38
1.275	32.7	13.65	30	40
1.293	34.3	14.33	31.5	42
1.310	35.8	15.01	33	44
1.329	37.3	15.69	34.5	46
1.347	38.8	16.37	36	48
1.366	40.4	17.05	37.5	50
1.386	42	17.74	39	52
1.406	43.1	18.42	40.5	54
1.426	44.8	19.10	42	56
1.447	46.3	19.78	43.5	58
1.468	47.8	20.47	45	60
1.491	49.4	21.15	46.5	62
1.510	51	21.83	48	64
1.538	52.3	22.51	49.5	66
1.563	53.8	23.20	51	68
1.587	55.3	23.88	52.5	70
1.614	56.8	24.56	54	72
1.641	55.8	25.24	55.5	74
1.669	59.8	25.92	57	76
1.698	61.4	26.60	58.5	78
1.727	62.7	27.28	60	80

The condition of the bath, when ready to enter the silk, should be absolutely clear and free from any turbidity, which, if present, indicates the presence of meta-stannic acid, a form of tin oxide of no value for weighting. Its presence is almost always due to imperfect hydro-extracting of silk, from previous passages through the sodium phosphate baths. With care, the *dynamite* bath can be kept quite clear, but should turbidity show, the bath should be strained, indeed, straining should be done every few weeks.

The time of immersion, that is, for one *pass*, in the bath, is usually for one hour, at about 60 to 65° *F*. Heating of the bath should be guarded against, and the vat should be so constructed as to permit suitable circulation of cold water to keep the temperature at the proper point. Some dyers have resorted to the doubtful expedient of using ice in summer time, adding it directly to the solution in the vats, but two serious objections arise: one is the unequal distribution of the cooled solution, and the other is the dilution of the bath, from the melting of the ice. Under all circumstances, the strength of the bath must be maintained.

After each passage through the *dynamite* bath, the silk must be allowed to drain back and whizzed, to free it from the excess of tin liquor (which must be saved) and the skeins well washed to remove all traces of excess of tin, when the silk is ready to be passed through the phosphate of soda bath. This solution is simply made by dissolving commercial phosphate of soda in water, until the hydrometer indicates 6° *Bé*; French silk weighters, however, use phosphate baths as weak as 3° *Bé*. The commercial article should be about 98 to 98.5 per cent pure, and contain upon analysis from 19.4 to 19.8 per cent. P_2O_5. The bath is cheap and easy to prepare, and during ordinary use it should not become contaminated with foreign matter. If the bath shows any cloudiness, or turbidity, which cannot be removed by straining, it should be run off, rather than take any chance of defective silk from its use. As a general rule, a passage of ½ hour through this bath will be found sufficient to convert the tin into the corresponding phosphate. Enter the silk at a temperature of 130 to 140° *F*., bring in half an hour to the boil, and keep at this final temperature for ¼ hour, to ensure the complete conversion of the tin. From this bath, the silk is again thoroughly washed in at least two waters, when it is either passed through a bath of sulphate of alumina, just before the final bath of silicate of soda, or directly into the silicate bath, omitting the alumina bath, which is only employed where it is the desire to have the silk fibres abnormally swollen.

The silicate of soda bath requires constant vigilance; while all else progresses regularly and without any apparent imperfection, the silicate is liable to sudden changes, which may be the direct cause of very serious defects in the silk, notably *chalkiness*. Silicate of soda is one of the cheapest chemicals used in the silk dyehouse. It is obtained in the market of various strengths, but as a rule that of 40° *Bé* is the grade usually bought. Above all other conditions it should be absolutely clear; any other condition requires that it should be at once rejected. At most, it should not have more than a pale straw yellow. As it dissolves easily in warm water, the fixing bath is readily prepared and brought to the ordinary working strength of 5° *Bé.* when cold.

In practice, the silicate-bath can be used for a limited number of passages of silk, generally not more than three or four, where the weighting is to be moderate or heavy. After the second passage, however, the bath must be observed very closely, and the moment the solution shows signs of *breaking*, a term applied to the bath when it becomes turbid, it must be run off, as it is then absolutely useless. Silk which has been passed through such a bath will always be chalky, and no amount of doctoring will remedy this defect. Some lots of silk have come to my attention with this defect, which originated in the silk after having been lifted from the silicate bath, the bath itself remaining quite clear until the next batch of phosphated silk was entered, when the bath at once *broke*. It was evidently just on the point of *breaking*—that is, required only to have its balance disturbed. Generally, the silk is not washed as it comes from the silicate bath, but is at once put in a bath containing about 10 per cent of a good fat soap, at a temperature of 125° *F.*, and given about four turns. After this treatment, the silk is well washed to remove the excess of soap and free silicate, if any is present, and then give one passage through a very weak acid bath, when the entire process is completed.

The employment of this final acid bath, however, must not be attempted if any doubt exists in the mind of the operator regarding the presence of any free or uncombined silicate, in which case additional trouble will arise due to *dusting*, a condition to be traced directly to imperfect handling in the final soap bath.

In the foregoing, no reference has been made to the number of passages through each bath to secure any given weight of silk, this being a matter which must be considered separately. What has been of the most importance, is to impress upon the dyer the absolute necessity of preparing each bath properly, so far as regards its strength, purity, and temperature, and to dwell as insistently as possible upon the importance of thorough washing, without which, it will be impossible to turn out properly weighted silk, or silk that will dye level and free from spots.

The customary weightings for silk by means of the tin-phosphate-silicate process, range from pari up to and frequently including 100 per cent, but as a rule the middle weights prevail. The following table gives the range from 16 to 32 ounces:

16-18	ounces	= 12½%	over pari.
18-20	"	= 25 %	" "
20-22	"	= 37½%	" "
22-24	"	= 50 %	" "
24-26	"	= 62½%	" "
26-28	"	= 75 %	" "
28-30	"	= 87½%	" "
30-32	"	=100 %	" "

To obtain a weight of 16/18 ounces, the silk would be given a single passage through each of the baths in the following order: (1) Tin, (2) Phosphate, (3) Silicate, not neglecting the washings and other precautions.

For a weight of say 28/30 ounces, the silk would be given three (3) alternate passages through the tin and phosphate baths, and once through the silicate-bath, and so on for intermediate or higher weightings.

Some dyers modify the time of immersions, by reducing it, and increasing the number of passages. This, at the same time, increases the number of washings necessary, and at the same time necessitates additional handling of the skeins, all of which may tend to impair the condition of the silk.

While it may be considered from the description of the tin process given that it requires many points to be observed and conditions met, the advantages are of secondary consideration. While the ethical side of *dynamiting* has no place in this paper, we must consider the results of the process, as we see them. The great advantage that tin weighting has, is that neither the lustre or whiteness of the fibre is in the least impaired, and for this reason is so much employed for the preparatory treatment of silk, to be dyed light and bright colors.

Its two most prominent defects are: the tendency to cause certain colors to become fugitive, which otherwise are *fast* to light, when dyed upon pure silk, and the gradual alteration of the silk as time goes on, and under the influence of light, irrespective of any coloring matter present.

(To be continued.)

Dyeing Artificial Silk by Machinery.

Numerous attempts have been made to dye artificial silk, in the skein, by machinery in which the dye liquor circulates through the material; however, such attempts have met with no satisfactory results, for the reason that artificial silk, if packed in a solid dyeing compartment, becomes sticky, forming within a very short time a compact mass through which the dye liquor will not circulate freely, in turn resulting in uneven dyeings. This accounts for the reason that dyeing of artificial silk, as a rule, is done by hand, using regular dye-tubs for this work. This procedure excludes the use of very hot dye liquors, again by rotating the skeins over the dye sticks, a uniform even shade, is rather hard, if not impossible to obtain. At the same time, the process is a rather difficult one, since artificial silk, thus under treatment, cannot be touched by the hands of the dyer; artificial silk, in its wet condition, will not permit this to be done. For this reason, the dyer must work with rubber gloves, the same as has to be done when nitrating cellulose, in the manufacture of artificial silk.

The object of the new apparatus is to provide a dyeing machine with circulating liquor, in both directions, which will permit the satisfactory handling of artificial silk (also other fibres, yarns or fabrics) as well as the nitrating of cellulose, in the manufacture of artificial silk. In the machine, the material to be dyed is placed in rather thin layers between a series of movable, perforated plates, a construction more or less used in connection with dyeing machines of older construction, but with the difference that in the new machine these perforated plates are carried upon springs. In the process of dyeing, the flow of the circulating liquor will press these perforated plates towards each other, in one or the other direction as regulated by the direction of the flow of the dye liquor, in this way exerting a pressure on the yarns under operation. This pressure is in turn reversed by reversing the direction of the flow of the liquor, on account of the spring adjustment of the perforated

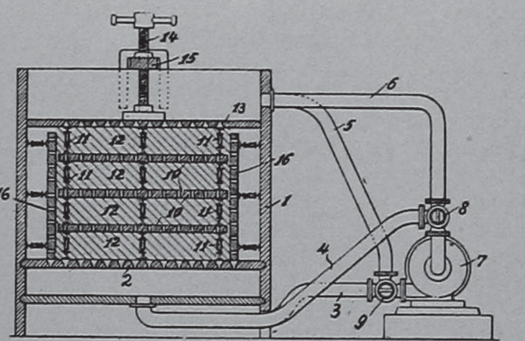


Fig. 1

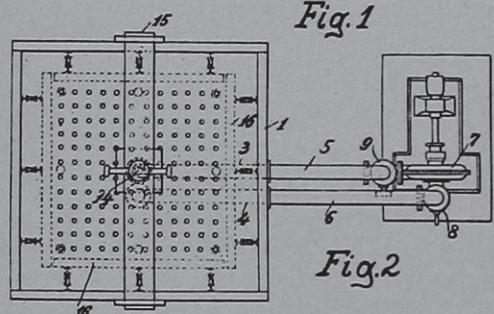


Fig. 2

plates, in turn loosening any compactness previously produced, to the material under operation. To increase this opening action to the material, if so desired, the four sides of the dyeing machine may be arranged movably to and fro, by means of spring pressure, in turn exerting a similar pressure on the material under operation, but in another direction than is done by the perforated plates, previously referred to.

If so desired, alternate compartments in the machine may be left empty, thus providing collecting reservoirs for the dye liquor.

To illustrate the construction of the new machine, the accompanying two illustrations are given; Fig. 1 shows a sectional elevation, and Fig. 2 a plan of it.

A description of operation of the machine is best given by quoting numerals of reference accompanying the illustrations, and of which 1 indicates the dye-tub, 2 its perforated bottom. The interior of the dye-tub, below bottom 2 as well as above its perforated top 13, is connected by means of pipes 3, 4 and 5, 6, with pump 7, permitting, by means of properly setting three-way-valves 8 and 9, the direction of the flow of the liquor through the material to be changed, *i. e.*, the dye liquor is either extracted from the bottom of the dye-tub by means of pipes 3, 4, and in turn fed into the top of the tub, by means of pipes 5, 6, or the procedure is reversed.

Above the perforated bottom 2, there are placed in the dye-tub several perforated plates 10, the same being kept the proper distance apart from each other by means of springs 11, forming in turn a series of compartments 12, for holding the material to be dyed. 13 is the perforated top cover; a screw 14, working in screw-threaded block 15, provides the means for regulating the required pressure to be exerted on the top cover and thus in turn on the material under operation.

It will be readily understood, that springs 11, bottom 2, top 13 as well as side 16, etc., must be made from material not influenced by the chemical nature of dye liquor.

The sides 16, of the material holding compartments 12, are shown connected by means of springs to the walls 1 of the dye-tub, in order to exert the side pressure on the material under operation, previously referred to. In Fig. 1, the sides 16 are shown to be perforated, a feature compelling us to be careful to provide means so that the dye liquor does not follow the possible channel between said sides 16 of the cloth holding compartments and that of sides 1 of the machine.

The holes in the bottom 2 and top 13, of the dyeing compartment, are drilled in a conical shape, to permit an even distribution of the liquor during the dyeing process, and thus through the goods handled.

Artificial Silk Trust.

An agreement has recently been concluded between four of the chief French firms manufacturing artificial silk, *viz:* La Soie Artificielle, of Givet (Isère), La Soie Artificielle d' Izieux (Loire), La Société Francaise de la Viscose, and La Société Ardéchoise pour la fabrication de la Soie de Viscose (Vals-les-Baines, Ardèche), for the purpose of controlling prices, which are said to have fallen of late to an unremunerative level. These companies manufacture artificial silk by the so-called *copper* and *viscose* processes, as distinguished from those factories working the Chardonnet patents at Besancon and elsewhere in France. There has, as yet, been no attempt on the part of the combine to raise prices.

Wild Silk Cocoon Reeling

by the S. Manchurian Railway at Fushimidai.

Everything at the Fushimidai silk reeling mill is, to a certain degree, in an experimental stage, and it will take eight months more to complete its first working year before its status can be assured. The great difficulty has been the training of the unskilled hands. The present wage scale for the 140 working girls, begins with 20 sen (10 cents) for apprentices and goes up to 50 sen (25 cents) for the best workers per day. The mill will be placed on a self-supporting basis when, with 200 reeling hands, it can turn out 100 kin (133 pounds) of wild cocoon silk per day, which is considered feasible, and quite within their reach when the hands have acquired sufficient skill.

Silk Cotton Market is Dull.

The Batavia (Java) Market Report of September states that the tendency in the *kapok* (silk tree cotton) trade is dull; stocks in Amsterdam amount to 16,000 bales at the beginning of marketing the new crop.

COTTON SPINNING.

The Ring Frame.

(Continued from page 95.)

The Rhoades-Chandler Separator, as built by the Draper Co., is shown in Figs. 284, 285 and 286, show-

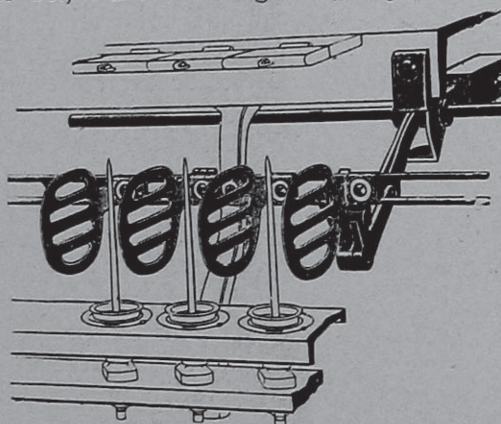


FIG. 284.

ing in connection with it those parts of the ring frame with which the device is more particularly associated, and consequently will readily explain the construction and operation of this separator. It will be noticed

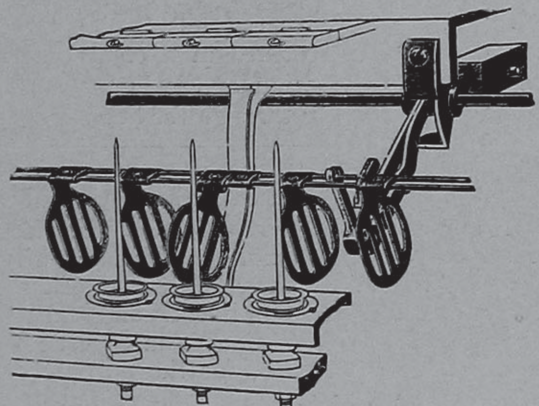


FIG. 285.

that this separator carries smooth, perforated blades, these being mounted so they can be properly adjusted on two rods, in order that the blades stand midway between the spindles. While the construction allows

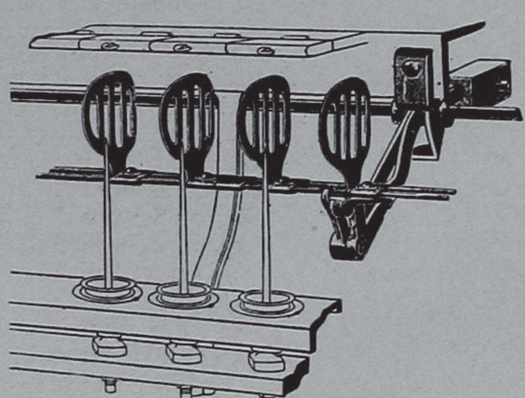


FIG. 286.

the blades to be turned up and back for doffing, it also allows a down turn as well, which is usually found preferable. The frame of stamped steel blades swings from a pivot in the rear of the roller beam, the long leverage allowing perfect east of motion. Fig. 284 shows the blades in normal position with the bobbins removed from the spindle. Fig. 285 shows the separators turned down for doffing. Fig. 286 shows the separators in an up-turned position. The question of the proper size of blade is of great importance, 2-, $2\frac{1}{2}$-, 3-, $3\frac{1}{2}$- and 4-inch blades being furnished according to the demands of the mill, *i. e.,* according to the work to be done by the frame on which they are to be fitted.

The Whitin Separator is shown in Fig. 287; the connection of their lifting rods with the regular cross shafts, which also carry the lifting rods for the ring rail, being also shown. The blades are made of stamped steel, perforated, combining strength with lightness. The rod on which the blades are fastened is also of steel, and is raised up and down in its path by auxiliary lifting rods, resting upon a second set of rollers fastened to the arms of the regular cross shafts. The rod on which the blades are fastened is joined to the lifting rods, by their *Taft Patent Clutch Hinge,* so that the blades can be conveniently and quickly turned back, out of the way, when doffing. An automatic device is also provided which restores the blades to their working position after doffing, should the operator neglect to do so.

The L. M. S. Separator, as built by the Lowell Machine Shop, is shown in its perspective view in Fig. 288, the illustrations showing, at the same time, also those parts of the ring frame more particularly associated with it. Its construction and operation is explained as follows:

The blades *a* are attached to the rail *b,* in the usual manner; this rail is hung to rod *c,* at point *d,* which allows the rail *b* to be turned back or taken off if necessary. The rod *c* passes through the stand that is attached to the spindle rails of the frame, and which can be easily bolted to any style of frame.

At point *e,* on rod *c,* is attached connecting arm *f.* which in turn is fastened to the lifting shaft of the frame, at point *d.* The latter is supposed to be half way between the two ends of the lifting shaft, *viz:* half way from the point where it swings in its bearings and the point where it lifts the ring rail. This being the case, the blades must traverse just one-half as fast as the ring rail, consequently the blade is always half way between the top of the spindle and the ring rail. The arrangement of the parts are such that any size blade can be used, so that at very high speed, the yarn will not whip around the blades.

Winding. The problem of winding yarn on a bobbin is so closely associated with the action of the traveler, that the same must be considered to some extent first before the traveler's action can be dealt with in detail.

The method of winding yarn on a bobbin on the ring frame differs from those employed on the fly frames. In both cases a definite length of material is delivered in a given time to be wound on a varying diameter, however, in order to effect the proper winding, complicated parts are used on the fly frame, but only simple means are employed on the ring frame. The parts of the machine which do the winding are not positively driven in the ring frame, as is the case with fly frames, consequently no arrangement like cone drums is necessary.

Winding, in connection with the ring frame, may be properly divided into two operations, *viz:* the revolution of the traveler, and the vertical reciprocating movement, *i. e.,* upward and downward traverse of the ring rail. Two styles of bobbin winds are met with on ring frames, the warp and the filling wind. In either case, the speed at which the traveler revolves makes winding possible, and the manner in which the ring rail traverses up and down, in turn guides the yarn in the desired form onto the bobbin or tube.

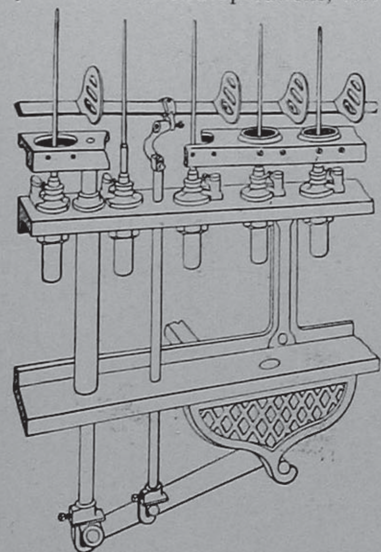


Fig. 287.

Winding and twisting of the yarn are simultaneous operations in connection with ring spinning, the controlling factors being the drafting rollers, spindle, ring and traveler, and the ring rail. The drafting rollers deliver a certain length of roving, which is twisted and wound on a bobbin by the actions of the spindle and traveler, the ring rail guiding the yarn during said winding operation on to its proper position on the bobbin. Spindle and ring must be concentric, and to accomplish this, the ring may be set to the spindle, or vice versa, the spindle set to the ring.

The functions of the traveler are to put twist in the roving, *i. e.,* transform it into yarn by rotating on the ring, and at the same time lag behind the speed of the spindle sufficient to enable the length of (roving) yarn delivered by the front pair of drafting rollers to be wound on the bobbin. The pull of the yarn, as the spindle rotates, gives motion to the traveler. To insure good spinning, the traveler must lag behind the spindle sufficiently to enable the yarn to wind satisfactorily on the bobbin, for which reason different weight of travelers are used for different counts of yarn; the coarser the yarn, the heavier the traveler.

The rotation of the traveler imparts a rotary motion to the yarn, and if the rotation of the traveler was constant, the twist in the yarn throughout the entire spinning process would be uniform, however, it will be noticed that the rotation of the traveler varies and when consequently the amount of twist in the yarn will vary in the same proportions. Although the matter is insignificant, if considered from a practical point of view, and cannot be noticed in the spun yarn, still the variation is there. The yarn pulls the traveler around the ring at a less speed than the spindle, owing to the weight of the traveler, this retardation of movement of the traveler being still further increased by the friction between ring and traveler. Another factor, that assists in increasing the retardation of the traveler at certain points in the build of the bobbin, is that when the yarn is winding from a larger to a smaller diameter, the speed of the traveler will be slower during winding on the small diameter and consequently the yarn there will contain slightly less twist. When in connection with filling wind, the yarn is winding on the bottom of the bobbin, the speed of the traveler is then at its height and the greatest amount of twist is being put in the yarn. In opposition to this, when the yarn is winding on the nose of the bobbin, the traveler is then moving at its slowest speed, the yarn in turn then receiving about one-half turn per inch less twist.

As the delivery of the (roving) yarn by the front pair of drafting rollers is constant, any variation of the diameter of the bobbin on which it is wound, will in turn result in a reduction of the tension or pull of the yarn on the traveler and a retardation of the speed

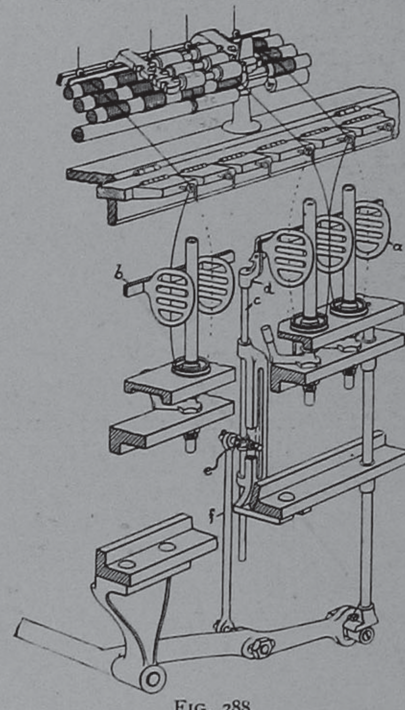


Fig. 288.

of the traveler will be the consequence. The tendency of the traveler, as it rotates, is to fly outward and what is overcome by the pull of the yarn and the position of the traveler on its ring. When this pull is relaxed, and which is the case if dealing with a ring out of round, one end of the traveler then comes more in contact with the ring and its rotation is retarded by friction as the traveler moves over that part of the ring that is not true, for which reason, rings out of true must be discarded at once, since besides producing defects in amount of twist, it must be remembered that every time the tension of the yarn is relaxed, the yarn that is wound on during that period, is not so firm on the bobbin.

(To be continued.)

THE MANUFACTURE OF LINEN YARNS.

(Continued from page 76)

SCUTCHING.—This is the next process to which the flax is subjected, and can be done by power or hand work. It consists in breaking up the woody part of the stem, and in turn eliminating it from the fibres.

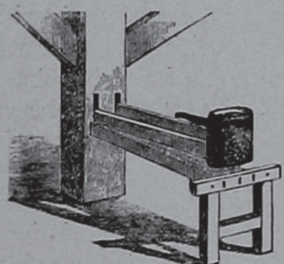


FIG. 6

FIG. 7

In hand scutching, the flax stems are first broken by placing them across a set of hard wooden slats arranged in a frame and having a similar set piv-

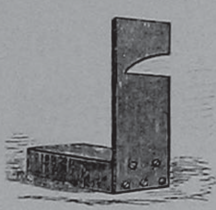


FIG. 8

FIG. 9

FIG. 10

FIG. 11

oted so as to descend between the first set of slats. The outer ends of the pivoted slats are connected by a wooden piece, which is struck with a mallet in order

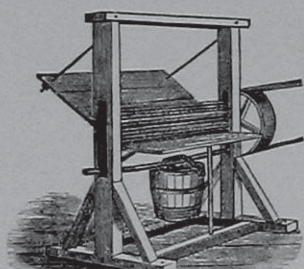


FIG. 12

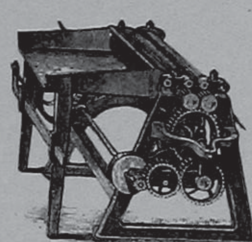


FIG. 13

to break the stems as placed between these two sets of slats. Fig. 6 shows us such a Hand Brake in its perspective view. During this procedure the flax stems are held by hand by means of what is known as a Gavel Holder (see Fig. 7), the same consisting of two short rods, connected to each other by a short wire, the operator gripping the two rods in one hand

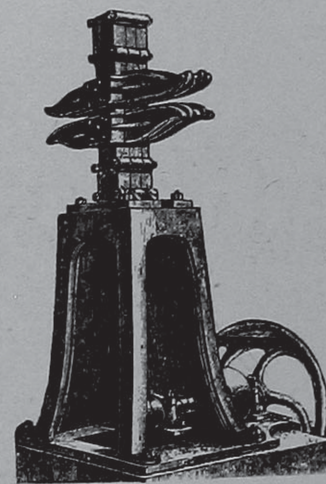


FIG. 14

with the flax stems firmly held between them. The breaking process must always be begun with the root ends of the stems. After thus breaking the stems, a convenient amount of them is placed, and held with one hand, through a cut out portion in an upright board, known as a scutching board (see Fig. 8), the projecting ends of the stems then being struck several times with the blade of a scutching knife as handled with the other hand, until that portion of the stem is completely separated from its internal woody part, which of course falls to the ground, and when the next portion of stem is treated in a similar manner until the entire length of the stems has thus been dealt with. Figs. 9, 10 and 11 show three styles of scutching knives used.

In connection with power breaking and scutching, although a variety of machines are built, their principles of operation are identical to those just explained. We thus find breaking machines built with crushing rollers, between which the stems are passed, see Figs. 12 and 13, showing two different makes of such breaks; whereas in another style of machine, see Fig. 14, we find one set of stationary horizontal iron bars having a similar set of bars working between them, so that when the stems are laid across the stationary set and the other set is lowered unto them, they are broken by this action.

(To be continued.)

ASIA MINOR. The cotton crop of Adana, Turkey, it is estimated, will amount to 100,000 bales this year as against only 60,000 bales in 1909. The average weight per bale is 440 pounds, though bales pressed by the new process of a German company weigh about 700 pounds. The local cotton is short fiber, but this year about 8,000 bales of long-fiber cotton will be produced from the planting of American seed. The principal drawback to a greater cultivation of American cotton is a lack of cheap labor to meet the added difficulty of picking the cotton directly from the boll in the field. The local cotton is easily picked—stalk, boll, and all—and the cotton later extracted at leisure.

Dictionary of Technical Terms Relating to the Textile Industry.

M

MABROUM:—A thin cotton structure, produced with a loosely interlaced filling, made formerly at Damascus, but now at Homs, Hama and Brussa, Syria; used for clothing, etc.

MACEIO COTTON:—A variety of Peruvian cotton; its fibres are characterized by the harshness, common to all varieties of Peruvian cotton. It is used in the manfacture of yarns varying from 30's to 50's count. Its maximum length of the fibre is $1\frac{3}{16}$ inches, minimum $\frac{7}{8}$ inch. The lower grades are sometimes very dirty, which make them relatively expensive to work.

MACHINE TWIST:—A three-ply silk thread made with a twist from right to left and usually harder and closer twisted than sewing thread; used in the sewing machine.

MACKINAW BLANKET:—A name given to the blankets distributed to the Indians of the Northwest by the United States Government.

MACKINTOSH:—A garment, particularly an overcoat or cloak, rendered waterproof by a solution of India-rubber, either applied on the surface as a coating, or placed between two thicknesses of some cloth of suitable texture.

MACO:—A name given to hosiery or underwear made from Egyptian undyed cotton. The name is derived from an Egyptian cotton planter, *Maco-Bey*.

MACO-FOOT:—A term applied to hosiery, the foot of which is made of unbleached yarn, while the leg is of colored yarn.

MACRAME:—A fringe or trimming of knotted thread or cord; knotted bar-work.

MACRAME CORD:—All kind of fine cord prepared for the manufacture of macrame lace, also used for other work, such as nettings, hammocks, etc.

MADDER:—Before the introduction of artificial alizarin, in 1868, Madder was the most important of the natural dyestuffs, with the single exception of indigo; although now entirely replaced by the artificial product in Turkey red dyeing, it is still employed to a limited extent in wool dyeing. The use of Madder as a dyestuff dates from very early times. Pliny mentions it as being used by the Hindoos, Persians, and Egyptians; madder-dyed cloth has been frequently found in the wrappings of the Egyptian mummies. The madder plant is indigenous to India and Central Africa, and in Europe was probably first cultivated in Spain, being introduced from Algeria by the Moors. It was grown in Holland as early as the tenth century, and first introduced into Italy and France about the time of the Crusades, records showing that it was cultivated in Marseilles in 1287. It was not, however, grown in Avignon until 1666, and is first noted in Alsace in 1729. The cultivation of Madder has frequently been attempted in England, (as early as 1624) however, it was never commercially successful.

Commercially, the different varieties of madder are distinguished by the names of the localities from which they originated, the following being the chief kinds: *Dutch* Madder, *Alsatian* Madder, *Avignon* Madder, *Levant* or *Turkish* Madder and *Italian* or *Naples* Madder. These different varieties of Madder yield somewhat different colors, according to the proportion of coloring matter (alizarin and purpurin) present, and the amount of chalk, pectic matter, etc., which they contain.

MADDER EXTRACT:—The same may be prepared from Madder in several ways; for instance, garancin may be extracted with boiling water containing a trace of sulphuric acid, and the solution filtered, when, on cooling, an orange colored precipitate of impure alizarin separates out, which has about fifty times the coloring power of madder.

MADRAS:—A large bright-colored handkerchief of silk and cotton, used by the negroes in the West India Islands, and elsewhere, for turbans, etc.; from the French *Mah-Drahs*.

A thin and light fine woven cotton cloth in plain and fancy colored stripes, the distinguishing and essential feature of which is the presence of fine line, colored stripes, or imitations of simple embroidery work. Used extensively in the manufacture of shirtings; the better grades are frequently made from Egyptian cotton, with stripes of silk.

MADRAS COTTON:—Of this, there are two kinds, *viz:* the *Tinnivelly* and the *Western*, the former being much more superior than the latter, and worth almost ½d. per pound more.

Tinnivelly is cultivated in the Southern parts of the Presidency of Madras, where climatic influences are more temperate and equable than at any other part of the Presidency. The chief external characteristics which distinguish the Tinnivelly variety are, first, a dull creamy color; second, a high standard of strength; and, third, an excess of elasticity. In general the crops are moderately clean, but some deliveries, of the middle and lower grades especially, contain much impure vegetable and mineral matter, broken into fine particles. In the length of the fibres the maximum is $1\frac{1}{16}$ inch, minimum $\frac{5}{8}$ths of an inch. The number or counts of yarn for which this cotton is best adapted range from 26's count downward. Being fairly strong, it is well adapted for warp yarns. A feature of this variety of Madras cotton is their deficiency in natural twist.

In reference to the *Western* variety, the soil in the western and central parts of the Presidency is not so well adapted for the cultivation of the cotton plant as at Tinnivelly, owing to the heat being more continuous. Another objection to this variety of cotton is, that all deliveries are most exceedingly dirty, the percentage of leaf, seed, sand, shell, broken and ruptured and undeveloped fibre contained in them being exceedingly large. The fibres are, however, of a good standard of strength, and, but for the serious defect just mentioned, would otherwise be competent to produce a good warp yarn. The maximum length of the fibres is about 1 inch, minimum $\frac{3}{4}$ of an inch. The counts of yarn for which it is most generally used, range from about 20's count downwards. Under the microscope the general appearance and structure of the filaments are shown to have much in common with the Tinnivelly cotton.

MADRAS MUSLIN:—A light textured cotton fabric in which figures are formed by the introduction of a thick filling thread into the ground, and then cut away where said filling floats.

MADRAS WORK:—Simple embroidery upon bright-colored Madras handkerchiefs, furniture-coverings, banner-screens, etc. The art of embroidering muslin, silk or cloth.

MAFORS:—A woman's cloak. A monk's scapular.

MAGDALA:—A coal-tar dyestuff ($C_{30}H_{21}N_4Cl$) derived from naphthylamin, used to dye silk. Called also naphthalene red.

MAGENTA:—See Fuchsine.

MAGNANERIE:—An establishment for rearing silk worms.

INTERIOR OF A MAGNANERIE.

MAGNESIA:—Calcined magnesia, the oxide (MgO) has been recommended for weighting purposes in connection with the finishing of cotton goods, but whether it is ever so used is doubtful.

MAGNESIUM CARBONATE:—A filler for weighting cotton goods, but is too porous and light to be used extensively. It dusts very freely, is difficult to use, and is expensive; nevertheless, it is used to some extent on the Continent to give a special handle required to some classes of cotton goods.

MAGNESIUM CHLORIDE:—A complete preventive of mould in starch-dressed cotton goods, provided the starching has been done with fresh, unchanged starch. If, however, fats are present, the magnesium salt loses much of its efficiency, especially in damp places subject to sudden changes of temperature, and with goods that have been calendered or dried at particularly high temperature.

MAGNESIUM SILICATE:—Powdered meerschaum or soapstone. It has been recommended as a filler in the finishing of cotton goods, but its use is questioned.

MAHOUT:—A woolen fabric formerly made for export to the Levant.

MAIBASH:—A variety or grade of silk (reeled) produced in Japan.

MAIL:—The metal eye of a twine heddle, used in connection with a Jacquard harness.

MAIZE:—A starch obtained from Indian corn, used in sizing cotton fabrics.

MAKRAMA:—A Turkish pocket handkerchief.

MAKWA:—A short outer jacket introduced by the Manchu Tartars into the Chinese costumes.

(To be continued.)

THE FINISHING OF CARPETS AND RUGS.

(Continued from page 67.)

Carpet Steaming, Sizing and Drying Machines.

The next process carpets and rugs are subjected to is that of steaming, sizing and drying, in order to impart the necessary strength and wearing qualities to cut pile structures, as well as stiffness and durability to all grades of carpets and rugs thus treated.

These machines are built by the Curtis & Marble Machine Co. in three different types, according to the class of goods to be handled.

Fig. 9 shows in its perspective view, their Carpet Sizing and Drying Machine for Moquettes and the lower grade of Axminsters.

The object of the use of this machine is to apply size or glue to the backs of the carpets. As seen from the illustration, these machines are provided with metal sizing-rollers and copper size-pans with scraper for removing the surplus size. A steam-box is frequently used in front of the sizing-roller to slightly dampen and warm the back of the carpet so that the size will adhere better. In some cases a heated drum is used instead of the steam-box.

Some machines have a brush attached and where heavy steaming is required, a larger machine is used, being a Three Cylinder Machine with a large steam-box, so arranged that you can get a very heavy flow of steam through the goods from the back, which opens out the pile very thoroughly, brightens up and fixes the colors; then the drying is done on large copper cylinders in such a way that the face of the carpet does not come against any roller until it has been pretty thoroughly dried. For Wiltons, Tapestry, etc. this Three Cylinder Machine is more particularly adapted.

For better grades of Axminsters and Saxons, a Four Cylinder Machine is used, by which the face of the carpet is not allowed to touch any roller from the time it enters until it is finished.

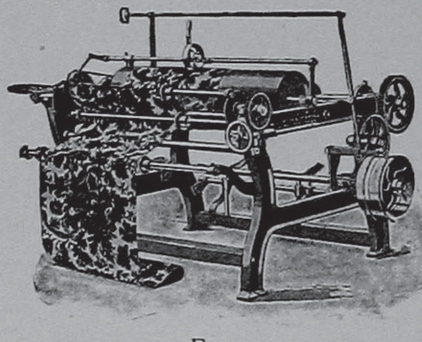


FIG. 9.

Overhead folding attachments, fastened to the ceiling, are used for drawing the goods through the machine and laying them down in loose folds after they are dried.

After being steamed, sized and dried in this way, the carpets will lie perfectly flat on the floor. This system of steaming and drying carpets imparts to the goods a superior finish all around.

For large rugs 9 feet and 12 feet, or larger, there is a special Steaming and Drying Machine built, by which the rugs are handled in endless belt form. This stretches the fabric flat, and holds them in that stretched condition while being dried.

Stretching frames upon which each individual rug of large size is stretched by means of tacking or clamping, are still used to some extent by a few mills, but the more progressive ones are using the copper cylinder dryer.

Carpet Rolling and Measuring Machine.

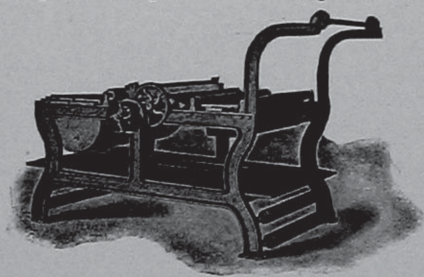


FIG. 10.

The machine built for this purpose by the Curtis and Marble Machine Co., is shown in its perspective view in Fig. 10, it being designed especially for Brussels, Tapestry, Wilton, Velvet, Axminster, Moquette and similar carpets. The machines are made to roll the goods on various styles of split or collapsible bars, which are drawn out after rolling, or in any of the usual methods in which carpets are put up for the market. By means of a friction device in front, the tension is easily regulated, and guide collars are provided to aid in making a neat looking roll with the ends square and even.

A brush is regularly put onto the machine, though not shown in the illustration, for cleaning the dirt and lint from the back of the goods before being rolled up. In some cases, to brush both the face and the back of the carpets, two brushes may be attached, one for each side of the goods. The machine is easily threaded, and the winding bar quickly clamped and unclamped in the sockets, enabling the work of putting the goods up for market to be done rapidly and with but little labor on the part of the operator.

A special feature of the measuring arrangement is that the mechanism for registering on the dial is made adjustable by means of an expansion pulley, and this can be set so as to give absolutely correct measurement. The recording on the dial starts as soon as the forward end of the carpet passes over the measuring roller, and stops automatically the instant the last end of the piece has passed through; the dial turns only while goods are passing into the machine, even though the machine may be left running. This insures a perfectly accurate measurement of each piece; the pointer may be readily pushed back by the operator to zero by the fingers, at the end of each roll.

In connection with the Paterson Industrial Exposition, we call your attention to the exhibit of Alfred Suter, Textile Engineer, 487 Broadway, New York City. Mr. Suter will be personally in attendance during the entire exposition, demonstrating his machinery and other appliances used in the Silk Industry.

DIRECTORY OF TRADE MARKS RELATING TO THE TEXTILE INDUSTRY.

Registered October, 1910. (*Complete.*)

1. Coal-Tar Dyestuffs, etc.—Badische Anilin & Soda Farbik, Ludwigshafen-on-the-Rhine, Germany.
2. Hosiery and Underwear.—Dayton Dry Goods Co., Minneapolis, Minn.
3. Ginghams.—Harris-Lipsitz Company, Dallas, Texas.
4. Woolen Goods.—S. Stein & Co., New York.

5 and 6. White, Dyed, and Printed Percale.—The Windsor Print Works, North Adams, Mass.

7. Cotton Goods.—Grinnell Willis & Co., New York.

8 and 17. Cotton, Woolen, Linen, and Silk Goods.—Bedell Parker, New York.

9. Carpets, Mattings, Rugs, and Curtains.—N. E. Boomhower Co., New York.
10. Hosiery.—G. & A. Wise, New York.
11. Ladies' Wear.—R. Kirshbaum & Son, Indianapolis, Ind.
12. Threads and Yarns.—Superior Thread & Yarn Co., Wilmington, Del., and New York.

13. Knit Goods.—Kahn & Frank, New York.
14. Hosiery, etc.—Stanley Clague, Chicago, Ill.

15. Knit Underwear.—Hecht & Campe., Inc., New York.

16. Percale.—Ely & Walker Dry Goods Co., St. Louis, Mo.

18. Floss Silk.—Meyer, Martin & Danda, New York.

19 and 24. Waterproof Tulle Nets and Chiffon.—L. & E. Stirn, New York.

20. Hosiery.—Danville Knitting Mills, Danville, Va.

21. White, Dyed, and Printed Cretonne.—The Windsor Print Works, North Adams, Mass.

22. Men's Wear.—Samuel E. Reinhard, Baltimore, Md.

23. Men's Wear.—Samuel Rosenthal, Washington, D. C.

Stop Motion for Fulling Mills.

The same is a late improvement to German built Fulling Mills.

Fig. 1 is a side elevation and Fig. 2 a front elevation of such a fulling mill equipped with this stop motion; only those parts of the machine being shown as are directly connected with the new device.

With hard fulling fabrics the fulling process is facilitated by running the goods under operation in double runs, side by side, through the squeeze rollers; again two pieces may be fulled at one time in one machine. In either instance the two feeds to the squeeze rollers are kept separated by running them through a guide rack.

In the process of fulling double runs, the loops may gain on each other and when the short run will soon arrest the progress of the cloth. If running two pieces they may become entangled, with the same result. It is then that the guide rack acts as a stop motion, the short loop, knot or twist in the feed of the

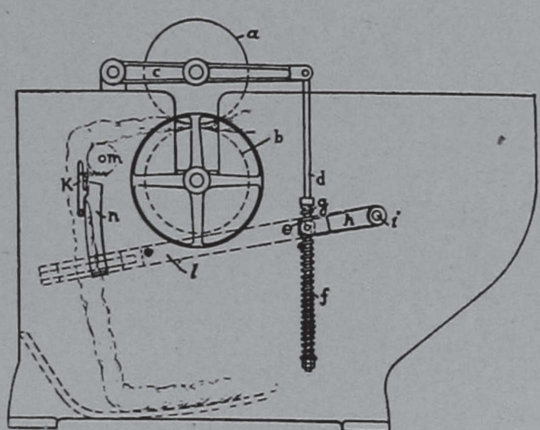


Fig. 1

cloth raising the guide rack, which then, by suitable connections, stops the running of the machine, thus preventing gross imperfections to the cloth.

The claim for advantage of the new stop motion is that since the guide rack (necessarily) must be made of a rather heavy construction, this feature may be found to be the cause of a tear to the fabric, on account of the sudden strain put onto the cloth when said guide rack, in case of a hitch in the feed, is suddenly raised.

Again, the arresting of the two squeeze rollers of the machine is not instantly accomplished with the raising of the guide rack, hence chances of bare places being formed in the goods. To overcome this, devices have been constructed for some time, to simultaneously raise the upper squeeze roller with the raising of the guide rack.

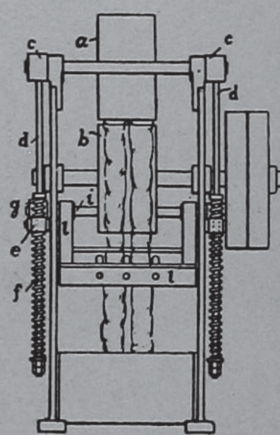


Fig. 2

In the new construction, the weight of the guide rack is used for weighting the upper squeeze roller, obtaining, as the builders of the new device claim, a lifting of the guide rack and the upper squeeze roller by means of lever connections. To facilitate the lifting of the guide rack and the upper squeeze roller, two springs are positioned onto the rod which connects the rack and the lever carrying the bearing for the upper squeeze roller.

As will be readily understood, the arrangement thus referred to is constructed in duplicate, one on each side of the machine and will be readily seen by consulting illustrations, where *a* and *b* are the two squeeze rollers of a single compartment fulling mill. *c* are the levers carrying the bearings for upper squeeze roller *a*. To each lever is movably joined a spring rod *d*, upon which, between spiral springs *f* and *g*, is elastically positioned a ring *e*, which forms the end of lever *h*, which with guide rack *l* is wedged to arbor *i*.

Guide rack *l* forms the weight for the upper roller *a*, it being released by means of spring *f*, so that the goods, if entangled, when starting to raise the guide rack, will find little opposition. Provided the entanglement is then not straightened out, the guide rack will compress the upper spring *g* which then by means of rod *d* and lever *c* will raise the upper roller *a*, in turn releasing the goods under treatment from any pressure by the squeeze rollers.

In order to hold the guide rack in its raised position until the operator has remedied the trouble, the guide rack is provided with a notched extension *n* which at the highest position of the rack comes in contact with a spring catch *k*, secured to the framing of the machine. The stopping of the machine is in the meantime accomplished by means of the usual anti-friction device (not shown) as is secured to the shaft of the guide roller *m*.

POINTS ON THE SHRINKAGE OF WOOLENS, IN DYEING AND FINISHING.

Most all woolen fabrics, when submitted to the various operations of finishing and dyeing, undergo, more or less, changes in their length and width, caused generally by the tension exerted onto the pieces by their run through the various machines. This tension onto the fabric will have a tendency to increase its length, at the same time decreasing its width. On account of the close margin of profit woolen mills are running on at present, the finisher must calculate these shrinkages in length and width to the fabric, to a nicety, and when with the greatest care, unexpected changes may produce disappointing results to him.

To overcome any possible trouble, as much as possible, avoid all unnecessary tension on the goods, whether it is the Cloth Washer, the Gig, the Napper, the Dyeing Machine, the Shear, the Brush, the Rotary Press, etc.

The finisher must take these shrinkages into consideration at the fulling process, although at times it may be difficult for him to determine the exact proportion of such shrinkages. Experience is the best teacher; unforseen changes in one range of goods may occur any time, which overthrow previous calculations.

For example, a change in stock, will frequently require a different treatment of the cloth in the scouring and dyeing processes; again a change in the counts of the yarn may influence the fulling process as well as the final finish of the fabric.

The behavior of the goods in the fulling process may serve to a certain extent as a guide, since the quicker, for instance, a fabric felts in its width, the greater will be its tendency to shrink in the subsequent processes; more so in connection with light weights, cheviots, serges, meltons, etc. The fulling capacity of the fibre, not being spent, the tendency for shrinkage retained by the fibre, therefore, is still proportionally strong. There are cases on record, where goods, fulling readily in the fulling mill, will shrink up to one inch in width after being taken out of the fulling mill and while lying in a pile or on a truck, waiting their chance at the washer.

The texture of the fabric also plays an item; loose textures, more particularly double cloth structures, have a greater tendency to shrink in width and draw out in length, than high textured, tightly interlaced single cloth structures.

The color of the fabric, in some instances, may also exert an influence as to shrinkage. For instance, it will be noticed that white, light colored as well as indigo blue goods are always more inclined to shrink in their width and stretch in length, than such as are dyed with natural dyestuffs a dark brown, dark green, black, etc., since with the latter colors the shrinking capacity and elasticity of the fibres is more or less impaired by boiling and mordanting with chemicals.

Do not overdo matters with reference to preserving the width of the goods, even in case matters refer to low textured, loosely interlacing structures, since such fabrics do not shrink so rapidly at the beginning of the fulling process as when the felting process has reached a certain point, and when then the goods begin to shrink more rapidly. If the cloth is taken at that stage from the fulling mill, the shrinking in the subsequent operations will not take place to that degree as it will when the proper period has been exceeded.

Let us explain the subject with a Piece Dye Cheviot. In order to reduce the fabric to a required finished width of 55½ inches, we may, for example, be obliged to take the fabric from the fulling mill when 57¼ to 57½ inches wide. Say that up to 58 inches the shrinking process progressed slowly, after which, however, it accelerated, and that after a short time (from ten to fifteen minutes), we then obtained a width of 57¼ inches for our fabric. If we exceed this width only ¾ of an inch, or in other words, continue to full to 56½ inches, we may find that the fabric will shrink considerably in its width in the subsequent washing process, and may be reduced to 54 inches in width, and possibly as narrow as 53½ or 53 inches; and when the fabric is too narrow, it becomes still narrower at the dyeing process, as well as in the subsequent washing process.

Now for example, take the next piece of the same lot of goods out of the fulling mill when from 58 to 58¾ inches wide. While with the first piece we experienced a loss of from 2 to 2½ inches after washing, we may now have very probably a shrinkage of one inch or less only, because the cloth was removed before the period where a more rapid fulling of the fabric had arrived. We find that the piece, which after washing is still perhaps 57¼ or 58 inches wide, shrinks less in dyeing and scouring; consequently it remains too wide when finished.

It is for such reasons that the fuller must be very careful to notice the time when, with the fabric, the fulling process begins to accelerate. To stop fulling with one inch difference, either before or after this time, will frequently make a great difference afterwards in the finished width of the fabric. Goods of a close warp texture, and strong fulling tendency, suffer but little change in length and width afterwards in finishing. It may also happen that goods which were shrunk in width, will only with difficulty become wider again in the subsequently following finishing processes.

The same remarks apply to goods shrinking hard in their length.

The treatment the fabric under operation receives in the subsequent dyeing and finishing processes, is another point requiring a careful consideration by the fuller, when establishing the proper measures of length and width for the fabric, when coming from the fulling mill.

It will be readily understood that a light or loose textured cloth, which is to be submitted to a more or less severe gigging, must be left wider at the ending of the fulling process as compared to one which has not to undergo this treatment. In the same manner, piece dye goods, requiring a rather severe scouring so as to clean them thoroughly, must be left wider at the end of the fulling process than is necessary for wool dyed goods.

Heavy weight wool dyed fabrics, having a nap finish like kerseys, doeskins, etc., and which are steam lustered or decatized afterwards, need not issue from the fulling mill any wider than is required, in fact, it is better to have them come out a little narrower than the necessary width, so that they can be tentered (stretched) well in the drying, to make them smooth. The steam lustering, or the decatizing process, in this case fixes the width and length imparted to the fabric by the preceding tentering and drying process, the fabric receiving its proper width in a very satisfactory way. Piece dyed goods of this kind of fabric structure, however, must be left somewhat wider, since their shrinking capacity is not impaired by mordanting and boiling as is the case with the wool dyed fabrics, in consequence of which they will, as a rule, shrink afterwards during washing and gigging processes. Owing to their natural elasticity, these fabrics will also stretch more or less in their length, a feature which in most cases is as unpleasant an affair as the shrinking of the fabric in its width, since it influences the required weight per yard, of the finished fabric.

Let us now consider how the different operations following fulling, influence the shrinking of woolen goods. Scouring, without question, is the most important process to be taken into consideration, more particularly the action of the soap, a most important agent in the fulling of the cloth, and which is also employed in the scouring process and when with goods that were not shrunk to their full extent in the shrinkage of the fabric in its width, takes place at the fulling mill, an additional felting, with a consequent scouring process. No shrinkage of consequence in the length of the fabric occurs on account of the tension lengthways that the fabric is subjected to at the scouring process.

The temperature and strength of the scouring liquor, *i. e.,* scouring bath, also influences the shrinkage of the fabric, to a considerable extent, it being a well known fact that many fabrics will felt if treated in a hot scouring bath, but which fabrics will not felt if the process is carried on in a cold state.

(To be continued.)

A meeting of Scottish woolen manufacturers was held lately at Galashiels, to form an association to prohibit pattern collectors obtaining new season's patterns and distributing them to foreign manufacturers for the purpose of copying.

The American Cotton Manufacturers' Association will hold its next annual convention in Richmond, Va. The meeting will probably occur the third week in May, 1911, though the exact dates have not yet been fixed. The sessions will be held in the auditorium of the Jefferson Hotel. The association met here in 1908 and 1909 and has voted to come back again in 1911. This year the convention went to Charlotte.

A Section of Hopedale

containing some of the houses, owned by the Draper Company, the view being reproduced from what is called a Sky Photograph. This process calls for sending the camera up to a height of about ninety feet and thus gives opportunity to obtain a view of a large district that would otherwise be impossible.

HOSIERY AND KNIT GOODS.

The Characteristics of Knitted Textures Compared to that of Woven.

(*Continued from page 108*)

Relation of Color to the Knitted Texture.

The amount and nature of color introduced into knitted goods depends on whether the goods are intended for underwear or outer garments.

For underwear the range of coloring is not great, a pure white being employed for the majority of textures. To attain this, bleaching is largely practised, either by sulphur or the liquid method. Of the two methods, the latter is most largely used on account of a better and more permanent white being produced. The chemical employed is either hydrogen peroxide or sodium peroxide.

Solid colors are also frequently introduced as stripes on the machine.

The dyestuffs must obviously be fast to rubbing and washing. If the first requirement be neglected, a color cake is deposited on the body, and if the second be not observed the color vanishes after a few washes. Fastness to light, while desirable, cannot be said to be indispensable.

Formerly the scheme of color combination was decidedly crude and devoid of taste. Loud and showy effects, distinctly displeasing to an educated color sense, were the rule. More attention is now being devoted to the matter, especially in the direction of better balanced effects. Colors of a primary or secondary nature still predominate with their shades or tints, the chief type being stripes introduced on a white ground.

The nature of the knitted fabric renders the production of horizontal stripes of color much more easy than that of vertical stripes. The course of loops is formed in a horizontal direction, and should be uninterrupted. If the course has to be made in sections of different colors, as is the case of vertical stripes, the progress is very slow and the fabric imperfect at the junction of the stripes. A more convenient mode is to introduce the colors as extra threads, small in diameter and bright in hue. In this way stripes of various colors can be attained in a vertical direction, variation being obtained by giving the lines a zig-zag character, an arrangement to which the machine construction readily lends itself.

The coloring for outer wear fabrics is entirely different to that of underwear. At the outset the tone is lighter or darker, as is required for summer or winter use, whilst the colors must be fast to light. From the considerations referred to, the effects rarely take a check form, nor do they occur in solid lines. Variation in stitch breaks up the color effect, and causes them to show in minute portions of varying sizes. Thus colors producing a displeasing effect, when occurring in a continuous way, can often be used with good results in a fancy stitch.

The effect of employing too great a mixture of coloring is often modified by trimming the edges of the garment with black, white, or a solid color, in harmony with the prevailing tone of the fabric.

Texture and Figuring Capacity.

The elementary loop is not suitable for fabrics other than those of ordinary underwear, and it was not till diversity of loop was achieved, and suitable machinery invented for its production, that the fabric made much advance in other provinces of clothing. Of recent years, the texture has been strengthened and improved, and the figuring capacity extended, so that provinces formerly confined to the woven structure are now being successfully invaded by its knitted rival. As typical fabrics, let us mention gloves, ties, jackets, vests, and to a limited extent costumes and children's wear. As to how far some of these knitted articles are merely the result of a passing fashion, and as to their permanency, I do not venture to say, yet I shall endeavor to outline the chief factors which have led up to these developments.

Diversity of Stitch and Texture.

It is often possible to amplify and strengthen the plain stitch by the simple device of plaiting. This consists in introducing an extra thread, to be worked side by side of the ground yarn, so that it shows on the back of the cloth. In the case of a material like silk, it is often difficult to fill up the fabric sufficiently with the pure fibre, the necessary solidity and handle being imparted by introducing an extra yarn of wool or other material, which goes to the back. It also proves useful in *fleecy* articles, where a thicker yarn is put on the back so as to provide material for the napping process. Some machines extend the principle and make it the basis of pattern production, using two colors. Under normal conditions, say thread *A* passes into the needle in front of thread *B* and shows on the face. By the aid of an extra selective motion, needles rise at certain points and reverse the above order, thread *B* showing on the face and thread *A* on the back.

The knitted reversible, however, differs widely from the woven one. In the latter, the thread once woven into a position remains there, fixed by the intersection of neighboring threads. The knitted reversible has no such means of maintaining the position of the fancy yarns, drawn on to the face of the fabric from the normal route. Should the fabric be severely stretched, the tendency for the two-colored yarns to reverse their places would be great. This fact, moreover, lies at the basis of the appearance usually presented by the knitted pattern. Owing to this tendency, the patterns are characterized by a certain vagueness and indefiniteness; viewed at close quarters, the effect is diminished; viewed as a whole, some small distance away, the best effect can be noticed.

The elasticity of the fabric is greatly affected by using stitches of the rib type, where we have alternate rows of right side and wrong side fabric produced vertically. This causes the thread to undergo a greater degree of intersection throughout its length, and such a fabric contracts more than the plain type, a quality which suits it for use at the extremities of garments, establishing a firmer hold on the parts and keep the article in position.

When two yarns, at regular intervals, are knitted in one loop, in such cloths more space is available, and a greater quantity of yarn can be inserted into the cloth. Such a structure adapts itself for articles like jerseys and sweaters, which are required to be heavy and bulky in handle. The same principle of stitch gives rise to the best-known patterns in color, the fancy yarn lying to the back of the ground, or knitting above the ground, as required.

For outer garments it is expedient that the surface of the cloth should be as even and flat as possible, so that uniform wear may result. The knitted fabric, however, varies its surface considerably with certain well-known principles of stitch.

The one most in evidence for outer wear during the past season goes under the name of the *pearl*. It owes its origin to the fact that the plain stitch presents an entirely different aspect on the face to what it does on the back of the texture, the face or right side appearing much flatter than the back or wrong side. When a wrong side stitch is produced at given points on the right side, a very striking, high and low effect, shows itself on the cloth, an effect greatly accentuated by using thick yarns. This stitch belongs to one of the most rapidly developing departments of the knitting industry.

The surface may also be varied by openings and elevations as in the *lace stitch,* a type which finds its chief use in ornamenting hosiery garments. During work on the machines certain stitches are removed from their rightful needles, and transferred one place to the right or left. Certain needles thus hold two stitches, whilst their neighbors have none, so that openings and high parts occur in the cloth, which, when arranged in a symmetrical manner, give rise to extremely ornamental effects. Pieces of lace can, of course, be inserted, but the material is different and is thicker at the joint, for which reason the lace work made as described above is preferred.

The best results are attained when fine yarns and a close set are used. A peculiar feature also is found in the great variety of raised effects procurable, and the facility with which fancy yarns of several colors can be introduced from the back. This structure may be considered analogous to the woven double cloth. Two plain-stitch fabrics are worked, one above the other, in different colors, and their positions on the face and back respectively reversed by a jacquard machine. The further extension of this type is at present occupying the chief attention of machine builders and inventors, and many interesting results may be expected.

The plain fabric has also been considerably enhanced by the embroidery mode of introducing fancy colors in a vertical direction. Fine silk is usually employed, the colored threads being fed into the needles by points straight from the bobbins. The points have a side to side movement, so that the position of the fancy thread may be altered at each succeeding course. The formation of the plain-ground fabric is proceeding all the while, the colored yarns being introduced over and above the ground.

Knitting Mechanism.

The fabrics described have been known for a very long period, and they would never have assumed their present importance had the mechanism not reached a high degree of perfection. The growth of the industry is inseparably bound up with, and completely dependent upon, the mechanical developments. Broadly speaking, the loom is required to produce long lengths of cloth of uniform width, the cloth being subsequently formed into articles of clothing by the tailor. We have a corresponding section in the knitting trade, but the task more often is to turn out the article ready for the wearer, a problem which must of necessity introduce many intricacies into the mechanism.

Take for example the machine which produces the articles for ordinary hose. The machine automatically changes the stitch of the upper part to that of the lower part, the articles being meanwhile reduced in diameter to correspond with the shape of the limb. Arriving at the heel, an extra thread is automatically drawn in to give greater wear, and the whole character of the motion altered to produce the extra material required for the heel. The foot is next worked, and a similar pocket worked for the toe.

The larger garments are made in parts, eight or twelve at a time, the parts being narrowed and widened along the edges, to correspond with the form of the relative part of the body. These portions are afterwards joined together into the articles required.

In the loom, the predominating principle of motion is the lever, and the movements have frequently a somewhat jerky character.

On the knitting machine, the circular principle is more in evidence, the chief parts being almost invariably worked by cams which have a shape in accordance with the nature of motion required. The frame thus moves smoothly, and anything of an irregular or jerky character at once puts the machine out of correct adjustment. Owing to the fact that each stitch is formed on its own individual needle, and that a similar motion must be imparted to each, one can readily understand that delicacy is of primary importance. The sinkers and needles work into each other in spaces of a minute fraction of an inch, so that a very small deviation gives rise to serious consequences.

In the machines for fancy fabrics, it is striking how frequently the jacquard principle appears in pattern making. Cards are cut, and operate in a manner similar to the loom. The production on machines, weaving a uniform diameter of circular fabric, can be enormous, because of the manner in which large number of feeds can be arranged round the circle of the machine. On some types fourteen and more feeds occur, which means that the number of picks or courses are made for one turn of the frame.

In the province of knitting mechanism the inventive mind has great scope; experiments are constantly being made and patents taken out, if not always for a distinctly new departure, certainly for the improvements of existing machines, the simplification of parts, and a reduction of wear and tear.

Review of the Hosiery & Knit Goods Trade.

HOSIERY:—The hosiery market, taken as a whole, still remains conservative. Mills are asking a fair price for their lines and holding to them; for instance, on the staple lines, one pound eight, seamless, is held at 70 cents, and bundle lines at 60 cents per dozen.

In view of the past sentiment of the market, these prices do not seem to attract a great many buyers, the reason being ventured that they are possibly waiting for a general disorganization of the market, with results corresponding to what it was some time ago, when the buyers named the price and not the seller.

Most manufacturers have profited by their experience under the circumstances cited, and it seems to be a general opinion that it will be many days before they again allow the buyers to get the upper hand and demoralize the market.

The outlook seems to favor a general increase in business, and a number of mills are figuring on it.

Sheer goods continue popular and an increased demand is noted in striped effects, in plain colors.

UNDERWEAR AND KNIT GOODS:—The most important feature of this market seems to be the anxiety to open the lines for the Fall 1911 season.

Some of the mills, however, do not look upon the proposition of an early opening very favorably, as they contend that there is still business to be done on spring deliveries, and that this should be finished up before the lines are opened.

It is safe to say, however, that there will not be any general opening until after the cold weather sets in; the most conservative factors in the field claiming that the longer the opening of the season is delayed, the stronger will be the business.

An encouraging factor in the market is the general knowledge of the incompleteness of stocks on hand, and which will have to be made up before cold weather sets in.

The demand for specialties, such as union suits, etc., in the higher priced lines, continues, but the supply is limited.

On the low end of cotton underwear, medium and light weights, duplicate orders are still being received, but prices are extremely irregular anl deliveries poor.

India now stands second to the United States in cotton production; and the export last year, after the requirements of all the cotton mills and hand looms were fully met, amounted to about 2,000,000 bales (of 400 pounds each) out of a crop of about 4,500,000 bales.

SHUTTLE EMBROIDERY MACHINES have been purchased in Plauen, Germany, in increasing numbers by American manufacturers of embroidery goods, due chiefly to the admission of the machines into the United States free of duty. The exports of such machines declared at the Plauen consulate for the year ended July 31, 1910, numbered 160, valued at $268,828.

GREEN OLIVE SOAP.

Soap used for silk dyeing should be of the highest quality, thoroughly saponified and free from alkali in order to insure the best results.

The Tuscan Brand of pure Green Olive Soap manufactured by Harding & Fancourt, Inc., 1095 Germantown Ave., Philadelphia, is especially recommended for that purpose and is without doubt one of the best soaps for the handling of silk.

Being made from the highest grade of Tuscany Oil, the best grade of soap is assured; silk dyeing requires the best, and cheap is not true economy, preference should be given to quality and not price.

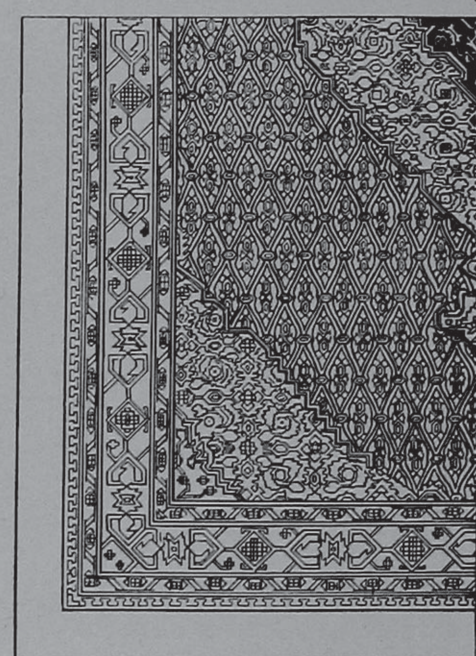
Samples and quotations will be submitted upon request by the manufacturers.

Chile, via Punta Arenas, exported to the United States during April, May and June, Unwashed wool to the amount of $49,617.

The Canary Islands offer a fair market under ordinary conditions for cotton and miscellaneous goods. Dyed sateens and mercerized fancy prints have a fair sale among visitors and tourists. Striped and gray drills are in limited demand, and are supplied by Manchester, England, and Barcelona merchants—principally the latter. Spanish makes of Oxfords and Harvards are also in considerable favor. Italian prints and flannelettes have a fair sale. Belgium supplies the bulk of the awnings and ticks. Regattas and low fancies are generally of Spanish manufacture. Printed moleskins for trouserings are imported from Hamburg.

New Design for a Rug.

The design shown has just been patented by J. Merry, New York, and consists of a New Design for



a Rug, one quarter of the full design being shown in the illustration. It comprised a central medallion placed upon a ground work, a corner piece and a border.

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