strongly attached to the framing of the machine so as to secure perfect rigidity. Said bed or surface (not seen in the illustration) is covered with a piece of carpet, held in place by means of clamps or rods. The cloth to be rubbed is held very tense while under operation, by means of a wire friction roller, being passed slowly over this bed, and while there, is subjected to the action of the other part of the machine called the *follower a.*

This *follower* is a frame of iron, the same size as the bed, suspended above the latter by chains *b,* and capable of being raised and lowered by handle *c,* and of resting upon the face of the cloth. The surface of this follower *a,* which is of wood and which comes into contact with the face of the fabric under operation, must be perfectly true. To this face of the follower is securely fastened, by means of clamps *d,* a flat piece of rubber, about half an inch thick. This rubber surface may be either plain or pebbled, coarse or fine, but in any case it must be perfectly parallel with the bed of the machine below, and always perfectly true.

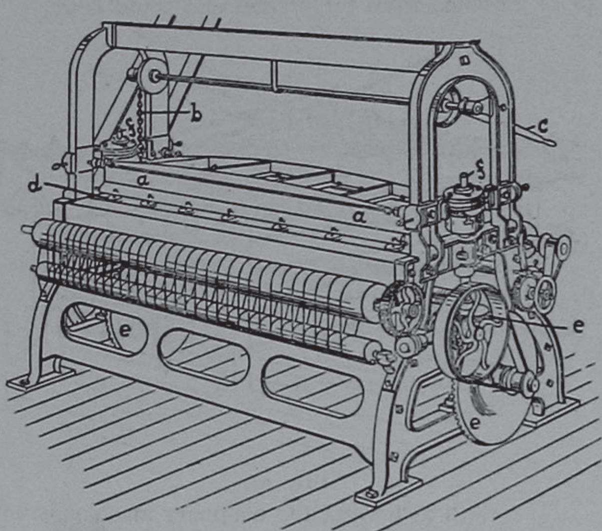


FIG. 65.

From one side frame to the other, of the machine, near the floor, passes a shaft, which carries the main pulleys. This shaft, by means of bevel gears *e,* at each side, operates an upright shaft *f.* On their upper ends, these two upright shafts *f,* are connected to the follower *a,* the operator being able by this mechanism to revolve follower *a* in any direction; in concentric circles of varying width, or to have greater or less sweep, as the finish desired may require. It is the rubbing of the lower surface of this follower upon the nap of the cloth, sheared to its proper length, that twists this nap into spiral nubs, or forms the wavy ridge effect, warp ways, filling ways, or obliquely, as desired.

In connection with the ratiné effect, after giving the fabric a thorough rubbing, put the piece back on the shear again and clip the nub tops slightly, so as to leave them a little flat or rounded. It can now be determined whether the nap is thick enough to produce the required finish. The piece is then passed a second time through the chinchilla machine, giving the follower somewhat less sweep than before, so as to harden the nubs, *i. e.,* impart to them a sufficient compact intermingling, so they will retain their shape for some time.

When chinchilla effects are desired, the follower must be given such a motion as to produce ridges to the face of the fabric, said ridges running either warp ways, filling ways, or in an oblique direction, as the case may require.

Sometimes the piece is run through the chinchilla machine twice, and then sheared and finished up, while in connection with more particular grades, another run may be necessary after this shearing.

After the last run through the chinchilla machine, or the shear, as the case may be, the goods are brushed by hand on back and face, and then, when weighed, measured and rolled, the piece is ready for the market.

With reference to the follower, some finishers hold that the rubber is best when plain, others, when pebbled; again some use plush in place of the rubber covering of the follower. When using a smooth rubber, the surface must receive a periodical cleansing, as it becomes coated with grease and glaze so as to be unfit for use, a feature more often the case when handling piece dyes. Benzene or a mild alkali is best to use for the cleansing of these rubber faced followers, for which reason, when a great amount of work has to be done by the machine, a duplicate follower for the machine is required. About 500 *r. p. m.* is a good average speed for the follower.

While awaiting shipment, at the mill, or in the commission house or at the stock room of the clothing house, ratinés, chinchillas or all similar pile fabrics, must be stood on end, not packed in cases or stored away on the flat of the roll.

(To be continued.)

Making Durable Solutions of Peroxid of Hydrogen.

Organic products of the class of tannic acid, as well as the pyro-gallic and gallic acid, possess the property to absorb, especially in the presence of alkalies, large quantities of oxygen. On the strength of this fact, J. Arndts, a German chemist, lately ascertained, and in turn patented the fact, that said products are also capable to act against the tendency, of the peroxid of hydrogen, to separate oxygen. By experiments he learned that already by a very small addition of tannic acid, or also of pyro-gallic or gallic acid, to solutions of peroxid of hydrogen, the decomposition of the peroxid of hydrogen is considerably reduced.

The following example is quoted by him in the interest of the Bleacher:

A peroxid of hydrogen of 3 per cent to which very small quantities of tannic acid were added in a proportion of 1000 : 1, did not show any decomposition after six months.

The amount of the preservative agent to be added depends, of course, on the purity of the peroxid of hydrogen and on the temperature and intensity of light to which the peroxid of hydrogen is exposed.

SILK FINISHING.

(Continued from page 11.)

Cylindering or Ironing.

This is another finishing process given to silk goods. In connection with it, they are passed, under strong tension, over or partly around a heated cylinder, which may be kept stationary, or made to revolve with or against the run of the goods. Arrangements are also provided so that live steam may be blown upon the goods before they reach the cylinder. Some fabrics may require only a cold cylindering.

Tuilé is the name given to another style of calendering machine, and which is used in connection with the finishing of silk fabrics, the same somewhat resembling the rotary press. The steam heated cylinder (of about 18" diameter), is covered with a well fitting, seamless, woolen jacket, and works close onto a half cylinderical trough, which also may be heated, the cloth to be ironed passing between the woolen jacket and the close fitting, highly polished trough. The cylinder travels with the run of the goods, the machine being also provided with suitable let-off and take-up devices, for conveniently handling the fabric under operation. Pressure of cylinder against trough and the heating of both, are under perfect control of the operator.

In connection with calendering and cylindering machines, we find frequently used a device known as

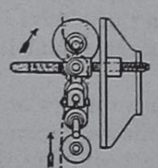


FIG. 16

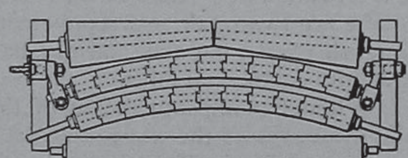


FIG. 17

a *Cloth Expander,* placed at the feeding end of the machine, which device takes out any wrinkles, by stretching the fabric under operation to its full width. The device in turn is secured to a suitable frame, which is pivoted in the middle, and when the cloth runs a little to one side, it then causes the device to tilt, bringing the cloth back to the middle, and causing it to run always in its proper path, *i. e.,* in a straight line into and through the machine where applied to. Figs. 16 and 17 show such a cloth expander, the former showing an end view, the latter a plan view of it.

Singeing.

Fabrics presenting a hairy surface, require singeing. The cause of this hairiness may be due to the inferior character of the silk used; to its nature, as with Canton silks; or to certain spun silks used in singles.

Goods used for piece dye or printing, as with foulards, are often well singed face and back in the grey, it being sometimes necessary to singe these materials a second time. Skein dyed goods are singed on one or both sides, as found necessary, in which instance, the singeing process usually precedes the others. Half-silks, also known as silk mixtures, as a rule, require singeing; silk and cotton mixtures being in turn singed, boiled-off and dyed, whereas silk and wool mixtures are singed, crabbed and then boiled-off.

The object of singeing is to clear the face, or the face and back of the fabric, as required, from any

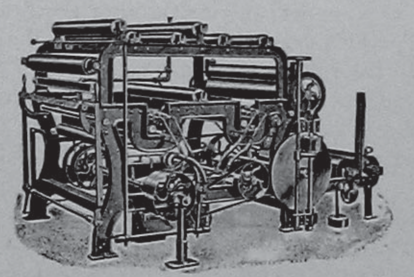


FIG. 18

fibres protruding from its surface, bringing the latter in contact with gas flames, which give the cloth the desired smooth appearance.

Fig. 18 shows a 2-burner singeing machine, as built by the Curtis & Marble Machine Co., in its perspective view, Fig. 19 being a sectional view of it, showing the passage of the cloth through the machine. When singeing only one side, the goods have four contacts with the flames, whilst when singeing both sides they have two contacts on each side at each passage through the machine. The burners are made by a long narrow slit at the top of a flat, hollow, triangular shaped box or plate extending the whole width of the machine, giving a solid and uniform sheet of flame from selvage to selvage; there being brass slides which go over the ends of the burners to shorten the flame when singeing narrow goods.

The burners are so arranged that air under pressure is mixed with the gas just before combustion; and, by varying the quantity of air and gas admitted to the burners, various degrees of heat can be obtained.

When both face and back of the goods are to be singed, the goods, on entering the machine, pass over tension and spreader bars in front, to straighten them out. They then pass over friction roller *A,* where

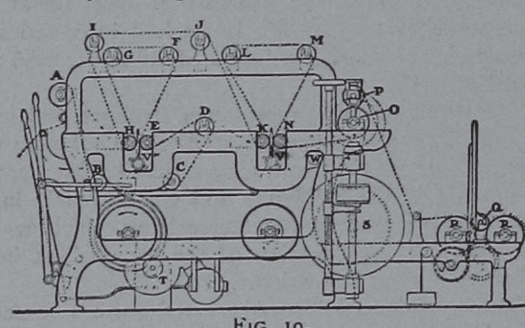


FIG. 19.

they receive the desired amount of tension; thence in sequence around rollers *B, C* and *D,* to the burner roller *E,* where they are first acted upon by the flame *V"*; thence they pass upward around rollers *F* and *G,* and thence down to burner roller *H,* where they are acted upon the second time by flame *V"*; they then pass upward around rollers *I* and *J;* and down to burner roller *K*, where they are singed on the opposite side by the flame *V*; thence to rollers *L* and *M*, and down to burner roller *N*, where they receive a second singeing from flame *V*. They then pass over the steamer *W*, where a vapor of steam may be applied to put out any sparks; thence through the draft rollers *O* and *P*, which draw the goods through the machine; thence to the rolling-up attachment, where the goods are wound on roller *Q*, which rests on two winding drums *R*. The speed of the draft rollers *O* and *P*, is regulated by means of the differential friction plate *S*.

A supply of air, to mingle with the gas to give complete combustion and as intense and hot a flame as possible, is supplied by the fan blower *T*.

When only one side of the cloth is to be singed, the goods pass from the friction roller *A*, directly to the first burner roller *H*, where they are singed by the flame *V″*; thence over rollers *G* and *F* to the second burner roller *E*, where they are again singed by the flame *V″*; thence over roller *D* to burner roller *K*, and around rollers *L*, *M* and *N*, the same as referred to before, the rollers *B*, *C*, *I* and *J* not being used when only one side of the goods is being singed.

Singeing requires good judgment on the part of the operator, too close a singeing being apt to make the small burned ends of the fibres show, a defect not easily gotten rid of. The colors are also apt to suffer by singeing; in fact singeing is best considered as a necessary evil to be avoided whenever possible.

(To be continued.)

Automatic Mercerizing Machine.

For Skein-Yarn.

The Mercerizing process dates back to the year 1850, when John Mercer, a prominent Calico Printer of Lancashire, England (born Feb. 21st, 1791, at Great Harwood, near Blackburn), obtained a patent for his invention of treating cotton with caustic soda. According to the terms of the patent, the fibre submitted to the action of caustic soda of 38 deg. Bé at the temperature of 60 deg. F., is washed in a series of tanks, passes through a solution of sulphuric acid and is washed again.

The result of this process is a stronger and more resistant fibre, and a greater affinity for coloring materials. This was the exclusive object of Mercer; he did not obtain the brilliancy and characteristic lustre of the modern processes of mercerizing which are accomplished through tension of the yarn whilst being subject to the caustification.

The invention of Mercer created quite a sensation those days, but, unfortunately, the considerable shrinking of the material was a drawback to the development of this industry.

In 1896, two French Dyers, Messrs. Thomas & Prevost, established in Crefeld, while experimenting on some half silk and cotton goods which they desired to piece dye, found that the cotton did not take the dye with the same intensity as the silk, and to help themselves over the trouble, they concluded to mercerize the fabrics, and when, to prevent the loss in the cotton by shrinkage, put it through the concentrated solution of caustic soda in a strongly stretched condition. This experiment was a perfect success. They not only found that they had achieved all they desired, but to their astonishment, also that the cotton had assumed a lustre equal to that of silk. They developed this discovery into a process to produce the silk lustre upon cotton now known as mercerized cotton, silkoline, sub-silk, silk-lustre, etc., *i. e.*, the process known at present as mercerizing was thus invented and in turn patented by them.

Since that time a great many patents for improvements and machines have been issued, and incessant efforts have been made to reduce the cost of the process and to increase its fine effect upon the yarn.

There are machines for mercerizing cotton in the loose state, in the skein, in the warp, and in the piece. The opinions about the serviceableness of the different methods vary decidedly.

Mercerizing in loose state is practically unknown in this country, but the other three systems are used extensively.

The fact that there is not one single warp-mercerizing machine in operation on the European continent contradicts the erroneous opinion of some American manufacturers that it is impossible to obtain an even mercerization on the Skein-Mercerizing machine. There are two or three warp-mercerizing machines in English plants, but this machine has never found its way into continental mills.

Without going into details of the advantages and disadvantages of the warp- and the skein-mercerizing machine, it is significant that from the beginning of mercerizing, the skein machine has been used, and 90 per cent of all patents relate to the improving and perfecting of the skein machine. The latest and most successful of these machines, uniting the best features of the various systems, is:

The Automatic Mercerizing Machine for Skein Yarn, System St. Georgen, patented 1899, and built by the St. Georgen Machine Works, St. Georgen, near St. Gall, Switzerland. It is extensively used in all European countries where mercerizing is done, and is known under different names, such as the Dolder, the Suskind, the Swiss, or the St. Georgen machine.

The model 1910, performing automatically a series of operations in a continuous process, solves the problem of practical and economical Skein Mercerizing.

Six pairs of rollers are set around a central shaft. One roller of each pair has a smooth surface. These smooth rollers are driven by a chain, while the other rollers are corrugated and driven by the skeins of yarn. The corrugated rollers are connected with an adjustable tension lever to regulate the tension for skeins of different length. The machine makes one-sixth revolution each minute, and the six pairs of rollers perform their work. While one pair of rollers is being stripped and loaded, the other five are in different stages of the mercerizing process.

The operations are as follows:

1. The rollers in front of the machine where the attendant stands are loaded. They are close together, to facilitate the placing of the hanks (see *a*).

2. The rollers gradually expand, start to revolve, and the yarn is immersed in the mercerizing liquor (see *b*).

3. The rollers move forward and the skeins continue to revolve in the mercerizing liquor, but the other roller is immersed in the bath (see *c*).

4. The surplus liquor is squeezed out from the yarn *d*, by means of rubber rollers *d'* and flows back into the tank *T*.

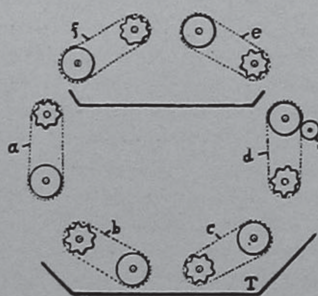


Diagram of Operations.

5. The yarn is washed and rinsed in warm water (see *e*). After the first revolution of the skein, the rich waters, containing most of the mercerizing liquor, are collected and go to the storage tank. The pipe closes automatically, and the rest of the waste water flows into the drain.

6. The yarn is washed and rinsed in cold water (see position of hanks indicated by letter of reference *f*).

7. The yarn is taken off the rollers and new material is put on.

Every time the main shaft rotates, a system of cams and levers operates the various movements of closing the hot- and cold-water pipes, and as soon as the rollers have arrived in their position every part starts to work again automatically.

During these various operations one of the most important parts of the mercerizing process, the variable tension, a feature of highest importance, and not found in any other mercerizing machine, is carried out. The tension adapts itself to the physical properties of the yarn whilst undergoing the various operations. The six pairs of rollers arranged around a cam of the main shaft have to follow the curve of this cam, so that the tension of the skein increases gradually to counteract shrinking proportionately.

An uneven mercerizing may partly be traced to the wrong principle in the construction of the tension arrangement on existing skein-mercerizing machines.

Each pair of rollers is loaded with two pounds of yarn, which is the production per minute. In coarse sizes somewhat less than 2 pounds, and in fine sizes over 2 pounds, are placed on the roller. The daily average output in 10 hours is about 1200 pounds. All the main parts are made of steel, and the rollers are running in ball bearings. The workmanship is of the very best, and no machine is sent out without having been tested in every way. The machine requires about 4 H. P., and occupies floor space 10 feet 5 inches by 7 feet 6 inches, and is 7 feet 6 inches high. The weight is 20,000 pounds.

Its principal advantages are:

1. Thorough impregnation and thorough washing.

2. Lowest consumption of caustic lye, continuous circulation of the liquor, uniform strength and temperature. Separation of the rich and the poor washing waters.

3. Perfect automatic work, considerable saving of labor, requiring one man.

4. Correct and automatic tension application in the various operations.

5. Reliable, economical working and A[1] construction.

Supplementary Treatments to Mercerizing.

After Treatments.

The alkaline solutions are very adherent, and the best washing arrangement cannot remove all traces of alkali. The soda, therefore, is neutralized in a warm bath containing sulphuric acid, and is washed again in warm and in cold water. It has not proven practical to do the neutralizing or souring on the machine, although it has been done, but is not advisable.

There are various methods of obtaining a *crackling* effect with organic acids, such as lactic, acetic or tartaric acids.

To obtain a soft touch, a solution of boric acid or a simple bath of soap is employed.

For embroidery cottons the hydraulic lustering machine is employed, where the cotton is exposed to considerable heat and tension, which produces a high silky lustre, that is not permanent, however.

Preliminary Treatments.

The most widely known is the "Merceranine" treatment, a process that has been thus far somewhat misunderstood here, whereas in English and Continental mills, the process is applied very successfully, and large prices have been paid, the use of the process being only sold on the base of a license or royalty. As the process is not applicable to every grade and quality of yarn, an experienced chemist is required to demonstrate this treatment, a feature never done in this country. The process, if applied correctly, we are informed, is of value in preparing the cotton fibre for a more uniform reception of the caustic soda; all impurities, greases and resinous matter being removed. It replaces the boiling-out of the cotton, facilitates to obtain even shades in dyeing, and it is claimed, softens the yarn.

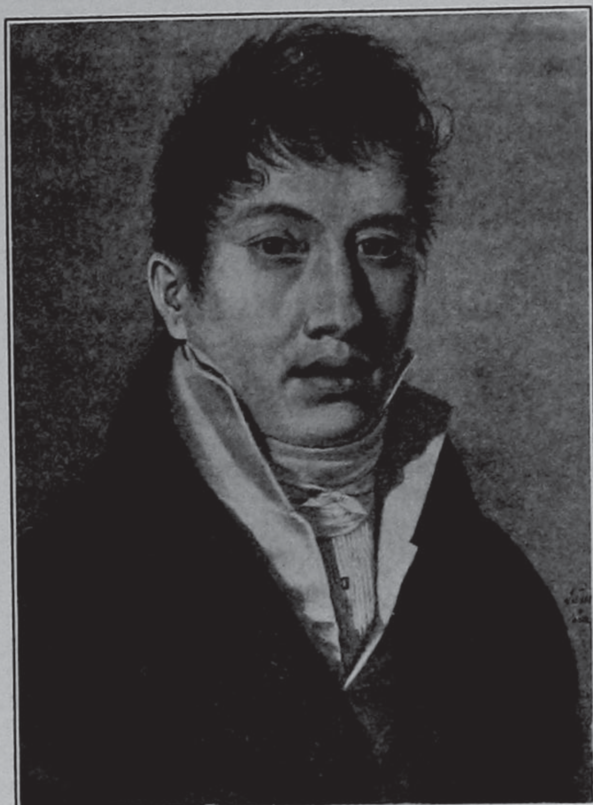
The American Representative for the St. Georgen Machine Works is Mr. A. W. Buhlmann, Textile Engineer, 487 Broadway, New York.

According to the import record of the United States for 1909, just completed by the Bureau of Statistics of the Department of Commerce and Labor, wool imports were more than doubled in value compared with those of 1908, they having been $55\frac{1}{2}$ million dollars in the past year as compared with $23\frac{1}{2}$ million dollars in 1908.

PHILADELPHIA — THE TEXTILE CITY OF THE WORLD.

The History of the Silk Industry in America.

The Wm. H. Horstmann Co., Inc., has the unique distinction of having been the first Silk Manufactur-



Wm. H. Horstmann.

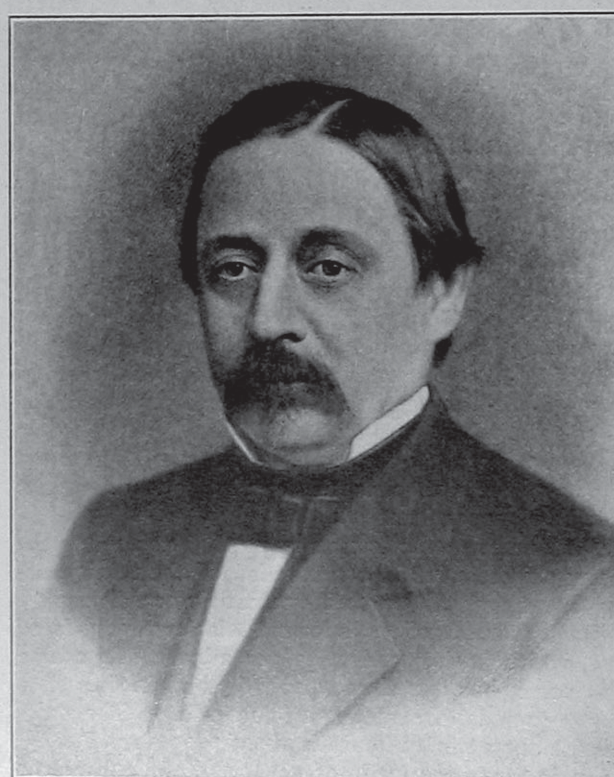
ing Plant established in America, the management of the firm having rested with one family for a century.

Not only carrying the distinction of the first silk mill of note established in America, as well as being one of the largest silk manufacturing houses in the United States, it is interesting to mention that it was the founder of this concern, Mr. Wm. H. Horstmann, who in 1824 introduced the first Jacquard loom here, his son, Wm. J., in turn designing and building the first power loom for weaving narrow ware fabrics in this country, simultaneously with its adoption in Switzerland.

The founding of this extensive concern dates back to May 1, 1816, when William Henry Horstmann, a native of Hessen Cassel, Germany, landed in this country. He settled in Philadelphia and commenced the business of passamenterie. He had learned the art in Germany, traveling from place to place and working at the trade as the regulations then in vogue in that country required. After completing his apprenticeship and attaining his majority, Mr. Horstmann visited nearly every European country and in this way became proficient in every branch of the manufacture of passamenterie.

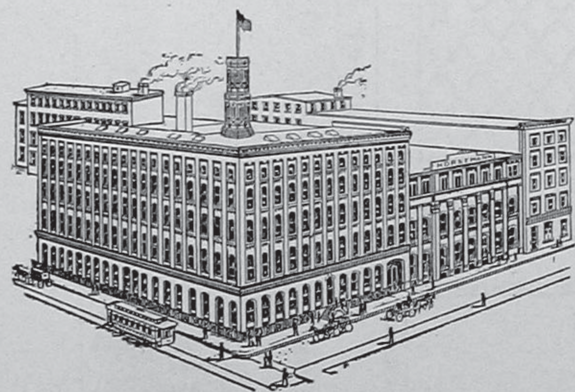
When the late William Henry Horstmann began business in 1816, he then occupied rather small quarters at 55 N. Third Street, but intelligent and well applied effort, supplemented by the foundation traits of firmness, thrift and industry, soon brought deserved reward. Each year witnessed a substantial increase in the volume of business, and while they were yet comparatively young men, the enterprising proprietor admitted his older sons William J. Horstmann and Sigmund H. Horstmann, to an interest in the concern. In 1840 the firm style was changed to Wm. H. Horstmann & Sons, and five years later the senior Horstmann retired from an active interest in the business.

In 1852, owing to the steadily increasing requirements of the trade generally, it became necessary to remove the mills and sales rooms to greatly enlarged new quarters at the present location at Fifth and Cherry Streets, where the nucleus of the present extensive plant was established in newly erected buildings. Since that time it has been necessary to make frequent additions, until the plant now covers several acres of floor space and affords employment to an average force of 600 operatives. The death of Sigmund H. Horstmann in 1870 was followed two years later by that of his brother, William J. Horstmann; and in the interval between 1872 and 1893, when the enterprise was incorporated as the William H. Horstmann Company, the business was conducted under the active management of F. Oden Horstmann and Walter Horstmann, sons of William J. Horstmann. The former died in 1894, while Walter Horstmann has been president of the Company practically the entire period since its incorporation in 1893.



Wm. J. Horstmann.

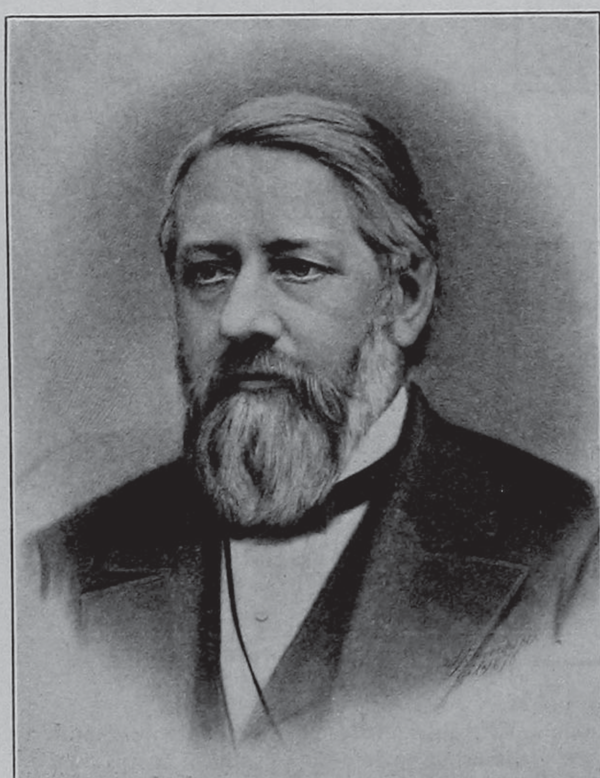
It is an unusual record in the commercial world to find an enterprise continuing under the active management of members of the same family for nearly a century, and it is perhaps just as remarkable to find its present affairs being directed by men whose average term of service is nearly forty years. Mr. Walter Horstmann, the president of the Company, can point to a connection with the house covering more than



Plant—Fifth & Cherry Sts.

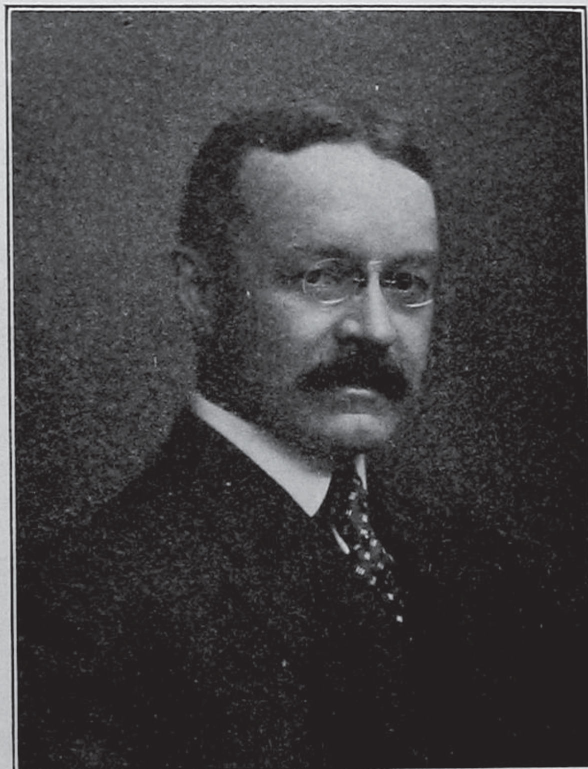
thirty years; Mr. Samuel Eckert, the vice-president, has had a connection of even greater length; Mr. Henry Freund, the treasurer, has a half-century of continuous service to his credit, while Mr. H. McManus, the genial secretary of the concern, became connected with the enterprise some thirty-five years ago.

As to the business of the Wm. H. Horstmann



Sigmund H. Horstmann.

Company, little needs to be said, as the enterprise is too widely and favorably known to require any introduction in this connection. In addition to the mills and main offices at Fifth and Cherry Streets, Phila-



Walter Horstmann.

delphia, branches are also located in New York, Boston, Baltimore, San Francisco and Detroit. European offices are maintained in Paris, London, Berlin, Vienna and Lyons.

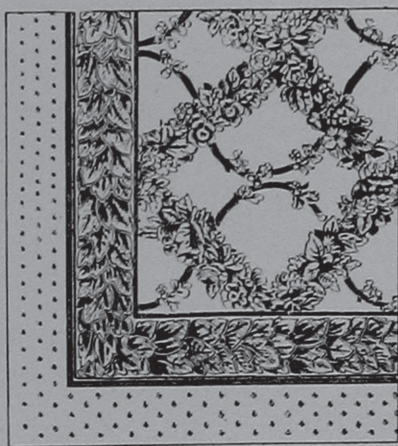
Among the class of goods manufactured by the concern are military equipments, society goods and regalias, flags, banners, theatrical goods, narrow textile fabrics, knitting yarns, fancy goods, small wares, upholstery goods, carriage cloths, laces, etc. That the facilities controlled by this concern are not surpassed in this country, is shown by an incident, that at the outbreak of the late Spanish War, it was to the credit of Philadelphia to be the only city in the United States able to meet the requirements of the Government for equipping the troops put in the field with National and Regimental Colors. Proposals had been widely invited, but when the time came for opening the bids in New York City, there was only one had been presented, that of the William H. Horstmann Co., Inc., of Philadelphia.

The wool and woolen schedules of the new tariff were given the approval in the main of the National Association of Wool Manufacturers at its forty-fifth annual meeting in Boston, Feb. 2.

Officers were elected as follows: President, William Whitman, Boston; vice-presidents, Charles H. Harding, Philadelphia; William M. Wood, Boston; Frederic S. Clark, North Billerica, Mass.; secretary and treasurer, Winthrop L. Marvin.

NEW DESIGNS FOR CARPETS.

The accompanying nine new designs for Carpets have just been patented by William Murray Morton, of Hastings Square, Darvel, Ayrshire, Scotland.

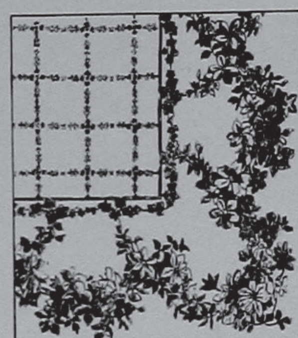


A

B

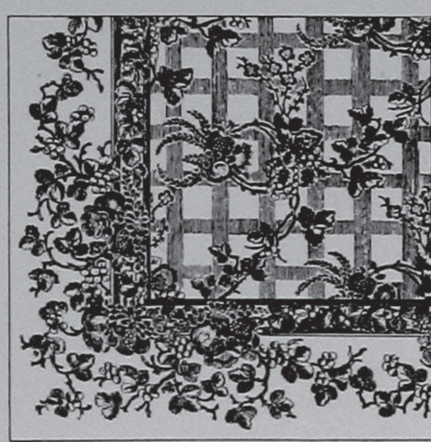
C

D



E

F



G

H

I

Design *A* comprises a filling formed of two large interlacing trellises, a broader trellis formed of peonies and clematis and a smaller or undertone trellis formed of a treatment of the acorn. The border is a broad foliage band with a broad sprig margin.

Design *B* comprises a border, the main feature of which is a treatment of apples and plums with corresponding foliage, and a centre of subdued diagonal trellis formed by a small leaf.

Design *C* comprises a border formed of large bouquets of tulips, roses and convolvulus, and a centre made up of sprigs of the same flowers.

Design *D* comprises a plain centre and a contrasting border formed of large rose clumps.

Design *E* comprises a border formed of graceful clematis festoons, an inner border formed of a delicate ivy trail and a centre of square diaper with blooms at the interlacing.

Design *F* comprises a border formed by a free treatment of hydrangeas and a centre formed of a broad ribbon trellis.

Design *G* comprises a centre formed of a vine and pomegranate trail growing on broad lattice work and a border formed of sprays of vine and pomegranate on a clear ground.

Design *H* comprises a plain centre with a border treatment of broad ribbons interlacing and containing a bouquet of roses where the ribbon forms a bow.

Design *I* comprises a border the main feature of which is a delicate grouping of roses and a centre of rosebuds and leaves in the form of a square trellis.

Testing Yarns and Apparatuses for It.

(Continued from page 18.)

Testing the Evenness of Yarns.

An apparatus for this work is shown in Fig. 3, and is another interesting machine introduced by Mr. Suter. In connection with this machine, the thread is

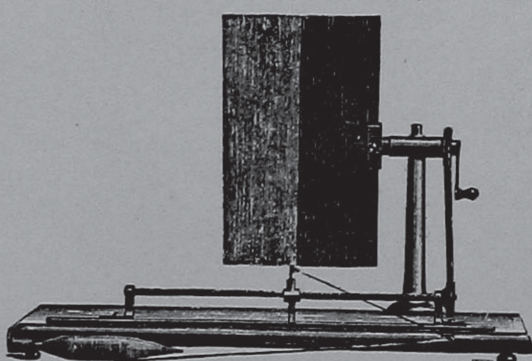


Fig. 3.

wound on a black or white velvet covered board, the color of the board depending on the color of the thread, *i. e.*, the greatest possible contrast between the color of the thread and that of the board must be present.

The thread guides, which travel on a screw turned by a band from the hand wheel, lay the yarn regularly on the surface of the board with a small space between the threads. The perfectly even distribution of the yarn enables any irregularities, such as knots or weak places, to be readily observed; also as the yarn from two cops or bobbins may be wound simultaneously, the external appearance of one yarn can be compared with that of another. The board, which may be of wood or card, is simply held in position on one side by a clip and thumb-screw, and when covered, may be taken out and another put in its place, while the bracket carrying the thread guides can be raised up and moved back to the starting point.

The boards, when removed, are then taken to the light, where the general run of the thread can be judged to a nicety.

In another type of thread controller, the thread is wound on a reel.

Testing for Twist.

The twist or number of turns per inch in a thread has an important influence in determining the strength and stretch, also the *covering* capacity of the cloth woven from the yarn under consideration, since a thread which is hard twisted can stand a greater strain, though not necessarily stretch more than a softer twisted thread. Threads which are perfectly alike in quality and counts, but varying in twist, may produce cloths quite dissimilar when finished. Therefore, when desiring to produce a yarn similar in character to another yarn, or a cloth identical to another, the average number of turns per inch must be found.

Fig. 4 shows us the new twist measurer as built by Henry Baer & Company.

The test is performed on the machine referred to, by placing any given length of thread between the jaws, and taking out the twist by revolving a hand wheel which causes one of the jaws to rotate. A pointer on a dial indicates the number of turns which are taken out, from which the number per inch is calculated according to the length of the yarn under test. The same tension weight is placed on each thread, so that accurate comparison can be made.

When a folded yarn is being tested, by inserting a needle between the threads close up to the fixed jaw and sliding it along as the threads are untwisted, the operator can easily determine when the thread is free from twist. When the thread is single, however, this process cannot be adopted; but by examining the thread through a magnifying glass which is provided with the machine, the point at which the thread is free from twist can be accurately determined.

When threads are twisted together in the production of folded yarns, a certain amount of take-up or contraction takes place, which has a material influence in determining the resulting length or counts of the yarn, and also its cost. The amount of take-up of each thread varies according to the number of turns per inch, and also according to the bending of the individual threads. Thus, if the diameters of the

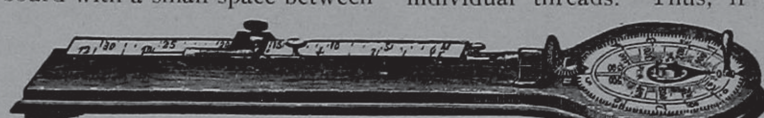


Fig. 4.

threads are unequal, or one thread is softer than another, the bending power of the threads will be unequal, and different lengths of each yarn will be required.

By means of Baer's machine, the amount of take-up of each thread can be readily found, as one of the jaws, between which the threads are suspended, is so arranged that a separate tension can be placed on each thread, and any required number of turns per inch be inserted by revolving the hand wheel. The scale of the machine will show first the length of the shorter minor thread, provided they are of unequal length; notice being made of this, after which said shorter minor thread is cut out, and the length of the longer one then recorded in the same way.

Conditioning.

The proper amount of moisture in a yarn is a most important item to a manufacturer; it means the success of the mill, many of which have been driven to the wall by not paying proper attention with reference to the moisture in the yarn bought.

The subject will best be explained by quoting the definition for *Conditioning* given in "The Dictionary of Technical Terms Relating to the Textile Industry," as published regularly in every issue of Posselt's Textile Journal (see pages 317 and 318 of the May, 1908, issue).

All textile fibres contain moisture in their normal condition. Since this amount of moisture present can be increased, with a consequent loss to the buyer, up to twice its normal percentage, in 1875 an international congress met at Turin, Italy, and when the following allowances or reprises were adopted as the normal amount of moisture allowable in the various textile fibres: Silk 11 per cent, Wool-carded 17 per cent, Wool-combed $18\frac{1}{4}$ per cent, Cotton $8\frac{1}{2}$ per cent, Flax 12 per cent, Hemp 12 per cent, Tow $12\frac{1}{2}$ per cent, Jute $13\frac{3}{4}$ per cent of the absolute dry weight of the fibres. To-day every prominent textile centre in Europe has a conditioning establishment, the decision of which is final in law.

The skeins of yarn, after having been reeled, measured and weighed, at first together and then separately, are for the purpose of conditioning, then dried in ovens and when perfectly dry, a certain amount of water is added to the yarn equal to the permissible percentage (normal amount) of moisture, for each fibre previously referred to. The count of the yarn thus treated is termed its conditioned count.

In order to guide mills, the Henry Baer Company has built a Conditioning Oven, specially adopted for mill purposes, *i. e.,* a conditioning oven for one pound of material. The apparatus is equipped with a highly sensitive balance, with or without glass case as desired, the oven being supplied with natural warm air draft. Alcohol, gas, steam or electricity may be used for heating. Another conditioning oven has artificial warm air draft supplied by a small fan.

Machines and instruments thus referred to are built in several sizes and types to meet all possible needs.

Mr. Suter also carries complete lines of foreign textile machinery and will gladly give information to all interested parties, who will address him at Room 510 Silk Exchange Building, New York.

A New Silk Reel.

The same is shown in the accompanying illustrations; in Fig. 1 in its front view, and in Fig. 2 in its side view.

A description of the construction of the reel is best given by quoting letters of reference accompanying the illustrations, and of which *a* indicates the hub of the reel, provided with pivots *b*. Upon the front sides of the hub *a* are screwed metal clamping-disks *f* provided with grooves *c* into which are placed metal reel-flights *d,* which are flattened on the side facing the hub of the reel, in order that the same cannot be turned. These reel-flights *d* are provided at their upper end with several undulations, to retain cords *e* which carry the yarn

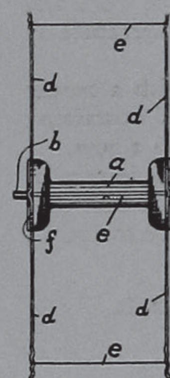


Fig. 1

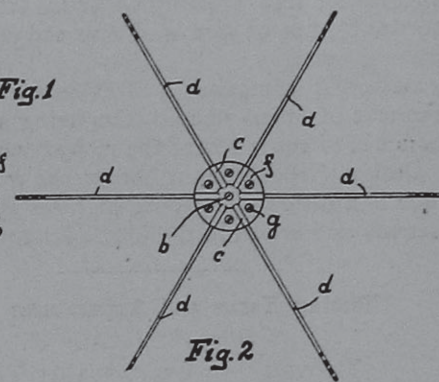


Fig. 2

in the process of winding. At the lower end they are flattened a little on the side facing the hub of the reel, so that the same cannot turn. To prevent the single flights from falling out and to keep them in the right position, wooden screws *g* are firmly tightened.

Advantages.

By this arrangement the surface on the reel, on which the yarn rests, is made much broader, because the flights extend beyond the hub. The reel-flights being formed of thin metal bars, the whole reel thus becomes very elastic and the yarn can be easily placed on it and wound off without any trouble, even if slightly entangled, without straining the yarn very much or breaking it. This feature makes these reels very valuable for reeling silk and fine cotton threads. The reel being very light, it can be easily taken to pieces and by inserting other reel-flights, adapted to be transformed at once into reels for holding either larger or smaller skeins.

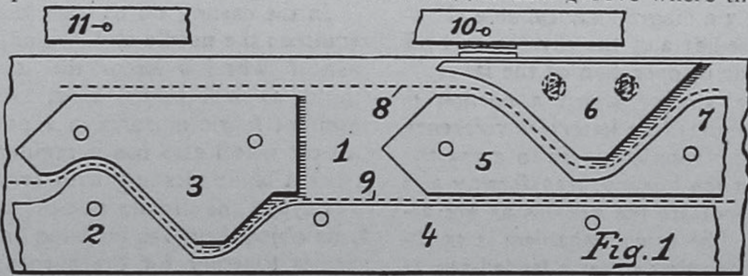
KNITTING WELSBACH MANTLES.

(Continued from page 131, Vol. V, No. 5.)

Mantle Knitting Machine for Lattice Stitch.

This machine produces what is known as the lattice stitch, which is considerably tighter and more substantial than the floating thread stitch, explained in the November issue, and in turn will produce a higher priced mantle. The stitch is made by using two sets of needles on the cylinder and a sufficiently high yarn carrier ring to protect the latches from closing, said ring having two separate yarn carrier eyes, and also two cam grooves, one situated over the other on the cam cylinder. The needles of one set are placed alternately with the other set in the needle cylinder. Each set of needles knits the plain stitch, using its respective yarn, and the small float between two needles of one set is stitched in on the inside or back of the intervening stitch of the other set, and vice versa the float from the intervening set is stitched in on the inside of the needles of the first set, thus producing a web somewhat resembling a lattice and hence the name, *lattice* stitch. The method of making the stitch on the machine is best shown by means of the accompanying illustration Fig. 1 which is a development of the working portion of the cam cylinder, showing also the relative positions of the yarn carrier eyes, while Fig. 2 is a diagram of the web produced.

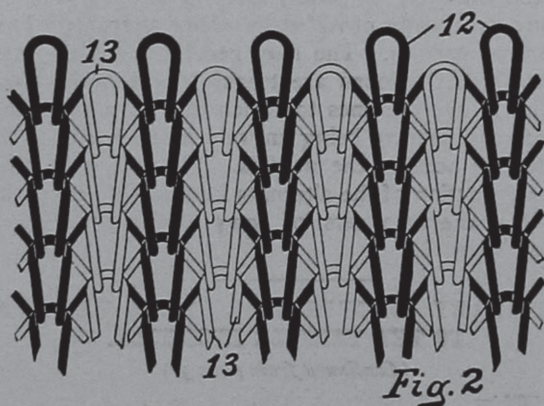
It will be noticed that the cams 5, 6 and 7 for making the stitch by the upper set of needles are placed over the resting cam 4 of the lower cams, and *vice versa,* the cams 2 and 3 are placed under the part of the upper cam groove where the upper needles are at



rest, so that only one set of needles will be working at the same point on the needle cylinder at one time, the two sets of needles thus not interfering with each other. The method of making the stitches by the two cams is similar to the regular plain knit stitch.

Referring to illustration Fig. 1, a portion of the cam cylinder of the machine is indicated by numerals of reference 1, the same carrying the cams 2, 3, 4, 5, 6 and 7 respectively.

Two separate and distinct cam grooves are used for the two sets of needles, the path of the upper set

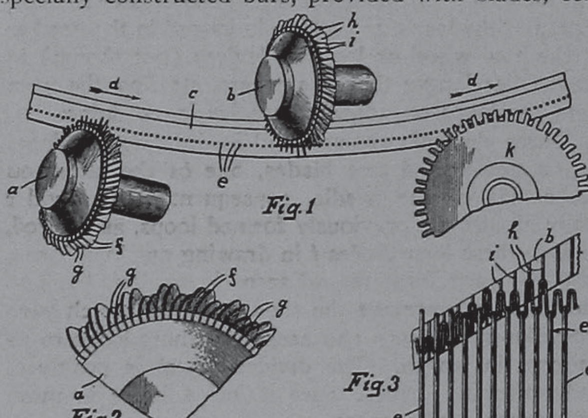


being indicated by a dotted line 8, and the path of the lower set by the dotted line 9. The cam cylinder moves in the direction of the arrow. When the needles of both sets are in a resting position, the hooks of the upper set rest above those of the lower set, and the yarn carrier eye 10 for the upper set is situated above the hooks of the lower set when in their resting position, thus said yarn carrier can deposit yarn in the hooks of the upper needles when they are raised by cam 5, without touching the lower set of needles, and *vice versa,* the yarn carrier eye 11 for the lower set is placed low enough as to only deposit yarn in the hooks of the lower needles as raised by the cam 2, the upper set being sufficiently high, to be out of the path, and by the time their hooks descend to the line of the yarn, the loops on said hooks have closed the latches and the floats are not caught. When the hook of the upper needle is at its lowest point, *i. e.,* casting off, the float of the other thread passes over said hook, owing to its being pulled over by the take-up and consequently rests on the inside of the web, together with the loop just cast off, and in this manner is stitched in on the back. In a similar manner the floats of the thread of the upper needles are pulled back of the hooks of the lower needles and are stitched in on the back of the web.

On examining the diagram Fig. 2, we can readily trace the interlacing of each thread; for instance, take the thread 12, which we will consider as having been knit by the upper set of needles, and it will be seen that it knits after the plain stitch on every other stitch and is caught behind the stitches between them. In the same way, the thread 13 knits plain by the lower set of needles on every other stitch and has its floats caught behind the stitches between them, thus producing the lattice work effect.

Improved Stitch Transfer Mechanisms for Circuclar Spring Needle Knitting Machines.

The object of the new device is to enable this class of knitting machines to produce an open mesh fabric, by providing means whereby long and short loops are produced and transferred to neighboring needles in any desired regular sequence. This feature is accomplished in the new device by means of providing specially constructed burs, provided with blades, cer-



tain of which are made shorter than the others; the long blades are adapted to form stitches or loops longer than those produced by the other blades. At the same time, the arrangement of the spring needles is such as to facilitate the transfer of the loops and prevent dropped stitches in the completed fabric.

Of the accompanying illustrations, Fig. 1 represents a plan view of part of a circular spring needle knitting machine, showing the new burs in operative position. Of the latter, *a* is known as the *divider wheel* and *b* as the *divider cast-off wheel.*

Fig. 2 is a perspective view of a segment of the divider wheel, and Fig. 3 a diagrammatical side elevation of some of the needles and the divider cast-off wheel, showing the mode of operation of the latter.

The needle cylinder, and of which a portion is shown in Fig. 1, is designated by letters of reference *c;* arrows *d* indicating its rotation so as to carry the needles successively past the looping, transferring and cast-off devices. *e, e'* indicate the needles as are attached to the cylinder. The new mechanism is applicable to knitting machines using either a leaded-needle cylinder, or a trick-needle cylinder.

A description of the construction and operation of the new mechanism is best given by quoting letters of reference accompanying the illustrations and of which *a* designates the divider wheel, which operates at the outer side of the needles, and is supported on the usual bur stand. *b* designates the divider cast-off wheel, which operates at the inner side of the needles, being supported on an ordinary grip. Wheels *a* and *b* are located adjacent the cylinder at a point intermediate the usual devices for looping the yarn on the needles (not shown) and the usual landing and cast-off devices (not shown).

The divider wheel *a* is provided with alternate sets of long blades *f* and short blades *g*. The relative number and distance apart of the sets of short and long blades depends upon the pattern to be produced, *i. e.,* the number of long loops to be produced in sequence and the number of intermediate short loops to be produced in sequence between the sets of long loops. In the example of wheels shown in our illustrations, the pattern is supposed to require two long loops and two short loops in each set, hence there are two long blades *f* in each set, and two short blades *g* in each set. The long blade *f* of the divider *a*, draw certain of the loops, as previously looped in the needles by the loop wheel or looping devices (not shown) in the needles longer than the others, stealing the yarn from the loops on adjacent needles in so doing.

Three elements are required in drawing one loop, *viz.,* a needle and two blades, one of the latter on either side of the needle, consequently the divider really divides the previously formed loops, as desired, because these long blades *f* in drawing out long loops, steal the yarn from the adjacent loops; but the two short blades *g* prevent the stealing of too much yarn from the latter loops and cause the short loops to be uniform in length. The divider wheel is positively and uniformly driven, since it has a blade in mesh with every needle space.

Beyond the divider wheel *a*, is the divider cast-off wheel *b*, which is substantially like a regular cast-off bur, except that it has alternate sets of long and short blades *h* and *i* corresponding in arrangement to the blades of the divider-wheel *a*. This divider cast-off wheel *b*, casts the loops off of the heads of the needles and acts much like an ordinary cast-off bur, except that it preserves the long and short loops formed by the divider wheel *a*, that is, the long blades *h* draw and hold the long loops to the proper size in casting them off and the shorter blades *i* draw and hold the small loops to the proper size as is required.

In the casting off of each loop, three elements are required: the needle and two adjacent blades; divider cast-off wheel *b* keeps the long loops uniform in length, as well as the short loops, thus making the resultant fabric uniform in appearance. This divider cast-off wheel also has a regular positive drive since it has a blade meshing with every needle space.

Beyond the divider cast-off is the transfer presser *k*, its object being to hold the heads of two adjoining needles together for the purpose of transferring the stitch from one to the other.

Another important feature of the new mechanism is the peculiar arrangement of the needles. Using the ordinary arrangement of needles of equal length would be the cause for the loop transferred catching against the side of the adjoining needle, thus preventing the transfer, ultimately causing a drop stitch, a feature practically obviated by using alternately long and short needles. The long needles *e* are the ones from which the loops are transferred and the short needles *e'* are the ones to which the loops are transferred; this feature being entirely independent of the method of holding the needles. Fig. 3 clearly illustrates the action of the alternate long and short needles and the alternate sets of long and short cast-off blades *h* and *i*.

DICTIONARY OF TECHNICAL TERMS RELATING TO THE TEXTILE INDUSTRY.

(*Continued from page 31*)

KENNETS:—A coarse Welsh cloth.

KENTISH SHEEP:—A type of sheep known in England as Romney Marsh, being raised in south-eastern England, in the extensive marshes of the County of Kent, and is the product of the crossing of the original native breed of

KENTISH SHEEP.

that district with the (new) Leicester breed. The weight of the fleece is from 7 to 10 lbs. In Holland these sheep are known as the race of the Polders.

KENTUCKY JEAN:—A cheap, but durable fabric made of cotton warp and wool filling; formerly made in color resembling Cadet and Oxford mixtures, but now made in various shades.

KENTUCKY SHEEP:—A good American breed, known as the Improved Kentucky sheep, was begun 70 years ago by crossing the common native sheep of that locality with Merino, South down, Leicester, Cotswold, and Oxford down rams.

KERCHIEF:—A square or oblong piece of linen, silk, or other material, worn folded, tied, pinned or otherwise fastened about the head or neck; also a handkerchief or a napkin.

KERF:—The material (flocks) shorn off with one cut of a cloth-shearing machine.

KERMES:—A dyestuff of great antiquity, being used by the Hebrews, and mentioned by Moses, their earliest writer. It seems probable that the Hebrew word several times translated *scarlet* in the Old Testament was used to designate the blood-red color produced by kermes with alum mordant. This was one of the three colors prescribed to be used for the curtains of the Tabernacle and for coloring the holy garments of Aaron. The term *granum*, which was given to kermes by Pliny, probably on account of its resemblance to a grain or berry, was adopted by more recent writers, and is the origin of the term ingrain color, which is still in use. Our words vermillion and crimson are also derived, respectively, from the old Italian words, *vermiculus* and *cremesimo*, the former of which signifies the kermes insect, and the latter being probably a corruption of the original Arabic *kermes* or *kremes*. Coming to later times, we find kermes in general use as a dyestuff in Europe as early as the tenth century. In Germany, from the ninth to the fourteenth century, the serfs were bound to deliver to the convents every year a certain quantity of kermes amongst other products of husbandry. It was collected from the oak trees on St. John's Day, between the hours of eleven and noon, with religious ceremony, and on this account it received the name of *Johannisblut* (St. John's blood). At that time a great deal of German kermes was sent to Venice to produce the *scarlet* to which that city gave its name. About the year 1550, cochineal was introduced into Europe, and since it is far richer in coloring matter than kermes, it gradually superseded the older dyestuff, which has not been used to any extent for at least one hundred years. It is, however, still employed in some countries to which it is indigenous, *i. e.*, Italy, Turkey, and Morocco. Kermes is derived from the insect *Coccus ilicis*, which is found principally upon the *Quercus coccifera* or Ilex oak. The dyestuff is obtained in a similar manner to cochineal, and is also of similar appearance, but it contains only about one-tenth as much coloring matter, which is probably identical in chemical composition with that of cochineal. One peculiarity of kermes is that it possesses a pleasant aromatic smell, which it also imparts to cloth dyed with it. It is employed in exactly the same way as cochineal, and it has been frequently stated that it produces more permanent colors than that dyestuff, but there does not appear to be any foundation for this assertion.

KERSEY:—A compact woolen fabric, fulled so as to completely conceal the warp and filling, the face being finished with a short, extremely fine nap, and highly lustrous.
A light weight beaver (from 22 to 24 oz. in weight) having a smooth face with a soft nap, and made in all qualities, from the coarsest to the finest, used for fall overcoatings, cloakings, etc.

KERSEYMERE:—Another name for Kersey, derived from the location of the factory where it was originally manufactured; the factory stood on a mere or brook running through the village of Kersey, England.

KHAIR-TREE:—A hard wood tree, chiefly found in India and Southern Asia (*Acacia Catechu*), the wood, twigs, leaves and fruit of which, by boiling and evaporation, yield the commercial catechu.

KHAKI:—A light drab, clay-colored cloth, formerly used for the uniforms of some East Indian troops; now used by modern armies, both here and abroad.
A brown or salmon colored, coarse muslin, made in India, and used for making loose jackets for men, and wraps for women.

KHIRKAH:—A garment made of patches, etc., worn in Mohammedan countries by derwishes and other religious enthusiasts.

KIDDERMINSTER:—See ingrain carpet.

KIDNEY COTTON:—Also called G. Braziliense, belongs to the species of *Gossypium Peruvianum*, being cotton grown in Brazil and Peru.
The name given to this cotton because of the peculiar manner in which the seeds are arranged in the capsule, adhering together in each cell in the form of a kidney.

KIESERITE:—A by-product prepared during the process of refining the salts of potassium found at Stassfurt in Germany. It is made into large cubical blocks of a loose, friable nature, having a grey color. It consists principally of sulphate of magnesia, but it also contains sulphate of calcium, salt, potassium chloride, and silica. It is sold as containing 46 per cent of magnesium sulphate. Kieserite is used as a material for making Epsom salts or as it is, for finishes. In this case, unless care be taken to allow the insoluble dirt and grit to settle after boiling up, it is apt to dirty the clothes. Finishers prefer, therefore, to use the cleaner Epsom salts.

KILKENNY:—A mantle resembling a wrapper, for ladies' wear.

KILT:—The skirt of the Scotch Highlander; originally the part of the plaid falling below the belt, but now a plaited skirt.
A skirt made to resemble a Highlander's kilt.

KIMONO:—A loose robe, fastening with a sash, the principal garment of a Japanese lady's wardrobe.

KINCOB:—A rich, East-Indian silk, or silk and cotton mixed goods, interwoven with gold or silver thread.

KINDESTAN RUGS:—Serviceable rugs woven by Nomads in West Asia, in colorings of India reds, yellows, blues, etc.

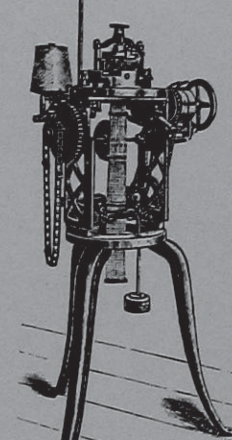
KIRTLE:—A garment, whether short or long, with a skirt; a frock or mantle; variously applied to an upper garment or to an outer petticoat.

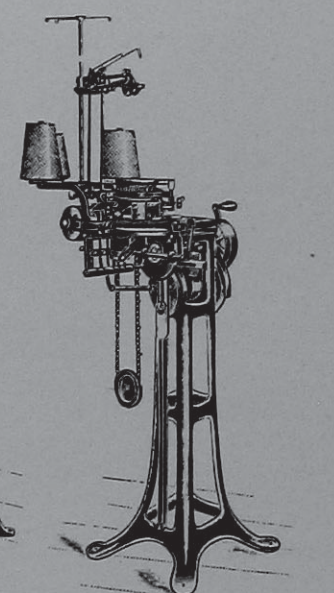
KNABS:—The offal or waste of silk in winding off from the cocoon.

KNEE-BREECHES:—Breeches extending from the waist to a point just below the knee; formerly in common use, but now worn chiefly by boys, or in athletic sports.

KNICKERBOCKERS:—In woolen yarns or fabrics irregular bunches or spots of different colors and materials.

KNITTING:—One of the great divisions of fabric structure, and differing radically in the principle of producing the fabric from that of weaving, being based on the principle


RIB TOP KNITTING MACHINE. (*H. Brinton Company.*)


FULL AUTOMATIC SEAMLESS KNITTING MACHINE. (*H. Brinton Company.*)

of forming a fabric or web by means of a series of interlocking loops, from one or more continuous threads. Different systems of interlocking the loops produce different styles of stitches, each being best suited for certain kinds of fabrics, etc.

KNITTING MACHINE:—Machine used for the process of knitting. There are hand and power, circular and flat machines. Two general types are in use, *viz:* the latch and the spring needle machine.

KNOPS:—Congested or spiral loops formed in fancy yarns.

KNOT:—Eighty yards of woolen or worsted yarn.

KNUB:—See Husk.

KOMPOW:—A strong linen, made in China.

KRIMMER:—The fleece of the Persian lamb as used by furriers.

NEW DESIGNS AND FABRIC STRUCTURES.

Woven and Knit Goods.

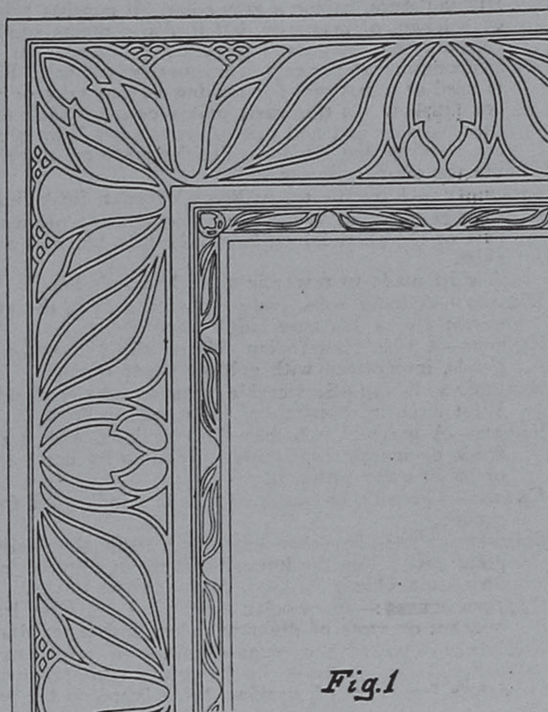


Fig. 1

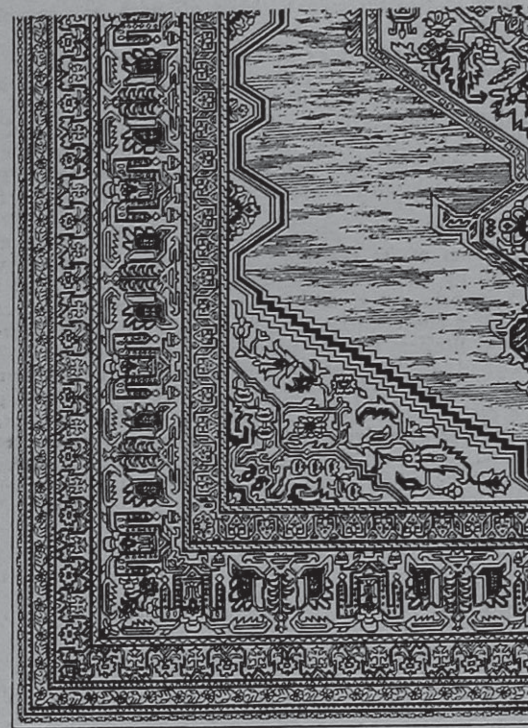


Fig. 2

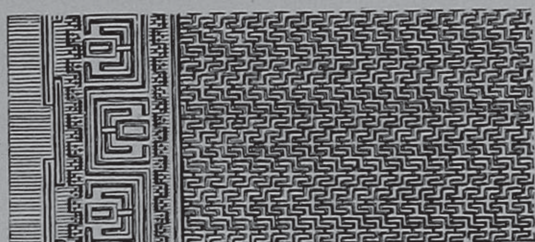


Fig. 3

Fig. 4

Fig. 1 shows an ornamental Design for Rugs, lately patented by the Kilmarnock Textile Manufacturing Co.

Fig. 2 shows an ornamental Design for a Rug, one quarter of the full design being shown in the drawing. The same has been lately patented by The Bigelow Carpet Company.

Fig. 3 shows an ornamental Design for Carpets, also lately patented by the Bigelow Carpet Company.

Fig. 4 illustrates (on an enlarged scale) a new knit goods fabric, the construction of which has been lately patented by the H. Brinton Co., of Philadelphia. It refers to the manufacture of *Fancy Stockings*, whereby open stripes (lace effects) are produced. The result is obtained on a regular circular knitting machine, by providing a thread feed and a series of needles in combination, with means whereby a novel relative action between the needles and the stitches is effected. After the completion of the leg portion of the stocking, the open stripe work is continued to be produced along the top of the foot of the stocking, said open stripes being then automatically omitted from the bottom portion of said stocking, and which is knitted in the regular full fashion. For further details address the H. Brinton Co., Philadelphia.

Lacquering and Lustring Machine: The object of this machine is to put onto the fabric the highest possible lustre without imparting any harshness in touch.

The cloth in entering this machine passes partly around a moistening roller, and in a damp condition over (with its face against) three highly polished steel rollers. The latter are hollow and heated from inside. The cloth is brought with its face in close contact with these three heated rollers by pneumatic cushion breaks of a similar construction as explained in connection with the polishing machine. The fabric is passed either once, twice or three times through the machine, according to height of lustre for the cloth under operation desired. If two or three uninterrupted runs of the fabric through the machine are desired, the latter is threaded for an endless run.

A good scroop can be imparted to cotton by means of lactic acid or tartaric acid, even when the proportion of the salt of such an acid which is added to the bath or the proportion of partly neutralised acid present in the bath is sufficient to avoid the tendering of the cotton fibre. How much of the acid has to be neutralised or how much lactate or tartrate has to be added depends on the nature and proportion of the dyestuff used in the dyeing process, and on the proportion of acid added to the bath.

DYEING COTTON CHAINS.

(Continued from page 3.)

Drying the Chains.

After being split, the chains are then dried.

While these machines vary considerably in size and capacity, what has come to be regarded as the standard machine for this work consists of eighteen tinned iron cylinders arranged in two columns of nine cylinders in each column, each cylinder 144

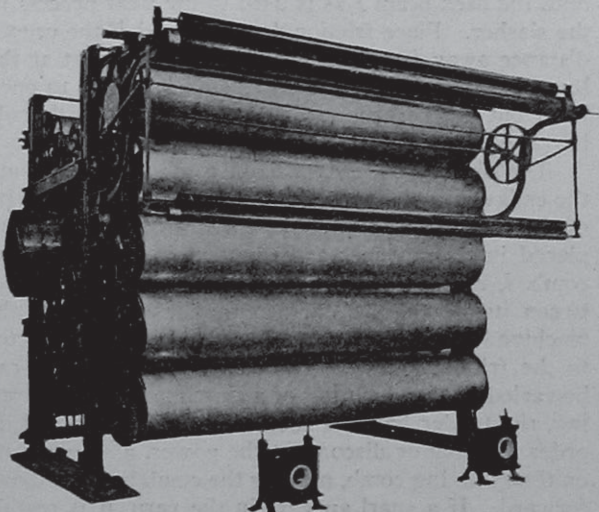


FIG. 12.

inches face by 23 inches diameter. These upright drying machines, in mills where a large capacity of chains are handled, sometimes have twenty-two cylinders arranged in two columns of eleven cylinders in each column, whereas for drying smaller quantities of yarn, drying machines with fourteen, nine or less cylinders are built. Drying machines are also constructed of what is known as the horizontal type machine.

Usually these chain drying machines are fitted with pin rails, wooden drag rollers, etc., for handling two or four chains at a time, although sometimes cylinders are made 72 inches face to run one or two chains only at a time.

Fig. 12 shows us the upright warp drying machine as built by The Textile Finishing Machinery Co., of Providence, R. I., the same showing nine tinned iron cylinders placed in each column, with 2 columns to the machine, *i. e.*, eighteen cylinders.

These upright (vertical) drying machines are more advisable than horizontal machines, for the fact that they require less space in the drying room compared to the horizontal machines.

Quantity as well as quality of work produced by these warp drying machines depend to a great extent, on the construction of their cylinders. Until the Textile Finishing Machinery Company, of Providence, R. I., invented their patented spiral scoop, it had been almost the universal custom to fit the cylinders of drying machines with what is known as a bucket scoop for lifting and discharging the exhaust water which acccumulates in the cylinder. The live steam enters the cylinder at one end through the hollow journal and this bucket or scoop discharges the water at the opposite end. For a great many reasons, this bucket scoop has never done the work satisfactorily for which it was intended. In the first place, as universally constructed, it does not reach into the cylinder more than 24″ from the head, hence it is evident that there must always be a considerable quantity of water which it cannot reach at once, and which flows gradually toward the bucket. As the speed at which the cylinder is revolved increases, the water is acted upon more and more by centrifugal force, which tends to keep the water against the surface of the shell of the cylinder and prevent it discharging by gravity. The efficiency of the bucket scoop is therefore proportionately reduced and at a certain speed the bucket scoop practically ceases to operate. It requires but a very small quantity of water in a cylinder to materially reduce the surface heat, hence the drying capacity of the cylinder. It was to overcome the obvious defects of the bucket scoop that the spiral scoop, as shown in Fig. 13, was designed and patented by the Textile Finishing Machinery Co., Providence, R. I. As will be seen from the illustration, this scoop consists of a spiral gutter extending the entire length of the cylinder. It starts shallow at the steam end and gradually increases in depth in order to take care of the increasing volume of water, makes a certain number of revolutions depending on the length and diameter of the cylinder and finally terminates in a lifting pocket or bucket which discharges out through the hollow journal of the cylinder. It will be readily understood that by the use of this spiral scoop, as the cylinder revolves, the water is forced along mechanically and lifted out in a steady uniform stream. This spiral scoop will absolutely remove all water from the cylinder and keep it almost absolutely free from water at all times.

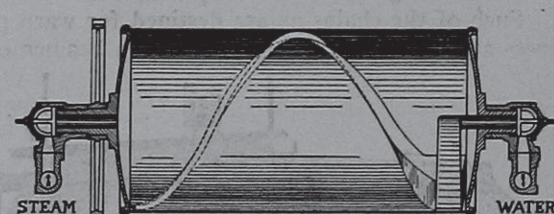


FIG. 13.

The advantages of this spiral scoop over the bucket scoop have been attested to by The Boston Manufacturing Co., of Waltham, Mass., thus: Production of 18 cylinder drying machine with cylinders 144″ on the face by 23″ diameter, fitted with these spiral scoops, 5700 to 6100 pounds of 34's cotton yarn per day; while another machine of exactly the same number and size of cylinders, but with the cylinders fitted with standard bucket scoops was able to handle only from 4000 to 4500 pounds of this yarn per day.

By the use of spiral scoops the capacity of a drying machine is not only increased, but the steam pressure and amount of steam necessary to do the drying decreased very materially. In addition to these advantages, the spiral scoop enables goods or yarn to be dried at a lower temperature which leaves them softer and more mellow. There is also very much less, or no liability of fugitive colors marking off and of starch sticking to the first few cylinders. From a mechanical standpoint, it is possible to fasten the spiral scoop in a cylinder far more strongly than the bucket scoop so that the old trouble of scoops becoming loose in the cylinders has been obviated.

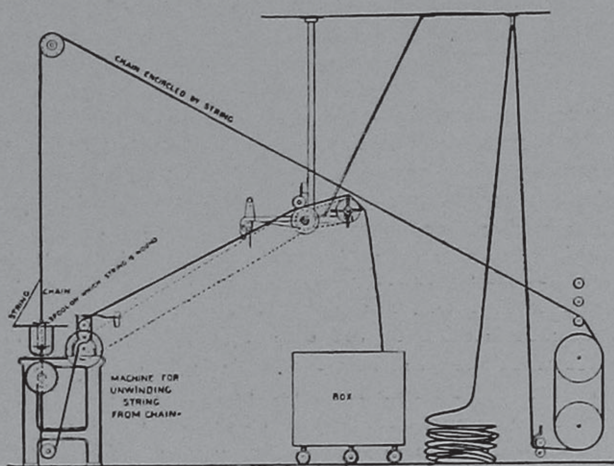


FIG. 14.

After being dried, the chains are sent to the beaming room, where first of all the cord which was wound around the chain, previous to the boiling process, to prevent slacks and kinks from being formed in the chain, is unwound. Fig. 14 is a plan view, with details, of the machine for this work. The chain for this purpose is passed through a rotating disc which revolves around the chain and unwinds the cord, *i. e.*, string, from the chain onto a spool. The machine is the mate to the one shown in Fig. 2 and is built by the Draper Co.

Long Chains for Warp Purposes.

Such of the chains as are destined for warp purposes are next beamed on a long chain beamer onto

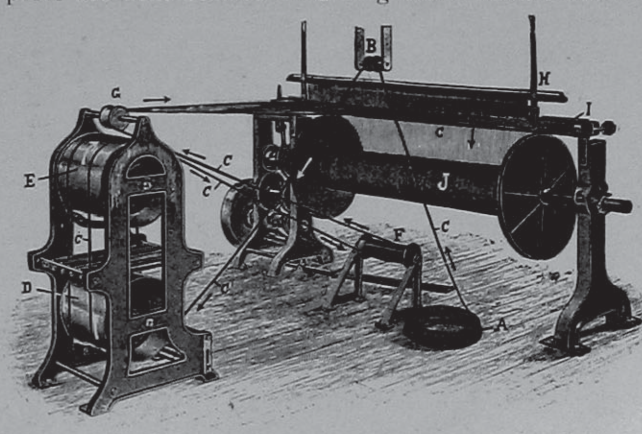


FIG. 15.

back beams for the slasher, where then the sizing of the yarn is done.

Fig. 15 shows us such a Long Chain Beamer in its perspective view. As shown in the illustration, the ball of colored yarn *A* is placed on the floor, under a wooden guide pulley *B* suspended from the ceiling. Over this pulley *B*, the yarn *C* passes to the bottom of friction drums *D* and *E*, which as the name implies, produce the required friction or tension to the chain of yarn while under operation. The more often you pass the chain around these friction drums, the more friction is imparted. From these drums the chain passes around wooden roller *F* as situated at the foot of the beamer, then back to an iron pulley *G* situated above the drum *E*, thence through swinging comb *H* and expansion comb *I* (only one end of it is shown), onto the back beam *J* as is used in the next process in the slasher. Place friction drums *D* and *E* the proper distance away from the beamer, about 20 feet at the least, in order to give the chain sufficient play to open itself out for the convenient entering of the threads into the dents of the swinging comb.

The object of the expansion comb is to distribute the ends of the chain as even as possible over the width of the back beam. After the threads of the chain are placed in their proper arrangement in the expansion comb, *i. e.*, to equally fill the space on the beam between its heads, the operator applies power to the machine by means of a foot board, which is connected to the friction pulley. The speed of the beamer can be varied by the changing of a clutch gear. In operating, the tender has one foot on the shipper board, in order to apply or disconnect the power, and one hand on the swinging comb, moving the comb backward and forward. If a snarl appears in the yarn, it is readily detected, for it will pull on the comb, giving the operator a chance to at once arrest the motion of the machine before any damage is done.

The procedure is best explained in connection with an example:

To make a loom beam of say 1,600 ends, suppose the designer orders for dyeing, four chains of 400 ends, which chains in turn will be dyed in four separate sets and beamed on four back beams for the slasher, where then the four chains, *i. e.*, the four back beams are run into one, as follows: 4 times 400 equals 1,600 ends on loom beam.

(To be continued.)

TESTING OF CHEMICALS AND SUPPLIES FOR TEXTILE MILLS.

(Continued from page 139.)

Tests for, and Estimations of Chemicals.

In testing chemicals, water is usually the first substance determined. This is not necessary in technical analysis if the chemical is dry in appearance, and is not sticky or lumpy. The method of determining water has been explained in Part II.

Many chemicals contain water as a necessary part of their constitution and it is for this reason that water is not determined except in special instances, unless the chemical is wet or lumpy; but since the amount of water must be determined in some instances, the proper per cent of water which a chemical contains in its constitution is of importance to be known. Any amount found above this percentage is in excess of what the chemical should contain.

In testing any salt for insoluble matter, always use *distilled* water. Use distilled water for washing precipitates. When dissolving a salt in water to test for insoluble matter take about 0.5 grams of the chemical and twenty to thirty cubic centimetres of distilled water. Heat the water to hasten its dissolving action.

THE ACETATES. The acetates are nearly all soluble in water. All acetates when treated with a few drops of sulphuric acid, in a test tube, should when heated give off an odor of vinegar.

ACETATE OF ALUMINA: The impurities that are most injurious are iron and copper. To a solution of the acetate of alumina add a solution of potassium ferrocyanide and to another solution add potassium ferricyanide; a blue or brown coloration shows the presence of iron or copper.

Impurities in chemicals are very often caused by the substance from which they are made. An illustration of this is shown in acetate of alumina, which is made by the action of acetate of lime on alum, or better, of aluminium sulphate. The mass is treated with water and allowed to crystallize. When heating with water, a little calcium sulphate may dissolve, which will crystallize out with the aluminium acetate. Dissolve a weighed portion of the acetate of alumina in water; if a sediment remains, filter and wash the precipitate and dry it, then weigh. This gives the insoluble impurities. To the clear solution add ammonia and ammonium chloride and when a white precipitate of aluminum hydroxide is formed; filter, wash the precipitate three or four times, dry, ignite and weigh. This gives the weight of the aluminum oxide.

Lead may be tested for by adding potassium chromate to the solution; a yellow precipitate of lead chromate shows the presence of lead. The amount of aluminium oxide in aluminium acetate should be at least 25 per cent.

ACETATE OF AMMONIA: It should dissolve in water to a clear solution; if it does not, weigh out a portion of the acetate of ammonia and dissolve in water, filter, wash and weigh the precipitate; calculate the percentage of impurities.

Iron should be tested for: Make a solution of the salt, to one portion add potassium ferrocyanide, to another portion potassium ferricyanide; a blue discoloration in either proves the presence of iron. If the blue color is dark, the acetate of ammonia is unfit for dyeing purposes.

ACETATE OF CALCIUM, (Calcium Acetate): Insoluble impurities. Dissolve a weighed portion of the calcium acetate in water, filter, wash precipitate with warm water. Dry in an air bath, keeping the temperature at 212° F.; do not let it rise above this point. Weigh the filter paper with impurities. In this test the filter paper which is used must be previously weighed. The difference between the weight of the filter paper and precipitate is the weight of the insoluble impurities. Iron may be tested for with potassium ferrocyanide and potassium ferricyanide, in the manner as explained in connection with the salt previously treated.

ACETATE OF IRON: Test for insoluble matter in same manner as in acetate of alumina. Acetate of iron may be adulterated with sodium sulphate or magnesium sulphate. To test for this, add barium chloride. If a precipitate is obtained sulphates are present. They must then be determined. To a weighed portion of the acetate, add ammonia and ammonium chloride and boil. This will precipitate the iron. Filter, wash the precipitate and add the wash water to the filtrate. To this filtrate add disodium hydrogen phosphate. If a precipitate is obtained, magnesium sulphate is present. If no precipitate is obtained then sodium sulphate is present. It must be known which is present in order to calculate the amount of the impurities. The barium sulphate obtained is weighed and dried as described in Part II.

If magnesium was found present this formula must be used:

$$120 : 233 :: x : y$$

y = amount of barium sulphate obtained. This then gives the weight of the magnesium sulphate.

If no magnesium was found, the following formula is used:

$$142 : 233 :: x : y$$

y = amount of barium sulphate obtained; x will then be the amount of sodium sulphate present.

ACETATE OF SODA: A white crystalline compound, which should dissolve in water to a clear solution. If it does not, test for insoluble impurities as explained in Part II. The amount of water present should not exceed 40 per cent. This salt should be gently heated and fused to obtain the amount of water present.

ACETATE OF TIN: A white compound, soluble in water. If it does not dissolve, determine insoluble impurities as explained in Part II. It may be tested for by adding sodium sulphide to a solution of the tin acetate. A yellow precipitate is obtained which dissolves on adding more of the sodium sulphide. The presence of iron may be detected by adding potassium ferrocyanide and ferricyanide to a solution of the salt.

ACETATE OF ZINC: A white crystalline substance which is soluble in water. If it does not dissolve to a clear solution, determine the insoluble impurities as in Part II. The clear solution should give a precipitate on adding caustic soda; this precipitate dissolves on adding an excess of the soda solution. If hydrogen sulphide is passed through the solution, the zinc is precipitated. Iron may be tested for with potassium ferrocyanide and ferricyanide and with potassium sulphocyanide, which produces a red color if iron is present.

ALUM: A white crystalline substance. The crystals have the appearance of two pyramids joined on their four sided planes. Alum is soluble in water, and the insoluble impurities are determined as in Part II. Iron may be tested for with ferro and ferricyanide of potassium. The amount of aluminium present is determined by adding ammonium carbonate to a solution of a known weight of the alum until there is no further precipitate on adding more of the reagent. The aluminuma hydroxide is collected on the filter paper, washed, dried, ignited and weighed. The weight obtained should be 10 per cent of the weight of alum taken. The amount of water permissible in alum is 45½ per cent. In determining water in alum, the salt must be heated in a crucible to a dull red heat.

(*To be continued.*)

A New Process for Manufacturing Artificial Threads.

Cupro-ammonium cellulose solutions, on account of their sensitiveness to heat, can only be produced and preserved at a low temperature. According to the inventor of the new process, they however acquire a high degree of permanence when other carbo-hydrates are incorporated in them, and when they then stand a temperature of 30 deg. to 40 deg. C. without injury and consequently can be preserved without being cooled. In addition, the products produced are exceedingly waterproof and elastic, the threads obtained being of a high count, do not adhere together and have an excellent silky gloss.

The gist of the invention consists in mixing carbohydrates with cupro-ammonium cellulose solutions obtained in the usual manner. The solutions obtained are easily worked up, for the structures formed from them become perfectly transparent when the ammonia evaporates in the air, they maintaining this valuable property during all the subsequent operations.

Most of the carbo-hydrates can be employed in the new process. Very good results are obtained with hexoses di-saccharids or polysaccharids by employing them in proportions of about 25 per cent by weight of the cellulose.

DESCRIPTION OF THE PROCESS.

A cupro-ammonium cellulose solution having 7 per cent cellulose is prepared in a kneading machine in one of the known ways, a small quantity of glycerin, one half of one per cent of the weight of the cellulose being mixed with the ammonia for the purpose of increasing the solubility of the cupric hydrate. No more ammonia, *i. e.*, pure NH_3, is then necessary, than is equal to the weight of the cellulose. Potato syrup, glucose, to the amount of about 35 per cent of the weight of the cellulose is added gradually to the solution, which is obtained in a short time without any cooling, whereupon the whole mass is kneaded for some time longer. The mass is then ready for use, remaining until the last homogeneous solutions, which only increase in toughness in the mass as ammonia is evaporated from them.

When the ammonia has entirely escaped, caoutchouc-like, but perfectly transparent products remain behind, which when dried, finally harden but keep their transparency.

Softeners and Conditioners.

Amongst the most important of the various materials used in the finishing of cotton piece goods, are the softeners or conditioners. These are used for the purpose of neutralising the harsh effect of the starch, clay, and minerals in heavy mixings. They insure a smooth mellow feel, and add lustre and closeness of texture to calender finishes.

Of all the classes of materials used by finishers, none are more liable to abuse. Generally speaking, these softeners are made on a soap basis, that is, by the action of caustic soda or caustic potash on certain vegetable oils. As nowadays the cry is for cheapness, the softener supplied to many finishers is not soap proper: this would be too expensive. In many cases it is simply soap that has been boiled up and diluted with water to a thick liquid. A better class of softener is made by saponifying certain vegetable oils by the cold process direct. These may, or may not, be diluted with water.

Apart from this class of softener, there is also on the market what is known as oleine or soluble oil. This is usually produced by the action of alkalies on castor oil, which has been found to be the best oil for the purpose, or by acidifying the oil and neutralising the result with alkalies. The latter method has proved the better in actual working.

Soluble oil of a good quality should be of a pale color in order not to affect white goods, and should contain at least 40 per cent of fatty acids. On mixing in water, in which it should prove perfectly soluble, the result should be a clear transparent liquid. If of a milky appearance, it indicates that the oil is not neutral, and is either acid or alkali in reaction. This may prove injurious to the fibre of the cloth, and to other finishing materials. Many qualities of oleine are sold, but the above, together with the following test, ought to be some guide to the practical finisher:

Take a tube graduated to 100 c.c. Place in it 100 c.c. accurately. Next, add a little hot water, mixing the softener and water with a glass rod. Pour on this a little diluted sulphuric acid, then mix again and let stand in hot water. The oil will be found to have broken up under the influence of the acid, collecting in a layer at the top of the liquid. Read off the graduations occupied by this layer. For example, 4 c.c. are occupied, this indicates that there is 40 per cent of fatty acids in the sample. "Dyer and Calico Printer."

SOAPING AFTER SULPHUR BLACK DYEING.

It is practically always necessary to soap sulphur black dyeings with soap or Turkey-red oil, either to liven the color or to get rid of unfixed dye. There are cases, however, especially in warp-dyeing, in which such treatment have had the reverse of a satisfactory effect, the goods being made sticky, whereby in the case of weaving the ends often adhered together. In all such circumstances, the amount of soap or red oil used must be cut down to the lowest possible quantity, and the rinsing after the soaping must be done with great thoroughness.

The raw wool of commerce contains: Moisture, grease, matter soluble and not soluble in water and finally the wool fibre proper.

The moisture which the wool in question contains, is ascertained by the usual method of drying a sample of wool in a 220 deg. F., stream of dry hydrogen.

POINTS ON WOOLEN FINISHING.

Pneumatic Extractor: From the gig, the fabric passes to the pneumatic extractor, in order to have all the water it contains, drained from it by means of suction; the cloth for this purpose passes over a trough having an adjustable opening or slot on its top, over which the cloth travels under tension. This fully covers the slot, in order that suction may be produced. The fabric is fed to the machine, either from open folds or wound on a roller; it then passes under a guide rod and over an expander, then over and under suitably situated feed and guide rollers, over the slot of the trough previously referred to, then over guide and under draft roller to the delivery end of the machine, when in turn the fabric is either wound by friction drive on a roller, or folded on a table. The machine, if so desired, may be connected with the dryer.

In connection with face finished fabrics, the cloth is made to run with its back over the slot of the trough, a feature which on account of the suction exerted by the machine, will lay the nap on the face of the fabric smooth. This slot of the trough can be lengthened or shortened side ways, in order to accommodate different widths of cloth. The parts of the machine with which the cloth comes in contact are made of metal impervious to acids, permitting the extractor to be used in connection with different processes of dyeing and finishing. The expander, with which the cloth when entering the machine comes in contact, stretches and pulls the fabric thoroughly open in its width, previously to bringing it in contact with the suction device, thus preventing all chances of kinks, creases, tears or any other damage whatever to the cloth; thoroughly extracting the fabric in the best possible condition, superior to the common drum-hydro-extractor. The machine is provided with a speed regulator, in turn delivering the fabric from the machine in proper condition, *i. e.*, the amount of extracting can be easily regulated to suit the demands of the fabric under operation.

As will be readily understood, the purpose of the pneumatic extractor is to do away with the disadvantages to fabrics, characteristic of drum-extractors, *i. e.*, prevent the formation of creases, nicks, tears, etc., to the cloth under treatment, delivering with the new extractor, the fabric in a nice, lofty condition, in its full open width, as compared to the cramped down string of cloth taken from the, until now commonly used drum-hydro-extractor.

Polishing Machine: The purpose of this machine is to impart fineness and lustre to the face of the fabric, softening the fibres composing the threads, rounding out each thread, and in turn giving the cloth that full, rich finish and superior touch to the hand, impossible to be obtained in any other way.

The working mechanism of the machine consists of 3 rollers, each covered with pulverized glass (a patented process) of a different degree of fineness. Working in contact with each of these polishing rollers there is placed in the machine, a pneumatic cushion for pressing the fabric onto the respective roller. These pneumatic cushions consist of a rubber tube covered with felt, said tube being filled with air by means of an ordinary hand air pump as used for blowing up the tires of a bicycle. Each cushion is raised or lowered by means of small individual levers, situated conveniently at both sides of the machine.

Polishing can be carried on while the cloth is in its moist condition, or dry if so desired.

The polishing rollers are driven with a constant surface speed, three different changes in speed for the run of the cloth through the machine are provided by suitably situated gears, permitting a change in production of the machine, with a consequent high, medium or low polishing effect to the fabric, as desired. Provided a still lower polishing effect is desired, it can be accomplished by changing the speed of the fabric; either one of these 3 rollers may be thrown out of working contact with the fabric, by keeping the lever controlling its mate pneumatic cushion in its raised position.

Previously to entering the first polishing roller, the fabric passes over a stretching device, in order to present it to the action of the polishing rollers in its full open width, free from any wrinkles or creases, rolled selvages, etc.

The fabric is fed to the machine, if in a moist condition, most conveniently from the roller it last was wound onto on the gig; suitably situated brackets for holding the shaft of the roller being provided in the machine.

In connection with polishing the fabric in its dry condition, it can be fed to the machine in folds, as coming from the dryer.

After passing the draft roller of the machine, the fabric winds itself on a common roller, a proper winding attachment being provided for the purpose; again if so desired, a folding attachment can be provided for plaiting the fabric on a table, scray, truck, etc.

Brushing Machine with Steam Box and Lustring Cylinder: This machine consists of the following parts: Steam box, brush cylinder, lustring cylinder, hollow suction roller and exhaust fan.

The cloth, being placed in open folds onto a scray in front of the feeding end of the machine, passes through a stretching device and thus in its full open width over the steam box, and from there over a guide roller in contact with the brush cylinder. The latter has its bristles set in an oblique position in the lags, so as to exert only a soft brushing action onto the fabric; hence no fresh fibres are loosened, *i. e.*, raised from the structure. Inside the brush there is a fan for circulating cold air through small apertures left between the brush lags, *i. e.*, the latter are not very closely joined.

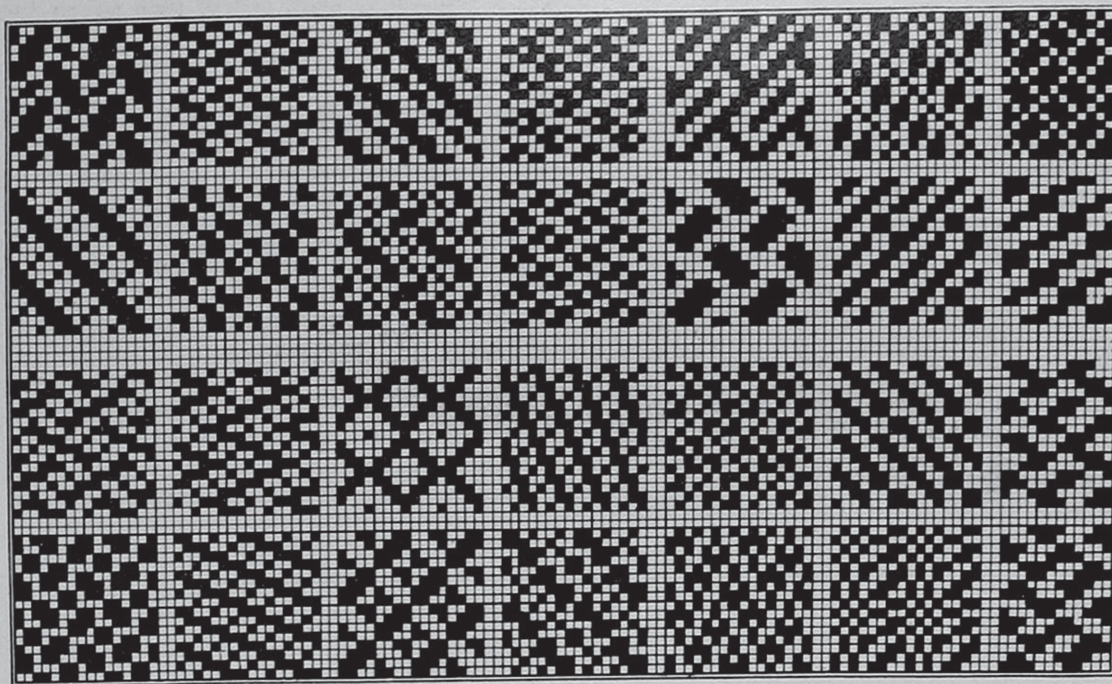
The lustring cylinder is a highly polished, hollow, steel roller, heated if so desired.

Previous to leaving the machine, the cloth passes over a hollow, perforated roller, which on one end, by means of suitable piping, is connected to an exhaust fan, thus drawing the air from the room through the cloth into the fan and from there it passes to the steam

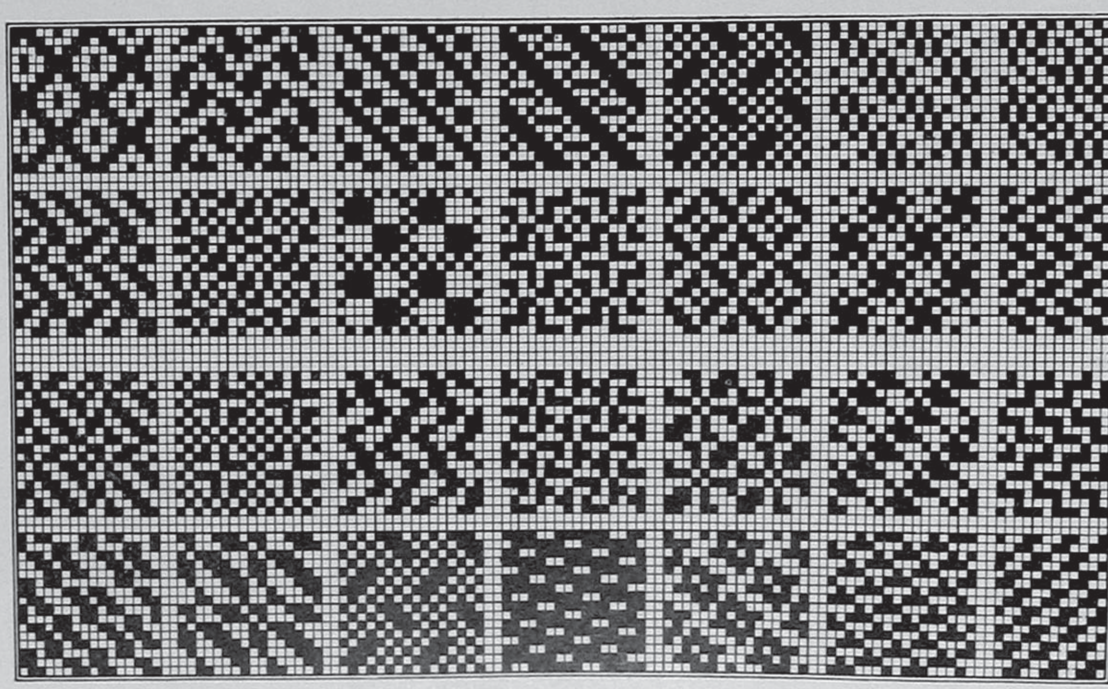
(*Continued on page xii.*)

DICTIONARY OF WEAVES

EIGHT HARNESS



EIGHT HARNESS



We herewith illustrate 56 Eight-Harness Weaves, different from those given before. In the Oct., Nov. and Dec., 1907, issues of "Posselt's Textile Journal," 260 Eight-Harness Weaves were given, making a total of 316 different Eight-Harness Weaves thus far quoted, every one of which is taken from Fabrics met with in the market; demonstrating the practical advantages of this Dictionary of Weaves.

Complete, this Dictionary will contain over TWENTY THOUSAND PRACTICAL WEAVES, taken from woven Fabrics. Over two thousand of them have thus far appeared, and can be obtained by ordering back numbers.

BUYERS' INDEX