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Posselt's Textile Journal

A Monthly Journal of the Textile Industries

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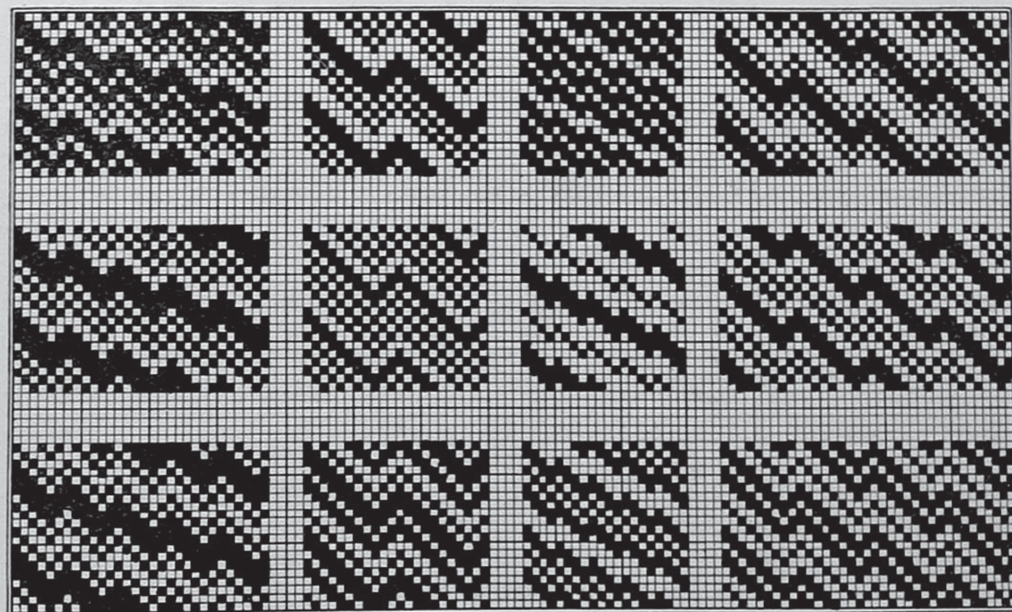

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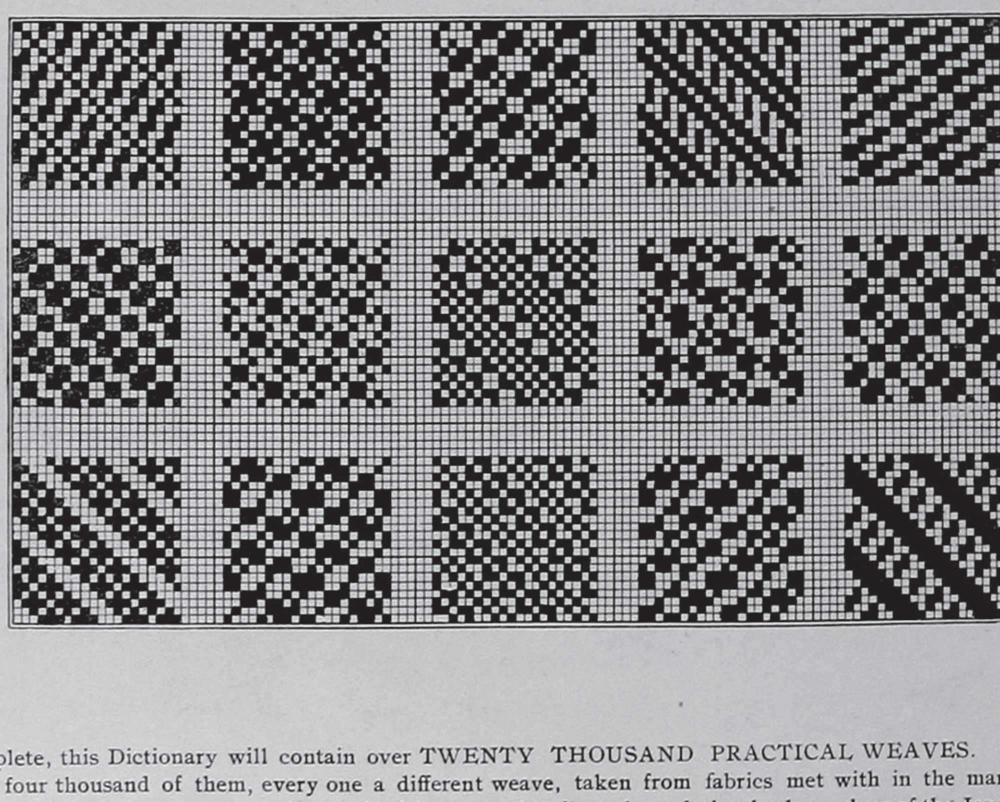

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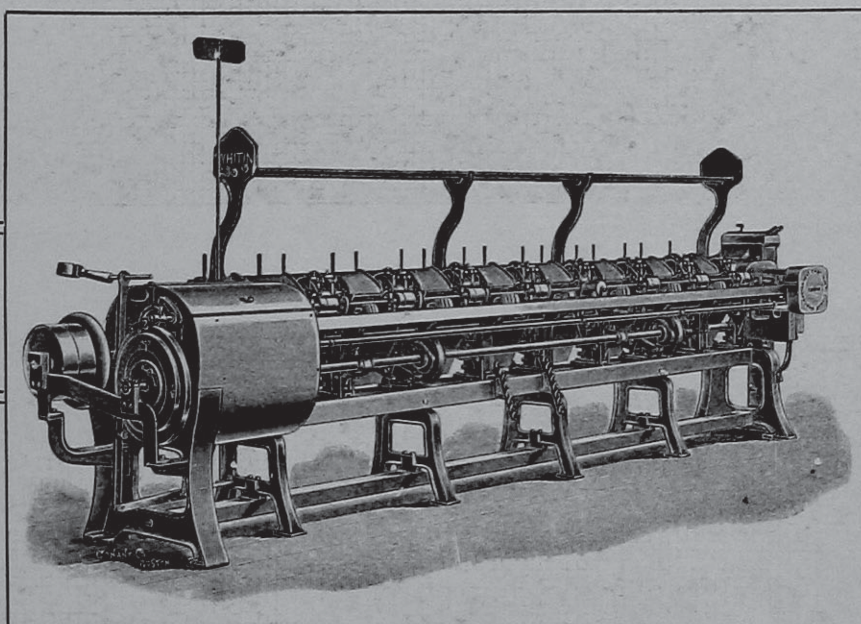

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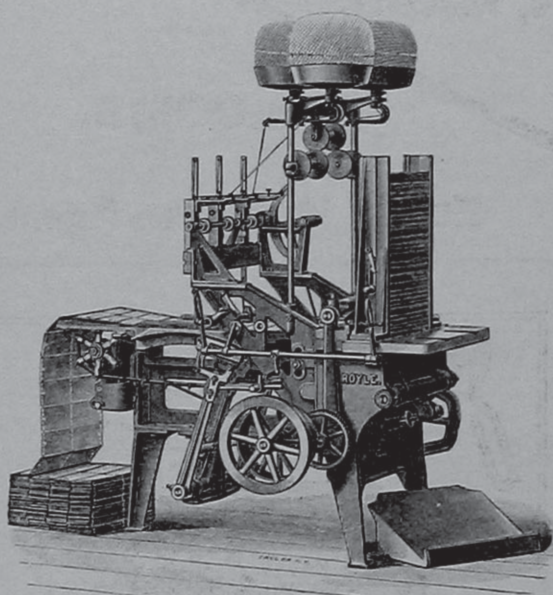

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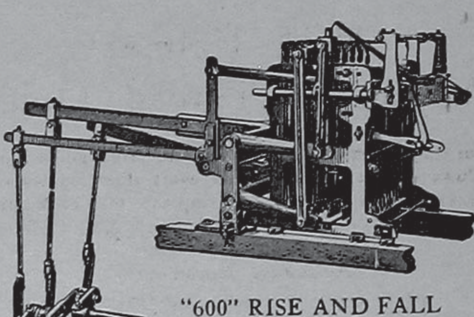

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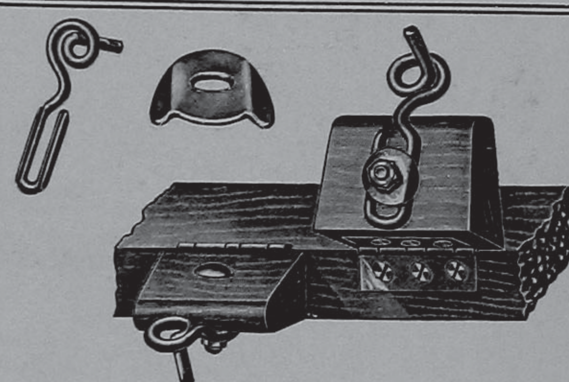

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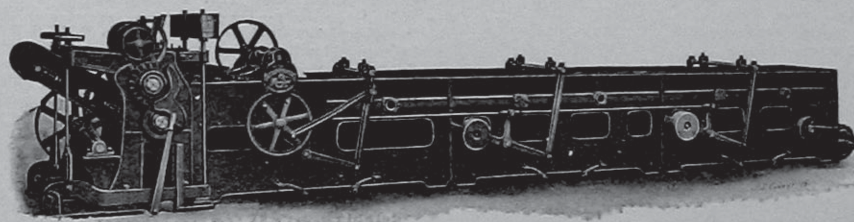

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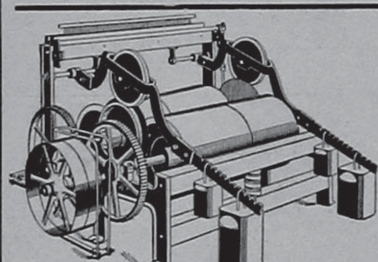

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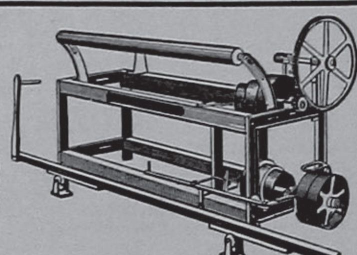
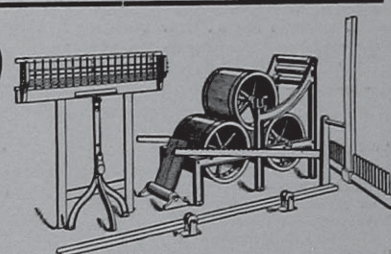
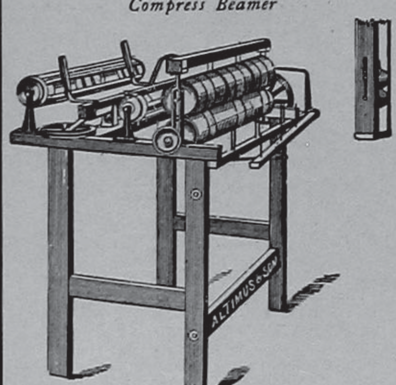


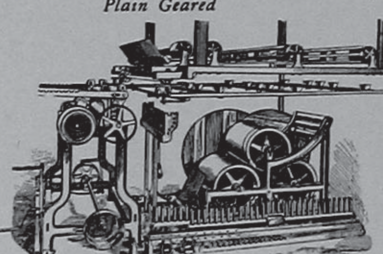
Plain Geared



Back Drum and Parts



Warp Splitting Machinery



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Posselt's Textile Journal

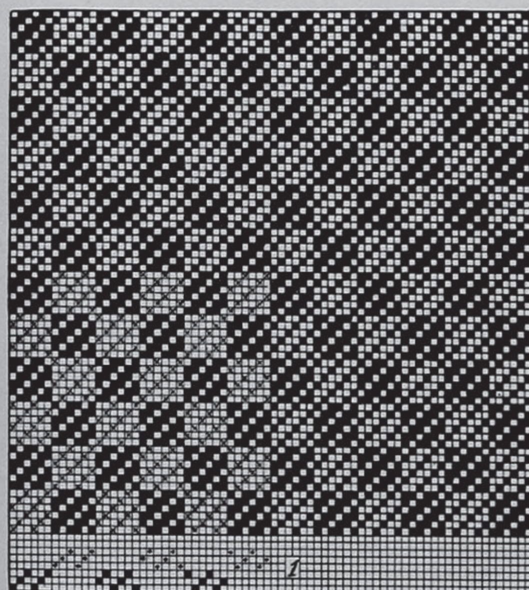
Vol. VII. December, 1910. No. 6.

DESIGNING AND FABRIC STRUCTURE.

CHECKERBOARD TWILLS

in which the direction of the twill in both effects, runs in the same direction.

In the August 1908 issue of the Journal, we then described and illustrated, on pages 41, 42 and 43, what is known as our regular checkerboard twills. The



direction of the twill lines of the two effects, in that lesson, was arranged to run against each other, *i. e.*, the twill line of one effect, say for example, the filling effect was then arranged to run from left to right, *vice versa*, the twill line of the warp effect, running in the opposite direction, *i. e.*, from right to left; whereas, in the present system of checkerboard twills, the twill in both effects (warp and filling effect) is made to run in one direction, from left to right in our examples.

The present system of weaves can be divided in two divisions: (*a*) Such as presenting a clear cut-off on all four sides of the squares. (*b*) Such as present a clear cut-off only on two sides of each square, the other two sides having the effects (warp and filling effect) run into each other.

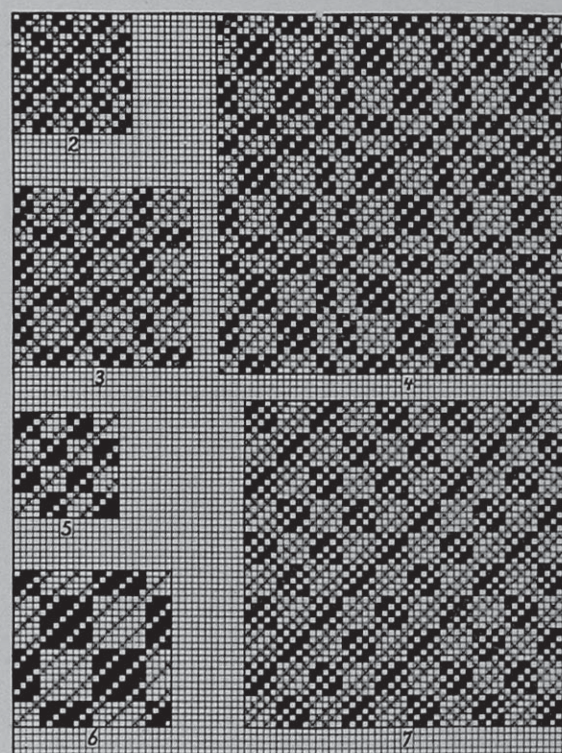
The first division will require the changing, or transposing of the points of starting, for each effect, with the consequent result of a large repeat for the new weave.

The second division will have a uniform starting for each effect, with a consequent small repeat for the complete weave, compared to the first division. However, in either instance, few harnesses will be required for the execution of the complete weave on the loom, the only difference being that the first division of checkerboard twills will call for a somewhat more fancy drawing-in draft, compared to the second.

Checkerboard twills with clear cut-off on all sides.

As will be readily understood, our most simple foundation twills will be the ones most suitable to be used in the construction of these checkerboard twills; for instance the $\frac{1}{2}$ 3-harness, $\frac{1}{3}$ 4-harness, $\frac{1\ 1}{1\ 2}$ 5-harness regular twills, etc.; those quoted, we have made use of in explaining the subject of designing these weaves, in our lesson.

If drafting only a few threads, warp and filling ways, of each of the effects, as will be readily understood, the resultant weave will come closely within the range of granite effects, whereas if drafting each effect several times over, before starting to draft its mate effect, and the more often we do this repeating of each effect, the more pronounced the checkerboard effect will be in the woven fabric.



The construction of this sub-division of checkerboard twills will be readily explained by means of the accompanying two plates of weaves.

Weave Fig. 1 has for its foundation, the combination of the 3-harness twill, warp and filling effect. Drafting six warp threads and six picks for each effect, after the *plain motive* setting, results in the new weave repeating on 36 warp threads and 36 picks.

In the left hand corner of the design, the construction of the weave is clearly shown, the filling effect being indicated by means of *cross* type, the warp effect by *full* type. In this way we executed one complete repeat of the weave, the other three repeats of the weave being shown all in one kind of type, to more clearly illustrate the appearance of the weave in the fabric.

Below the weave, we have given one repeat of the drawing-in draft, necessary to produce this weave, as repeating on 36 warp threads, and 36 picks, on 6-harness (or any multiple of it) on the loom.

To simplify matters to the reader, we have shown said drawing-in draft in two types. From drawing-in draft, as well as the weave, it will be noticed that when drafting complete draws with the 3-harness twill, each effect, in either instance, starts one pick higher. Three picks in the repeat of the pattern, will require three of these changes, and when repeat in the design occurs.

Weave Fig. 2 shows us the same 3-harness twill, warp and filling effect, used. In this instance, we drafted only three warp threads, and three picks for each effect, with the result that the repeat of the weave occurs with 18 warp threads, and 18 picks.

Weave Fig. 3 shows us the same two effects of the 3-harness twill, used for the foundation of a new weave, drafting in this instance alternately three warp threads and three picks from one effect, vice versa, six warp threads and six picks of its mate effect; complete weave repeats on 27 warp threads and 27 picks.

Weave Fig. 4 has again the two 3-harness twill effects for its foundation. The motive in this instance is a $\frac{1}{2}\frac{2}{1}$ fancy basket weave. Using three warp threads, and three picks, for each point of the motive, calls for 18 warp threads, and 18 picks for the repeat of effect. Three changes of this repeat of effect are necessary until final repeat of the complete weave occurs, and which is (18 × 3=) 54 warp threads and 54 picks.

Weave Fig. 5 has for its foundation the uneven sided 4-harness twill, warp and filling effect.

The exchange of these two effects is done by means of *plain setting*. Using four warp threads and four picks of each effect, for each point of the motive, results in the repeat of the new weave with 16 warp threads and 16 picks. In connection with this 4-harness twill, for foundation, it will be noticed that only two changes for starting either foundation effect are necessary, and which in this instance will bring a quicker repeat for the complete design, than if dealing with a foundation weave of an uneven repeat, as was the case before, and as will be seen further on in connection with weave Fig. 7.

Weave Fig. 6 has again for its foundation, the two effects of our 4-harness uneven sided twill. The motive used is the $\frac{2}{1}\frac{1}{2}$ fancy basket effect. Four warp threads and four picks, *i. e.*, one draft of the 4-harness twill is used for each point of the motive, the complete design repeating on 24 warp threads and 24 picks.

Weave Fig. 7 has for its foundation the combination of the 5-harness uneven sided, double twill, warp and filling effect; the effects are exchanged after the *plain motive* setting. One repeat of each effect of the 5-harness foundation twill is used for each point of the motive. Five changes for starting each effect are required on account of the 5-harness twill being of an uneven number of repeat; the complete weave Fig. 7 for this reason, repeats on (5 × 2 × 5=) 50 warp threads, and 50 picks.

(To be continued.)

RIBBONS, TRIMMINGS, EDGINGS, ETC.

(Continued from page 93.)

Ribbons Showing Cat-Stitch Effects.

This method of figured effects for ribbons is readily explained by means of illustrations Figs. 160, 161 and 163, showing respectively fabric sketch, weave and formation of the cat-stitch.

The same refers to a 2-shuttle effect, *viz:*

(*a*) the regular or ground weaving shuttle, and which carries a high count yarn, interlacing with the ground warp on a closely intersecting weave, in the present instance, the plain or taffeta weave, and which is a most satisfactory one to use.

(*b*) the figure or cat-stitch weaving shuttle and which, as a rule, carries a heavy count of yarn, often two or more fold, and of a contrasting color to that used for the ground warp and the ground fillings.

The peculiar cat-stitch effect is produced by floating the figure filling *b* below a certain number of warp threads taken in bunches, *i. e.*, rotation. After this, interlace a certain number of ground picks *a* (four picks in our example) after which the figure pick *b* is again interlaced, floating below a certain (but different selected) bunch, or number of warp threads taken in rotation.

It will be readily understood that the figure pick will float in an oblique direction on the face of the fabric, between the point where it left the first figure pick and the point where it entered the next figure pick.

Figs. 161 and 162 explain the subject.

Picks 1, 2, 3 and 4 are ground picks (see *dot* type). The shuttle is entered in the regular way, beginning with pick 1 from the left hand side.

Pick 5 is the first figure pick (see *cross* type). Warp threads 9, 10, 11, 12, 13, 14, 15 and 16 are up, the rest are down. The figure filling enters the back of the fabric at the left hand side of the warp thread 9 (see point *c* in diagram Fig. 162) appearing again on the face of the ribbon at the right hand side of the warp thread 16 (see point *e* in diagram Fig. 162).

Picks 6, 7, 8 and 9 are again four ground picks (as before).

Pick 10 is the second figure pick in our example.

Warp threads 5, 6, 7, 8, 9, 10, 11 and 12 are up. The figure pick enters the back of the fabric structure at the right hand side of the warp thread 12, leaving it (see point *o* in diagram Fig. 162), *i. e.*, returning to the face of the fabric at the left hand side of the warp thread 5 (see *s* in diagram Fig. 162). This will show that the figure pick floats on the face of the fabric—in an oblique direction—from *e* to *o* and in connection with the next five picks of the

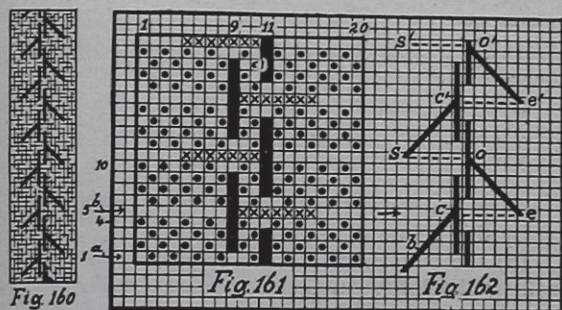


Fig. 160 Fig. 161 Fig. 162

second repeat of the weave, from *s* to *c'*, in a reverse oblique direction from that of the first float.

Figure warp threads 9 and 12, of weave Fig. 161, and which are floating threads, are of a similar count of yarn, and color as the figure pick; they are consequently shown in sketch Fig. 162 by heavy lines, corresponding to those of the figure filling.

Repeat of weave: 20 warp threads and 10 picks. 12-harness fancy draw.

As will be readily understood, this number of warp threads and picks in the repeat can be increased in the loom, when a more prominent effect is desired, without increasing the number of harnesses required. Two repeats of weave Fig. 161 and sketch Fig. 162 are given to better illustrate fabric formation. Six repeats of the design are given in fabric sketch Fig. 160.

Cloth Made From Seaweed.

Recent investigations in Australia indicate that the fiber of a submarine plant, known as the Posidonia Australia, found on the southern coast of South Australia, particularly in Spencer and St. Vincent gulfs, may become an important commercial asset, on account of its textile and other properties.

A measure has been passed by the South Australian Parliament, authorizing the Government to issue licenses for the raising of the fiber over specified areas, and several companies have been formed to experiment with it.

Samples of the fiber, cleaned and dried, prove to possess many valuable properties. It is not inflammable, except at a very high temperature, and for this reason has a distinct advantage over flock, kapok, oakum, etc. A mixture of this fiber with wool appears to weave into an excellent cloth, which may be dyed various colors. Other purposes for which the fiber seems adaptable are rope, twine, mats, linoleum, army blankets, etc. The quantity of fiber is believed to be practically inexhaustible. The chief difficulty at present with this infant industry is the obstacle to cheap production on account of a tremendous amount of waste matter raised with the fiber.

FABRIC ANALYSIS.

The analysis of textile fabrics forms a most prominent part of the knowledge required by a competent designer or manufacturer. In addition to theory, a practical experience in the construction of the various fabrics is likewise called for.

Thorough analysis consists not only in picking out the arrangement of the interlacing of warp and filling (the weave), but also in ascertaining the materials of which both systems of threads are composed, the process such raw materials must be subjected to before the required yarn or thread necessary for the construction of the fabric on the loom is produced, also the various processes commonly designated as finishing.

The analysis of a fabric is not always required to be a complete one, as is necessary for duplicating a fabric; in many cases information either as to materials used, amount of twist in yarn, or process of finishing necessary, etc., either one or all, being questions to be ascertained. But which ever special point is required to be known, or should a complete reproduction of a given fabric sample be required, it is always best to have a clear understanding (or analysis) of all points.

For example: A knowledge of the weave will be a good guide for an analysis as to the material to use, the amount of twist to put into the yarn, or the finish required, since the harder the weave takes up the filling, the stronger the warp yarn must be (as to quality of material to use, or amount of twist to be put into the yarn) so as to resist the amount of wear incurred during the weaving. The weave employed in interlacing warp and filling, the raw materials used in the manufacture of the yarns, are in turn items which will influence the process of finishing required, etc.

A complete analysis for textile fabrics can be classified under the following nine points:

I Ascertaining the weight per yard of the finished fabric.

II. Ascertaining texture of finished fabric.

III. Ascertaining the weave.

IV. Ascertaining raw materials used in the construction of the fabric.

V. Ascertaining texture required in loom.

VI. Ascertaining arrangement of threads, according to color and counts, for warp and filling.

VII. Ascertaining the proper counts of yarns, necessary for the reproduction of a given sample.

VIII. Ascertaining weight of the cloth per yard from the loom.

IX. Ascertaining the process of finishing necessary, and amount of shrinkage of the fabric during this process.

These nine points, if carefully considered, will, in most cases, produce the required object, a thorough analysis or a thorough understanding of the construction of the fabric with which the designer has to deal.

I. Ascertaining Weight per Yard of Finished Fabric.

Usually the sample given to the designer, for analysis, is less in length than one yard (of the finished fabric), and generally narrower than the finished width of the cloth; as a rule, only one or two square inches, or even less, may be furnished. Should, however, one or more yards of a fabric, having its regular width, be given, it is then an easy matter for the designer to solve the question, by weighing the amount of cloths given, and dividing said weight by the number of yards in the sample. The result will be the weight per yard of the finished fabric.

When the size of the sample submitted is small, its weight per yard must then be found by figuring in proportions.

Rule for Ascertaining from a Small Sample (finished) the Weight of the Fabric in Ounces for One Yard:

Cut your sample most carefully to a known size, and divide the number of square inches, thus derived, into the number of square inches which one yard of the fabric will contain. Multiply the result with the weight in grains of your sample and divide the product by 437.5 (number of grains in one ounce) which will give you the ounces per yard for the fabric in question.

Woolen and Worsted Fabrics are made either 54, or more frequently 56 inches wide, the same being known as 6/4 fabrics. If calculation refers to:

54 inches wide fabrics, there are (54 × 36=) 1944 square inches to the yard, whereas with

56 inches wide fabrics, there are (56 × 36=) 2016 square inches to the yard.

Woolens and Worsteds are also sometimes made in what is known as narrow fabrics, ¾ wide fabrics, and which are either made 27 or 28 inches wide, containing either 972 square inches or 1008 square inches, respectively, to the yard of cloth.

Example: Suppose you deal with a fancy cassimere, 54 inches finished width. Sample submitted being cut 3 × 3 inches = 9 square inches, and suppose the weight of these 9 square inches is 25 grains.

Question: Ascertain the weight in ounces for one yard of cloth?

Answer: 54 inches wide fabric = 1944 square inches.

1944 ÷ 9 = 216 × 25 = 5400 ÷ 437.5 = 12.34 oz.; thus the weight of the fabric is 12⅓ oz.

Example: Suppose you deal with a fancy worsted trousering, 56 inches finished width. Sample submitted being cut 3 × 4 inches = 12 square inches, and suppose the weight of these 12 square inches to be 40½ grains.

Answer: 56 inches wide fabric = 2016 square inches.

2016 ÷ 12 = 168 × 40½ = 6804 ÷ 437.5 = 15.55 oz.; thus the weight of the fabric is 15½ oz. per finished yard.

In connection with cotton and silk fabrics, the width of the finished fabrics varies greatly, the same being met with in all widths as we might say, however, explanation thus far given in connection with woolen and worsted fabrics will readily explain the subject, and how to proceed to obtain the weight of the fabric per yard, by simply substituting the proper numbers for the square inches in the finished yard of the respective fabric, and proceed as before.

Example: Suppose you deal with a fancy cotton dress goods, say 36 inches finished width. Samples submitted to be cut 2 × 3 inches = 6 square inches, and suppose the weight of these 6 square inches is 12.1 grains.

Question: Required to ascertain the weight in ounces for one yard of cloth?

Answer: 36 inches wide fabric (36 × 36) = 1296 square inches.

1296 ÷ 6 = 216 × 12.1 = 2613.6 ÷ 437.5 = 5.97 grains, or practically, the fabric weighs 6 ounces to the yard.

II. Ascertaining Texture of Finished Fabric.

By this we mean ascertain

(1) the number of ends to be put in the warp, in making the latter on the warper or dresser, as the case may be, as well as

(2) the picks per inch in the finished fabric, and from which we then have to ascertain, by experience, the number of picks to put in the fabric on the loom.

The first step to take, is to ascertain the finished texture for the fabric, for one square inch. For this purpose unravel a few ends of the filling, until you can clearly distinguish every individual warp thread and carefully count the number of threads one inch contains. A good plan is to mark the first and last end of the inch in some way, and thus facilitate counting. Paint them with your red brush or clip the ends not belonging to the unit of one inch short.

Next unravel some of the warp threads and obtain texture for the filling in the same way.

It will be found advisable for you to ascertain the texture for each system of threads in at least two different places of the sample, a feature which will test your count, since if any difference is found, you can go over your work, and thus find the mistake, or if you made no mistake, and the count varies, from practical experience, strike the proper average for the finished texture from your two figures.

Fabrics having a fancy arrangement, either in the warp or in the filling, *i. e.,* containing different counts or colors of yarns, may compel you to count more than one inch; again, in some patterns you may find it advisable to count the number of threads in one repeat of the pattern and then ascertain its width, in inches or fraction of inches, and in turn calculate texture by figuring by proportion.

In some instances, when dealing with high counts of yarn, high textures, you may facilitate your work by placing a contrasting card board below sample, in order that the liberated ends, to be counted by you, show up distinctly. By this we mean, have for example, a black back ground if dealing with white or light colored yarns, vice versa, a white back ground if dealing with black or dark colors for your yarns.

As will be readily understood the filling texture is found direct by counting the inch, or calculating to the inch if more or less length in the sample has been counted.

With reference to the warp texture, example will explain the subject.

Example: Suppose you deal with a fancy cassimere, 54 inches finished width. After liberating, in the sample, a sufficient number of picks of filling, in order that you can conveniently handle your warp threads, you then ascertain 48 ends to the inch.

$48 \times 54 = 2592$ ends, number of ends for warp.

Example: Suppose you deal with a fancy worsted trousering, 54 inches finished width. Suppose repeat of pattern counts 82 ends and measures $1\frac{1}{2}$ inches wide.

$1\frac{1}{2} : 82 : : 54 : \times$

$82 \times 54 = 4428 \div 1.5 = 2952$, number of ends for warp.

(To be continued.)

A New Method for Boiling-Off Silk.

Silk, previously to dyeing is boiled-off, discharged or ungummed, *i. e.*, has its gum removed from the fibroine, the actual silk fibre, by continually agitating the hanks of silk to and fro and up and down in boiling soap baths.

By the new method, an apparatus is provided in which the silk is hung on small hasps placed over the soap bath, which, when raised to boil, causes the lather to ascend and completely surround the silk.

Since the silk is heavier than the soap lather, it remains absolutely quiet during the whole boiling-off process, which, it is claimed by the inventor of the process (C. A. Koettgen, a Silk Dyer of Crefeld, Ger.) is finished in about one-third of the time than is done by the process practiced at present.

To change the position of the hanks on the hasps, the latter are turned slowly around by the operator, by a handle placed conveniently outside of the apparatus.

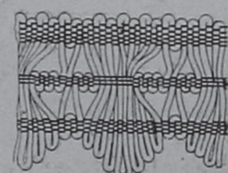
The influence of the lather on the silk fibre, it is claimed, is a very favorable one, the silk-gum being by it not entirely stripped of the interior portion of the silk thread, as is done by the pressure of the boiling-soap bath in connection with the boiling-off process, practiced at present, but is only partially dissolved. The soap lather, being one-twentieth part of the weight of the water, does not press heavily on the silk-gum, and the continual bursting of the many thousands of small air bladders cause a kind of respiration on the silk-thread, furnishing each time a very small quantity of soap liquor. The innumerable repetitions of this work forms the silk-gum into a liquor so thoroughly, that within a short time there is not the smallest part of the silk-thread not being discharged. On rinsing, the soap is immediately washed off, and the ungumming process is finished.

Though each single cocoon-thread is thoroughly cleansed by the new process, the combination of these cocoon-threads, and which forms the real *single* silk thread, is not destroyed, thus enabling the cocoon-threads to keep together and form a full round *single* thread, without getting loose.

It is claimed, for the new process, that silk thus ungummed does not get so fluffy as when boiled-off in the present way, for which reason it is claimed by Mr. Koettgen, that the new process is more particularly applicable to silks which have a tendency of showing loose fibres when boiled-off by the present procedure. Provided the silk is not absolutely cleansed, it will, it is claimed, be much cleaner. Better results in the throwing and weaving are claimed for the new method of boiling-off.

New Designs for Trimmings and Carpets.

Design 1 shows a new ornamental effect for a *Trimming*, just patented by William Hinchliffe, Valley Falls, R. I.



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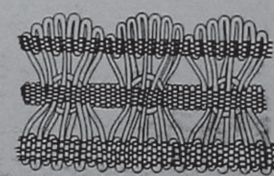

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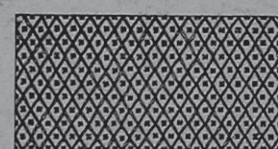

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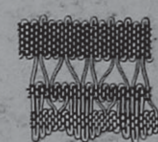

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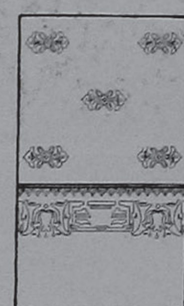

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Designs 2, 3 and 7 are three new effects for *Trimmings*, just patented by Frank Wood, Valley Falls, R. I.

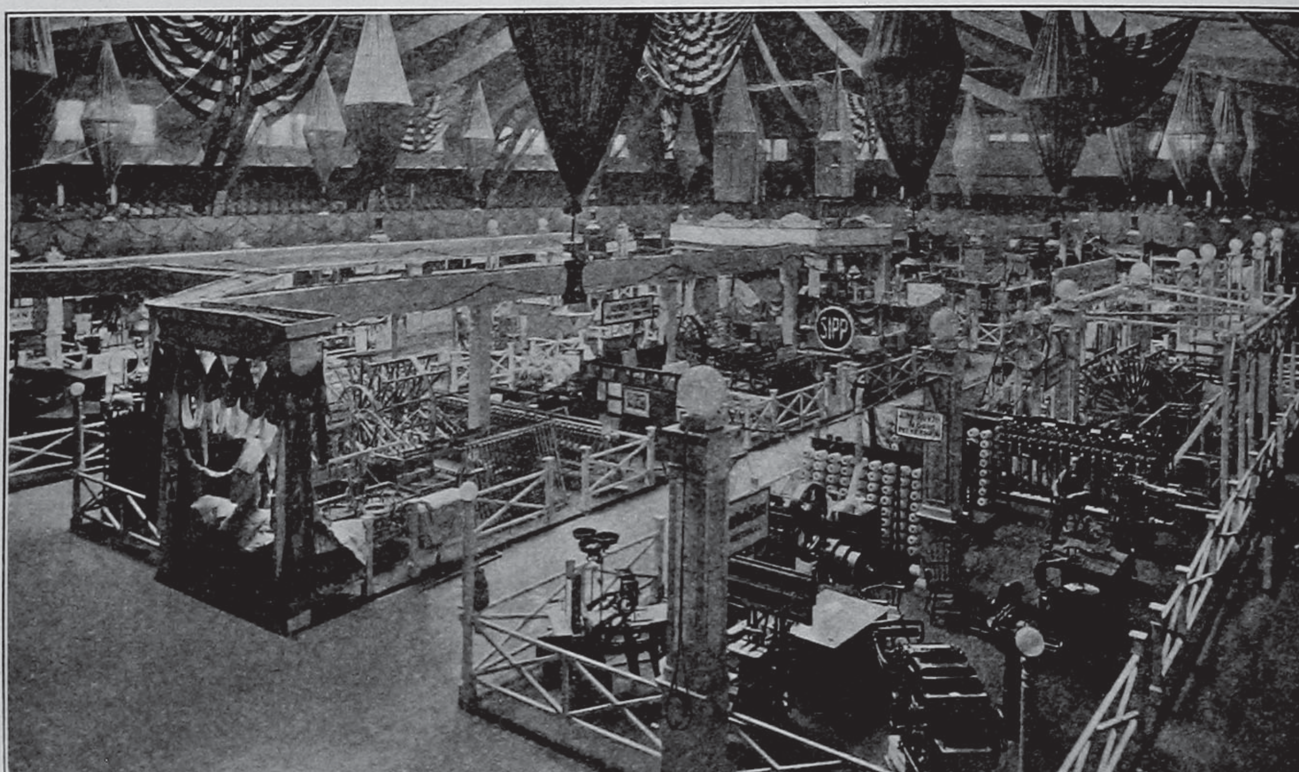
Designs 4, 5 and 6 are three new ornamental effects for *Carpets*, just patented by William A. Elliot, Yonkers, N. Y.

Design 8 shows a new ornamental effect for a *Carpet*, just patented by John B. Moffat, Bronxville, N. Y.

THE PATERSON INDUSTRIAL EXPOSITION.

The Paterson Industrial Exposition, popularly known as the Silk Exposition, opened in Paterson, the centre of silk manufacturing in this country, on Nov. 9th and closed on Nov. 19th.

The Exposition was held in the Armory Building, the largest in the city, and was under the management of the Board of Trade of the Silk City, which is composed of the leading silk manufacturers, machine builders, supply dealers and others identified with the silk industry, together with the progressive merchants of the city.



View of Exposition: Exhibit of John Royle & Sons, in Foreground.

The success of the Exposition was plainly visible, silk manufacturers being present from all parts of this and foreign countries, and every day was marked with some special feature or the attendance of some persons of prominence, who found the exhibits, of those identified with the industry, of special interest.

The Exhibits.

The exhibits of silk manufacturers, silk machine builders, and others identified with the industry, was very complete, and proved of great interest to manufacturers and others.

One of the exhibits which attracted considerable attention was that of

John Royle & Sons, Paterson, which was located near the entrance. The feature of the exhibit was their Power Piano Machine, equipped with individual electric drive, the motor being of ¼ *H. P.*, and self contained. The motor is rigidly supported and braced, and the speed of the same can be regulated to suit the operator, a rheostat being placed convenient to the finger board of the machine, for this purpose. Other than this improvement, the machine is identical with their standard Power Piano Machine.

Their exhibit also included a Power Repeater and a Hand-Repeater as well as Card Lacing Machines, together with their line of photo engravers' machinery. Another one of their productions is the De Laski Circular Loom, which was shown in operation; the same was operated by the Manhattan Rubber Co., Passaic, N. J., who were using the same for producing the interwoven tubing used in their Underwriters Fire Hose.

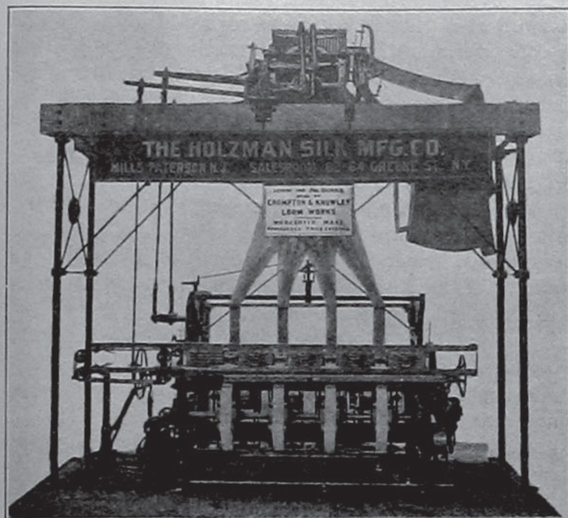
The operation and various other details of these machines were explained by Vernon Royle, John Royle, Heber Royle, Wm. K. Royle and Vernon E. Royle.

The new type of ribbon loom built by the

Crompton & Knowles Loom Works, Worcester, Philadelphia and Providence, operated by the Holzman Silk Mfg. Co., was a leading feature of the Exposition. This loom was one of their latest type, being of the four shuttle, positive acting, changeable motion, and was equipped with a Jacquard head, weaving a fac-simile of the Paterson City Hall, in black and white, with the *Bright Spot,* the official mark of the Exposition, in blue and gold.

Adjoining this Exhibit was that of McCollom & Post, manufacturers of dress silks. They exhibited an old hand loom which was operated by John Eadson, one of the early generation of silk weavers in Paterson, and was a great feature of the Exposition.

The contrast between the improved loom of the Crompton & Knowles Loom Works, and the old hand loom alongside, showed conclusive evidence of the growth of the industry, and from a productive standpoint in weaving, *who* was responsible, in a certain measure, for this growth, by devising improvements



Crompton & Knowles Jacquard Ribbon Loom

which resulted in a greater and more economical production.

The Sipp Machine Co., of Paterson, had a large exhibit of their foremost machines, which proved of interest to most every manufacturer who attended. The sensational feature of the exhibit seemed to be the Sipp Lightning Quiller-Copper. This machine is very ingeniously and durably constructed, and for speed is the marvel of the industry. It is capable of attaining a speed of 6000 revolutions per minute and producing a solid even surface, easily unwinding quill or cop, either plain or cross traverse. A special type of spool is also being brought before the trade by the Sipp Machine Co., which permits them to wind a greater amount of silk on a spool than heretofore.

They were also exhibiting their standard French Quiller for broad silks (720 spindles of which were sold during the Exposition).

They also displayed their new type of winder, which attracted considerable attention. This winder is constructed along scientific principles, which result in producing an even spool with the maximum amount of production. There are various distinctive features about this machine, which deserve special mention, one of which is its rigidity. This feature alone attracted considerable attention, as all vibration is practically eliminated. The traverse motion is securely fastened to the frame and is at the same time rigidly braced, which permits of no lost motion whatever. The traverse wheels are rigidly fastened to the frames and the oscillating arms, in turn firmly guided to the cams, allowing just enough freedom to give a steady, even motion to the traverse bars, which bars, by the way, are provided with a clever device to keep them from twisting and consequently binding in their guides.

This winder and its interesting traverse motion we will illustrate, probably in our next issue, and at the same time describe more of its new and interesting features.

Another feature is the shelf on top of the machine. Heretofore, it has been customary to leave the opening between the shelves over the swifts, but the Sipp Machine Co., seeing the disadvantages of such an arrangement, especially when running light colors, arranged their boards with the opening in the centre, between the swifts, and not over them. Such details as these are characteristic of the Sipp output.

Included in their exhibit was their new Warper, equipped with the Swiss attachment and movable Reed Motion. This machine was operated by the Madison Winding and Warping Co., and it is claimed, it is the leader in the field as to quality and quantity of production. The operation and details of the Sipp Machine Co.'s exhibit were demonstrated by Grant Sipp, Wm. J. Turner, E. H. Hergesheimer and N. A. Hover.

Another exhibit of interest was that of

Alfred Suter, Textile Engineer, 487 Broadway, New York, who was showing his line of scientific and practical equipment of special interest to silk manufacturers, consisting of yarn and cloth testing apparatus, the "Suter" Reed Entering Machine and the well known calculating disks and cylinders of E. Billeter, Zürich.

The collection of testing instruments was very complete, including automatic strength and elasticity measures for yarns and fabrics; quadrants for direct sizing and numbering of yarns; the new twist measurer for determining the take up, and twist per inch in yarn, having the improved magnifying glass attachment; the new type of silk reel with spreading motion, reeling from swifts, spools or cops; yarn inspectors and the direct reading speed measurer, registering up to 12,000 revolutions.

The "Suter" Reed Entering Machine, by which an operator can draw-in 5000 ends per hour, without

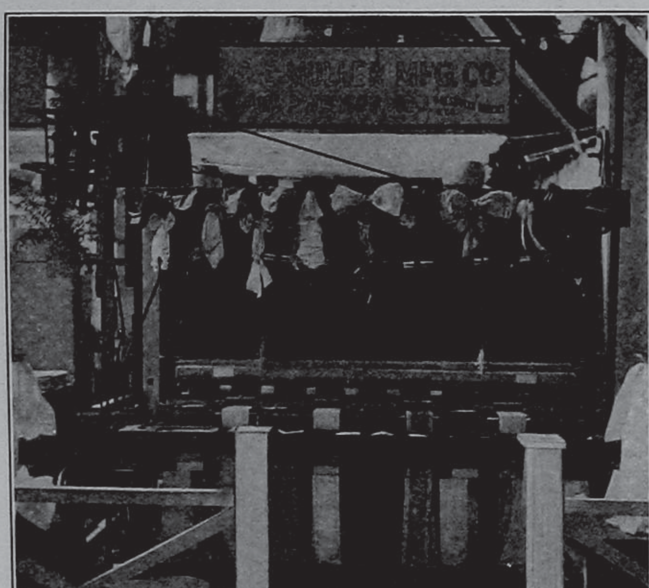
Exhibit of The Sipp Machine Co.

fatigue, was a very interesting feature, its labor and time saving features being fully demonstrated by Mr. Suter.

The Textile-Finishing Machinery Company, Providence, builders of drying and finishing machinery for silk, cotton and silk-cotton fabrics, were well represented at the Exposition. On account of the size and character of the most of the machinery that they build, it was impossible to exhibit the actual machinery in operation; they, however, showed a complete set of photographs, cuts and blue prints which were of much interest to the trade. This concern builds a complete line of machinery for dyeing and finishing, including gas singers, padders, jiggs, dyeing machines, printing machines, color kettles, color strainers, steamers, ageing machines, drying machines, tenters, finishing cylinders, calenders, hydraulic presses, pumps, etc. They exhibited among other things three different styles of Patent Automatic Tenter Clips; two of these showed clips which have been in use on tenters running silk goods for many years. The third is a new clip of especial interest to the trade, known as the two roller automatic clip, especially designed in order to obtain the best results on sheer fabrics, for running such goods without danger of injury and with a very uniform, even selvage.

An attraction which seemed to take the attention of the visitors was the exhibit of the C. E. Mueller Mfg. Co., manufacturers of ribbons, who were operating a loom built by

Widmer Bros., Paterson, who occupy an important position in connection with the ribbon and nar-



Ribbon Loom built by Widmer Bros.

row-ware industry, their works being located at 108-114 North 7th Street, and through their many years of experience, in the industry, have been able to produce a loom which is economical as well as productive, and is found in many of the most prominent mills throughout the silk ribbon industry. Both of the builders of the loom, as well as C. E. Mueller were in attendance.

In the same aisle was the interesting exhibit of the Clover Leaf Mfg. Co., of Carbondale, Pa., who manufacture a complete line of bobbins, spools, reel-arms, pin-boards, and trays, for the silk industry. W. E. Bennett was in charge of the exhibit.

The Ulrich Co., Paterson, had a very interesting exhibit which attracted the attention of most every one connected with the industry. A feature of their exhibit was the practical demonstration, by several of their employees, in drawing in a warp. Their work showed at a glance, the same care and accuracy that is characteristic of the work turned out by the Ulrich Co. Together with this they were showing the varied line of reeds, harnesses, lingoes, shuttles, mails, quills, ribbon blocks, wire and reed eye heddles and baked harnesses, as well as wire heddle frames for fancy and doup harnesses.

The Ulrich Co., were represented at the Exposition by Albert and Frank Ulrich, two of Paterson's progressive business men and Franz Ulrich, the founder of the business, who is known by almost every one identified with the industry.

Another interesting exhibit was that of Francis H. Mayhew, 397 Bridge Street, Brooklyn, N. Y. The same consisted of two machines for knitting silk ties similar to those built by the H. Brinton Co., 213-215 Race Street, Philadelphia, foremost builders of up-to-date knitting machinery. These machines were an extreme novelty to the manufacturers and visitors to the Exposition, and were producing ties of two varieties, one operating on the accordeon-stitch and the other on plain-stitch. The finishing of the ties was also of great interest; after being overedged, they were steamed, pressed and finished by means of heated irons, and boxed ready for sale. The exhibit was in charge of L. P. Hanse.

E. B. Hindley, of Paterson, was exhibiting the Hindley Winder, which is adapted to either hard or soft silk and is finding extensive use in many of the mills throughout the silk industry.

An exhibit of interest was that of the

Warp Twisting-In Machine Co., of Brooklyn, N. Y. This machine is adapted for twisting in all kinds of work, including multiple warps. The machine is capable of twisting 300 ends per minute or about 75,000 ends a day of 10 hours, on broad goods; and can be operated with the warp in or out of the loom. The principles of the machine were demonstrated by A. D. Adriance.

The Roessler & Hasslacher Chemical Co., New York, were exhibiting various samples of silk and silk mixed yarns and fabrics, together with samples of ramie yarns, bleached by their process, and through the courtesy of Robert Carter, Geo. W. Kuchler and Dr. Schoedler, their representatives, manufacturers were made acquainted with the value of their bleach.

The American Silk Dyeing and Finishing Co., Paterson, printers, dyers and finishers of piece goods, had a very interesting exhibit at their booth, which was quite a novelty. They showed the preparatory process of securing the silk fibre. The equipment consisted of electric apparatus for heating the water, in which the cocoons were immersed, and as the gum softened, the operator secured the free end of the fibre. After securing a certain number of ends they were reeled together as one thread and later transferred to the other reels, where the silk was entirely dried. Wm. A., Geo., Thos. J. Arnold and S. D. McCausland, were in attendance, together with A. de

Villeneuve of the Paul Geril Co., New York.

Frederick Kraissel, Sect. of the Emil Greiner Co., manufacturers of scientific apparatus, 45 Cliff Street, New York, was showing their line of laboratory accessories.

The Paterson Knitting Works, Inc., manufacturers of sweaters and other knitted fabrics, demonstrated the manufacture of their lines of production on a flat bed machine.

The National Silk Dyeing Co., were showing beautiful examples of their work of skein yarn, piece dyes and prints, in a wide variety of colors. Chas. E. Lotte, Frank Maas, J. O. Nightingale, B. Dreifus, J. Shattuck, J. Putizo, John Folks, J. Schotts and Fred. Martin were in attendance.

Directly opposite was the exhibit of the Weidmann Silk Dyeing Co., which consisted of a large variety of dyed skein silk arranged in the form of a semicircle, the colors blending in such a manner as to represent a sun set. The brilliancy of the colors were further intensified by the application of the Moore Light.

The Augusta Silk Co., Paterson, manufacturers of ribbons were exhibiting the smallest Jacquard loom ever constructed, and in actual operation, producing narrow figured ribbons. The loom was constructed by A. Fourneyron.

Stern & Pohly, broad silk manufacturers, of Paterson, were showing the production of their fabrics, the loom in question being operated on Persian prints.

The Meisch Mfg. Co., were showing a wide variety of their fabrics, as were also the Cramer & King Co., dyers and finishers of silk fabrics.

The Model B. Insulated Thread Finishing Machine, in operation, was exhibited by the builder, Wm. C. Keyworth.

The Hydraulic Press Mfg. Co., builders of silk finishing machinery and hydraulic hot plate presses, were represented at their booth by H. H. Pore.

Prescott and Waywell, winders and warpers, Paterson, were operating an Atherton warper, while I. A. Hall & Co., were exhibiting a full line of reeds, harnesses, shuttles and supplies of all kinds for the silk industry.

Other exhibitions were J. A. Van Winkle & Co., Mill Supplies; H. W. Mills & Co., Mill Supplies; The Manhattan Rubber Mfg. Company, Mechanical Rubber Goods; John W. Ferguson & Co., Engineers and constructors of some of the leading Silk Mills, all of Paterson. Mitsui & Co., New York, were exhibitors, and were represented by T. W. Fischer and M. Hotta, and others.

Included in the Exposition was the exhibit of art in woven fabrics which was in charge of John Matthews of the Paterson Silk Textile Institute.

Another feature was the exhibition of Paterson made silks, contributed by the manufacturers of Paterson and worn by models. Some of these fabrics were, a striped yellow crépe de chine, made by John Hand & Sons, a messaline made by the Pheonix Silk Mfg. Co., a green satin by Pelgram & Meyer, white marquisette by Arthur Price, a marquisette by the Empire Silk Co., a black and white satin by H. Miedendorp, a black marquisette by the Henry Doherty Silk Co., and a Persian fabric by Stern and Pohly. Baker and Schofield furnished a black crepé with messaline lining, while a ruby and blue changeable silk gown was furnished by the Henbert Silk Co. Black and white brocades and marquisettes were furnished by Ashley & Bailey and silk brocades by Cardinal and Becker.

Among the many manufacturers and others identified with the industry, whose presence was noted at the Exposition, were John Best, of the Best Silk Mfg. Co., E. A. Minet, of the Pine Tree Silk Mills, W. H. Rossmaessler, of the Sauquoit Silk Mfg. Co., of Philadelphia; W. H. Davis, of the Sauquoit Silk Mfg. Co., Scranton; H. J. Haytock, Northampton Silk Co., Easton; Henry Anner, Standard Silk Co., Phillipsburg; Joseph and Nelson T. Lockman, of Lockman Bros. Silk Co., Carlisle; Wm. R. Thomas, Jr., of the Wahnetah Silk Co., Catasauqua; Edward A. and Henry Soleiac of the Adelaide Mills, Allentown; Walter Lotte of the National Silk Dyeing Co., Allentown; A. P. Sully, of Reede & Co., Cumberland, England, one of the oldest silk houses in the world, and Vice-president of the Silk Assn. of Great Britain and Ireland, Jerome C. Reed, pres. of the Silk Assn. of America; Peter R. Rowson, pres. of the Silk Throwsters Assn. of America; Marquis Negroto Gambiaso and C. E. Ceacato of the Italian Embassy, Washington; Benj. Firth, of The Karl Schlatter Dye Works, Philadelphia; Henry Ruegg of Schwartzenbach & Huber, West Hoboken.

On Thursday, Nov. 17th, Chang Yin Tang, Chinese Minister to the United States, his Sect. Ping Tien Lu, together with Thomas W. Barlow, Esq., Honorary Consul of China, located at Philadelphia, were interested visitors, as was also Thomas Alva Edison, the Wizard of the Century, Herman A. Metz, Esq., and E. A. Widman, Sect. of H. A. Metz & Co., New York City, Arata Aoki, Vice Consul of Japan to the United States, S. Yagi of the Consular Service of Japan and Shinjiro Banno, of Horikeski & Co., New York City, T. Saklatvala and G. Miyizuma, of Tata & Co., New York, and Hermon Simon, of R. H. Simon, silk manufacturers of Easton, were interested spectators at various times.

New Process for Waste Silk.

The manager of the Fuji Gassed Yarn Company, at Yokohama, has patented a process with regard to waste silk. The new process consists in boiling the waste silk while it is still wet, instead of drying it first. At present the silk-reeling establishments dry their waste, and sell it either for consumption in Japan or for export in the shape of dry waste. This dry waste has then to be boiled. Under the new system the boiling of the silk will be done by the reelers themselves before the waste has had time to dry. It is estimated that in this way 70 pounds of boiled dry waste will be obtained for every 100 pounds of ordinary dry waste, but that the former will produce 35 pounds of peigné (dressed silk) as compared with only 30 pounds from the latter, and the quality under the system will, it is stated, be much better.

Preparatory Treatment and Weighting of Silk.

Dr. Louis J. Mátos, Textile Chemist.

(Concluded from page 134.)

Silk, after weighting, may be either dyed immediately while still in the wet state after the final washing, or it can be dried, bundled and stored until such time as it is required for use.

The storing of weighted silk cannot be done with indifference, a proper room should be set aside, well ventilated and with blue curtains at the windows, if the light shines directly on the shelves containing the silk; if the silk is protected from direct light, the shades may be omitted. It has been noticed in many instances that the ends of skeins of weighted silk exposed to light have been altered somewhat, and that certain classes of dyestuffs are not taken up, the result being uneven shades which are difficult to correct.

The silk store-room should also be protected against the possibility of dust entering and settling on the skeins. Sometimes this dust consists of minute particles of dyestuff which have floated around from the drug-room, and which make their presence known after the silk is wetted-out for dyeing; frequently causing stains and specks which baffle the dyers' attempts to remove them.

The dyeing of weighted silk should not be unnecessarily delayed after weighting. The skeins of silk, if taken from the store-room, should be thoroughly wetted-out in warm water and then passed on to the dyebath. Three classes of dyestuffs are principally used for dyeing this class of material, *viz: basic* colors, *Diamine* colors, and *acid* colors. Basic colors are most largely employed on account of their particular brightness and fullness, unfortunately, however, they do not share in the degree of fastness to light or washing possessed by the other two groups of dyes mentioned.

Boiled-off Liquor.

In using the basic colors, the best results are always to be had when boiled-off liquor is employed, on account of the peculiar control it has over the dyestuff when in solution, in not permitting it to jump on the fibre too rapidly. The dye-bath is prepared with the boiled-off liquor, and then acidulated with a small quantity of acetic acid; the temperature of the bath brought to about 150° *F*. A higher temperature at the start tends to produce unevenness of shade and less fastness to washing. The wetted-out silk is immersed, turned slowly but regularly until the proper shade is obtained. If an increased temperature is used, there is a strong tendency to unevenness, specially if the silk has been weighted for a long time. Another reason to keep the temperature at the point indicated, is due to tendency of some of the basic colors to decompose.

During the dyeing, no additional steam is turned on, the dyeing progressing in a gradually cooling bath, the final exhaustion of which is effected by the addition of a slight amount of acetic acid. Lift the skeins, rinse well, and brighten by passing them through a fresh bath containing a small quantity of tartaric acid.

Pale shades, obtained from the use of basic colors, should always be dyed upon freshly weighted silk, and then in a bath containing a fatty soap, at a mean temperature of 100° *F*.

In some mills it is difficult to procure boiled-off liquor in sufficient quantity, and dyers have constantly been on the lookout for a substitute that would be at once practical and economical. A boiled-off liquor, which has been successfully manufactured and used, is prepared in the following manner:

Take of neutral silk soap	2¼ pounds
Boiling water	10 gallons,
Dissolve, and add a solution of	
Transparent French glue	10 ounces, in
Water	1¼ gallons.

Mix thoroughly, and heat to boiling, and at the moment of boiling add

Commercial olive oil	5 ounces

Continue the boiling with constant stirring until the oil is thoroughly emulsified. The oil used should be as free from rancidity and odor as possible.

As the function of boiled-off liquor in the dye-bath is to ensure level shades, any substance tending to such a result is all that is desired. Besides compounding an artificial boiled-off liquor, such as the one described, and which works perfectly, various chemical salts have been suggested for the same purpose, one of the most simple recommended being sulphate of soda, in quantities varying from 10 to 20 per cent on the weight of the silk to be dyed. A cold bath is prepared, the silk entered, and the previously dissolved dyestuff fed in only at the same rate that it is taken up from the bath. The silk is claimed not to lose in lustre, though an after treatment with acetic acid tends to brighten the shade.

The diamine colors are dyed upon weighted silk in a bath charged with boiled-off liquor, and containing from 7 to 10 per cent of Glauber's salt; this bath must be neutral, acidity due to traces of acid contained in the Glauber's salt, should be neutralized with sal soda, otherwise certain of the shades are liable to be dulled, which, however, is easily corrected by passing the dyed silk through a bath made feebly alkaline with soda. The dye-bath should be luke warm, the silk is then entered, and the temperature raised gradually to the boil, and the dyeing continuing at or near this temperature until the proper depth or shade is obtained. when the skeins are lifted, washed, and dried, or, as is necessary in a number of instances for special purposes, the dyed material is aftertreated with metallic salts, for the purpose of imparting additional fastness to the shades, specially towards water, fulling and washing.

The metallic salts chiefly employed for this purpose are sulphate of copper, bichromate of potash, or chromium fluoride, used either alone, or in combination with each other. The quantities used vary from 1 to 3 per cent. on the weight of the dyed silk, depending upon the depth of shade to be *treated*. The process is to prepare a bath, dissolve the metallic salt, and add 6 per cent of acetic acid, raise the temperature to the boil and enter the silk, and work for ¼ of an hour, lift, rinse, and finish.

The so-called acid colors comprise the group of dyestuffs most generally used for dyeing weighted silk, for the reason that under ordinary conditions, shades of excellent brightness and good fastness are obtained. Another point concerning their use is that they exhaust more or less completely. They are usually dyed in boiled-off liquor, aciduated with sulphuric acid, the silk being entered at a temperature of about 110° *F.*, then raised to the boil, working regularly, while the bath is cooling off. An excess of acid should be avoided to ensure even shades. Rinse, and pass through a fresh bath containing a small quantity of tartaric acid to brighten and give scroop.

Some acid colors, notably those of the eosine and allied groups, require that dyeing proceed in an acetic acid bath, while the exhaustion is effected by adding a small quantity of sulphuric acid. Among the well-known acid colors are the Nicholson Blues—also known as alkali blues—which produce the brightest blue shades; these are dyed at or near the boil in a fatty soap bath containing a little borax, after which the shade is developed by passing through a hot weak sulphuric acid bath.

Certain classes of fabrics require that the colors had best be dyed with either basic or acid dyestuffs, on account of the brightness desired, and which should also possess a much better degree of fastness than the shades would have normally, consequently a mode of fixation, very similar to the well-known tannin-antimony mordanting process for cotton is employed; only it is applied directly to the silk, after dyeing.

The process is as follows: the silk, dyed with either acid or basic colors, is immersed in a bath at a temperature of 150° *F.* for several hours, and containing from 1 to 2 pounds of commercial tannic acid (not the equivalent in sumac or galls extract), lift, squeeze and work for half an hour in a fresh bath, heated to 120° *F.*, containing 8 to 12 ounces of antimony salt per 10 gallons of liquor, then rinse thoroughly and pass through a soap bath, and finally brighten. Silk, subjected to this treatment, after dyeing yields shades that are particularly fast to washing, fulling, etc., and as a consequence the process is very much used. When basic colors are subjected to this treatment, a slight amount of color comes off when the silk first goes into the hot tannin bath, consequently the dyer should allow for this in matching up by making the shade a little heavier.

Black dyeing on weighted silks, whether produced by artificial colors or with logwood, is carried on very extensively. When using the artificial colors, the process is rather simple, consisting of the use of diamine colors which are capable of being diazotized and developed with suitable developers, while the logwood black process, owing to its complexity, is not much employed for dyeing tin-phosphate weighted silks, but is confined exclusively to silks weighted with iron, the details of which will be described in a special article devoted only to blacks.

The Denitration of Nitrocellulose Threads in the Manufacture of Artificial Silk.

A. Dulitz.

One of the difficulties met with in the manufacture of artificial silk from nitrocellulose, is the production of a thread uniformly and sufficiently denitrated. It must be remembered that threads which differ in the amount of nitrogen contained, by $\frac{1}{10}$ per cent differ considerably in their capacity for absorbing dyestuffs. Fibres containing no more than 0.05 per cent of nitrogen are sufficiently denitrated for all practical purposes.

In carrying out the process of denitration it is necessary that:

(1) The nitrocellulose thread must be regular, of unvarying nitrogen content, and spun under the same conditions with reference to degree and duration of *setting;*

(2) Its moisture content, upon entering the denitrating liquor, must always be the same;

(3) The volume of denitrating liquor per given weight of nitrocellulose must be constant;

(4) The denitrating bath must remain of constant composition;

(5) Its temperature, both at the commencement of and during the operation, must be the same;

(6) The time during which the denitrating liquor acts upon the fibre must be the same.

Solutions of calcium or sodium hydrosulphide (with certain additions) are, as a rule, used in practice as denitrating agents.

The advance of the denitration is controlled by titration with iodine, but this method (as also that of examination of the thread in polarised light) hardly can be relied upon, for which reason, it is usual to ensure a practically thorough denitration by leaving the fibre in the bath for a few minutes longer than is considered necessary for the completion of the reaction. This procedure, however, carries with it the danger of reducing the strength of the fibre, since denitrated threads are attacked by immersion in *used* sulphide baths.

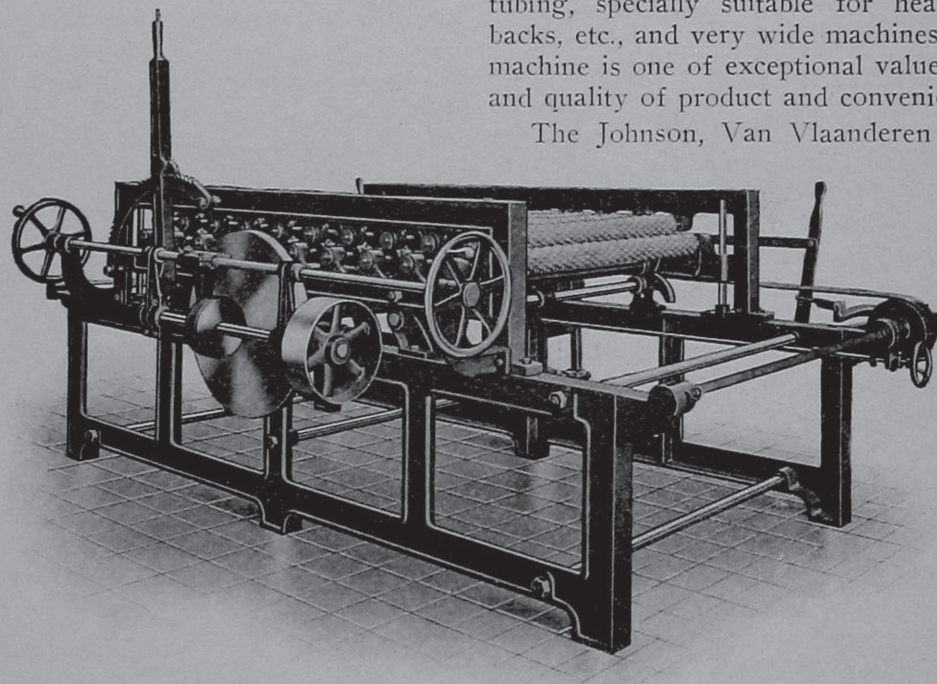
The question of additions to the collodion solution is important, since additions of resin, oils, etc., tend to diminish the lustre of the threads obtained, whilst others tend to produce oxycellulose, which, when the baths contain ammonia, may dissolve, giving, in turn, rise to a weak thread.

Alcohol has been suggested as an addition, since it produces a slight gelatinisation of the fibre and consequently a rapid penetration of the denitrating liquid.

Nitric, acetic or phosphoric acids are also efficacious, but their use is accompanied by a loss of sulphuretted hydrogen and a rapid diminution in the strength of the bath. Sulphide baths, which are not too highly diluted and with which the denitration occupies 1½ to 2 hours, are to be preferred; the sulphur which separates is then rapidly dissolved, and there is no tendency to loss of lustre or formation of spots in the thread.

Improved Button Breaker.

The Johnson, Van Vlaanderen Machine Co., Paterson, N. J., specialists in building machinery for finishing and dyeing all classes of silk and mixed silk goods, both broad and narrow fabrics, are presenting to the trade their *New Button Breaker,* which commands the attention of every silk finisher. The accompanying illustration shows this machine in its perspective view. While similar in general outline to button breakers heretofore constructed, this machine includes some



novel features which give it unique value, simplifying the operation of the machine, while improving the quality of the product. These changes include a new application of the friction drive and the placing of all the movements and adjustments of the machine under more ready control of the operator than has been heretofore possible.

Instead of the tight and loose pulleys heretofore used, a friction drive is provided, by means of which the speed of the machine can be regulated to the precise rate best adapted to the fabric that is passing through. The construction of the drive is of an improved character, strong, compact and certain in its operations. The pinion, which is made of tarred fibre, drives a cast iron face plate of large diameter, a decided improvement over the method of driving the pinion by the face plate, which is apt to result in wearing flat places on the pinion, which tends to drag, when the machine is started up. The large diameter of the face plate is also important, since it avoids the necessity of driving near the centre where the drive is weakest and the consumption of power greatest in comparison with results.

Specially worthy of note is the grouping of the parts for controlling the different movements of the machine, at one end, right where they can be conveniently reached by the operator, who never has to leave his position, to make any of the ordinary changes incident to the operation of the machine, like for instance, the hand wheels and levers for throwing the power on and off, starting, reversing and stopping the machine, raising and lowering the rollers, raising and lowering the spreaders, and throwing the tension on and off the take-up.

These machines are made with either lever or worm and wheel movement for raising the rollers, and with wooden rollers, or rollers made of brass tubing, specially suitable for heavy goods, cotton backs, etc., and very wide machines. Altogether, the machine is one of exceptional value, both in quantity and quality of product and convenience of operation.

The Johnson, Van Vlaanderen Machine Co. are continually bringing out new machines which are all of the same high type of design and construction, *viz:* Lustreing Machines and Washing Machines for skein silk dyers; Calenders of all kinds, both lever and hydraulic pressure; Moiré Machines, Printing Machines for Ribbons and Narrow-Fabrics, Jiggers, etc. They are continually bringing out new things, hence all interested in silk finishing or piece dyeing should keep in touch with this firm, especially when planning additions or alterations to existing plants. Their designs include everything of established value, modified and improved by the original ideas of the company.

Exports from Lyon to United States.

The exports declared at Lyon for the United States during the six months ended June 30, 1910, amounted to $5,806,430. The same are considered normal.

The following is an itemized statement of the exports: Raw silk $569,114, Artificial silk $12,748, Spun silk $596,068, Silk waste $352,908, Silk piece goods $1,870,186, Pongees $99,821, Silk tulles, veilings and hair nets, $1,008,966, Silk velvets and plushes $303,658, Church ornaments and vestments $53,281, Cotton goods $50,178, Metallic threads and trimmings $191,182, Machinery and parts of $47,259, All other articles $651,061.

COTTON SPINNING

The Ring Frame

(*Continued from page 138.*)

Yarn is spun either for warp or filling by varying the twist and the manner of winding the yarn on the bobbins. The winding is regulated by a cam.

The warp yarn receives a considerable amount of twist and is wound in layers up and down, like done on the roving frame, each layer a trifle shorter than the one preceding it, so as to form a cone or taper on top and bottom of the bobbin, as shown by the warp wind bobbin, see Fig. 289. A heart shaped cam is used.

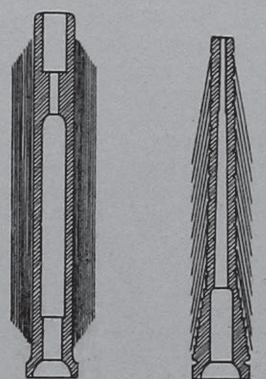


FIG. 289. FIG. 290.

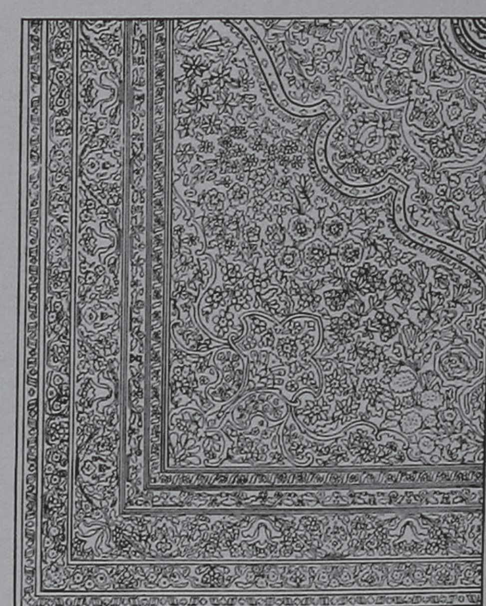
Filling yarn receives little twist, and to make it pull off conveniently, *i. e.*, unwind without strain in weaving, it is wound with each layer the same length, but the starting point of the traverse is a little higher up each time, as shown by the filling wind bobbin, see Fig. 290. A cam is used, shaped something like a three-leafed clover, and which gives the ring rail a slow and short upward traverse with a return about three times as quick, in order that every alternate row of yarn may be wound in a spiral of comparatively greater pitch, forming a binding thread to keep the yarn from ravelling off while winding, or more particularly later on during weaving.

To give shape to the full bobbin, filling bobbins are made with stepped taper at the bottom, while the warp bobbins are made straight. The taper on the bobbins is a matter of judgment, but should be sufficient to prevent tangling. The taper is regulated by adjusting the length of a rod, secured to the lower spindle rail, and used as a trigger to act on a pawl which in turn acts on a ratchet gear on the end of the warp builder, and turns it a few teeth every lift of the rail. The turning of this gear turns a worm which through suitable connections moves the point of attachment of the traverse chain farther in, which reduces leverage, and hence reduces length of traverse. The longer the rod is set, the more teeth are turned, and hence more taper given to the bobbin and vice versa. The finer the counts of the yarn spun the fewer the teeth to be lifted at each turn of the heart cam. With filling builders, the turning of the ratchet gear does not change the lift of the ring rail, but simply starts it a little higher up each time. The ratchet gear has to be wound back to the starting point after each doff, so as to start the bobbins building at the bottom again. Lengthening the traverse chain or increasing the leverage of the chain support arc, shortens the traverse, and vice versa. The descent of the ring rail, in both warp or filling wind, is occasioned by the force of gravity, but its speed is regulated by one of the cams previously referred to. Provided we should ever come in contact with extra hard twisted filling yarns, for example, such as are used for weaving crapé, we may then find the filling wind, in such exceptional cases, dispensed with, since the excessive twist would cause such yarns to run into snarls if unwound during weaving endways from the bobbin, and then the parallel or warp build is employed.

Ring rails should be stiff to avoid springing and consequent uneven winding. They should not be more than 8 ft. in length, and should be cast so that when finished and placed on the frames they will be perfectly level on the top and straight on the sides, without being pened. More than two lifter rods to a rail are not advisable, since if three are used, the rails are apt to dwell and thus be the cause of badly filled bobbins, especially with filling yarns. A slightly tapered hole on the under side of the rail, where it rests on the lifting rods, where two rods are used, will avoid binding or dwelling, due to the frame being slightly out of level. Ring rails should be perfectly level and straight, in order to have their rings level, a necessity for perfect spinning.

(*To be continued.*)

New Rug Design.



The illustration shows one quarter of a Rug, the design of which has just been patented by E. G. Sauer, Richmond Hill, N. Y.