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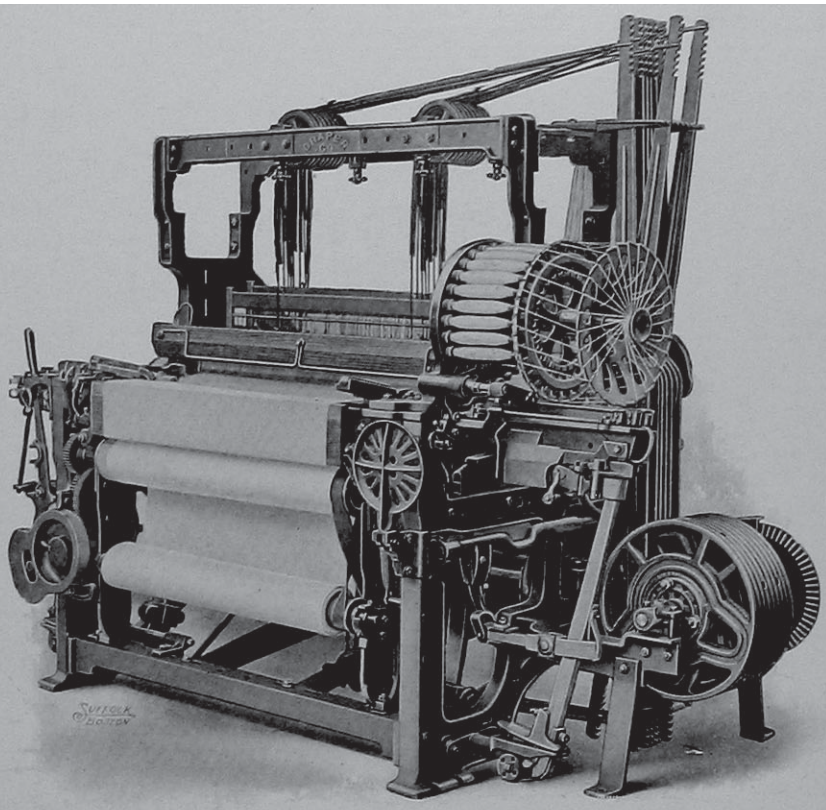

NORTHROP SIDE CAM CORDUROY LOOM.

THE PRESENT SEASON DURING THE STOPPAGE OF MACHINERY INCIDENT TO HIGH PRICED COTTON IS AN IDEAL TIME TO REPLACE COMMON LOOMS WITH NEW NORTHROP LOOMS AND THUS AVOID THE USUAL DISTURBANCE AND REDUCTION OF PRODUCT INCIDENT TO SUCH REPLACEMENT.

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THE JACQUARD MACHINE.

(Continued from page 159, June issue.)

The Jacquard Cards.

Fig. 12 represents a single Jacquard card, as required for a 200 Jacquard machine, $\frac{1}{16}$th of its actual size. This card shows 26 rows of holes in its width and 8 rows in its depth, or 208 holes total. These holes are shown in black, one for each hook in the machine. Besides these 208 holes, a large hole is shown on each side, permitting the pegs of the cylinder to enter and hold the card in position on the cylinder. The two small holes outside the peg hole, on either side of the card, are known as lace holes, *i. e.,* are used for threading, on a *Royle Card Lacer,* all the cards of the pattern in one string, which on the loom is then tied together in an endless arrangement.

Fig. 13 illustrates four cards laced together. The large hole, on either end of each card, is the peg hole, to receive the pegs of the cylinder (see Fig. 8). These pegs on the cylinder are movable so that any small variations, caused by card stamping, can be rectified.

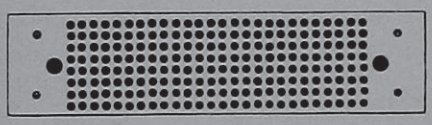


Fig. 12.

The paper used for the cards must be of sufficient thickness to resist the wear caused by the needles, as well as to give steadiness to the cards when resting in the pegs of the cylinder.

The cards are interlaced in an endless arrangement; hence, one card is brought after the other, in rotation, towards the needles. The cards only refuse service by not fitting properly on the cylinder, *i. e.,* if the peg holes are too near together or too far apart; or if the cards are warped, which is liable to happen in a damp workshop.

A careful examination of the cards fitting on the cylinder is absolutely necessary, otherwise, a wrong lifting of the hooks and destroying of cards by the pegs punching new holes, would result. The cylinder with cards perfectly cut, must be set so as to allow the needles to penetrate into the centre of the holes stamped for them in the card. Sometimes the cylinder is set too high or too low—too far in front or too far in rear.

To ascertain its proper position, lift the machine and place some paint or grease from the machine, on the heads of the needles. Afterwards, let the machine fall in, which will bring the cards against the heads of the needles and produce an impression, indicating the exact position of the needle heads on the cards. The cylinder is always set in its proper position when no marks are made by the entering needles on the margins of the stamped holes; and where there are no holes, the impression left by the needle head must be equally distant from the surrounding holes.

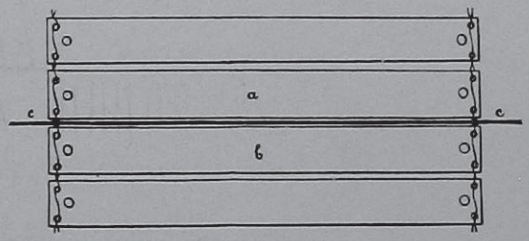


Fig. 13.

If the machine produces wrong lifts of the hooks and the trouble is not found in the setting of the cylinder, nor in the hooks or needles, then ascertain if the cylinder is adjusted, by means of the lever arrangement, close enough to the needle board; for if it is not, the hooks will not be pushed far enough from the griff bars, and by raising the latter, a wrong shed will be produced.

When using a great number of cards in a set, they are made to fold into a rack. This is done by attaching a common straight wire, 1 to $1\frac{1}{2}$ inches longer than the cards, at the junction of say every 12th, 15th or 20th card, as is shown at *c* in connection with illustration Fig. 13, between cards *a* and *b*. These wires

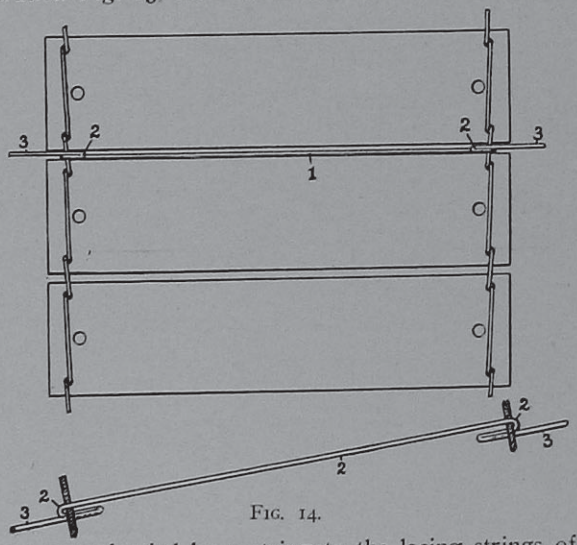


Fig. 14.

are securely tied by a string to the lacing strings of the set of cards. As will be readily understood, no matter how securely tied, there is always a chance for a wire shifting one way or the other and in turn causing trouble to the set of cards on the loom.

To overcome this trouble, of any chance of endwise play to the wire, is the object of the card wire shown in Fig. 14, showing three cards laced together with one of these self adjusting card wires attached thereto; below it is given a perspective view of the card wire, clearly showing the manner in which it engages the lacing.

Quoting numerals of reference will readily explain the subject.

1 designates the new card wire, and which is nothing more than a plain piece of wire having its end

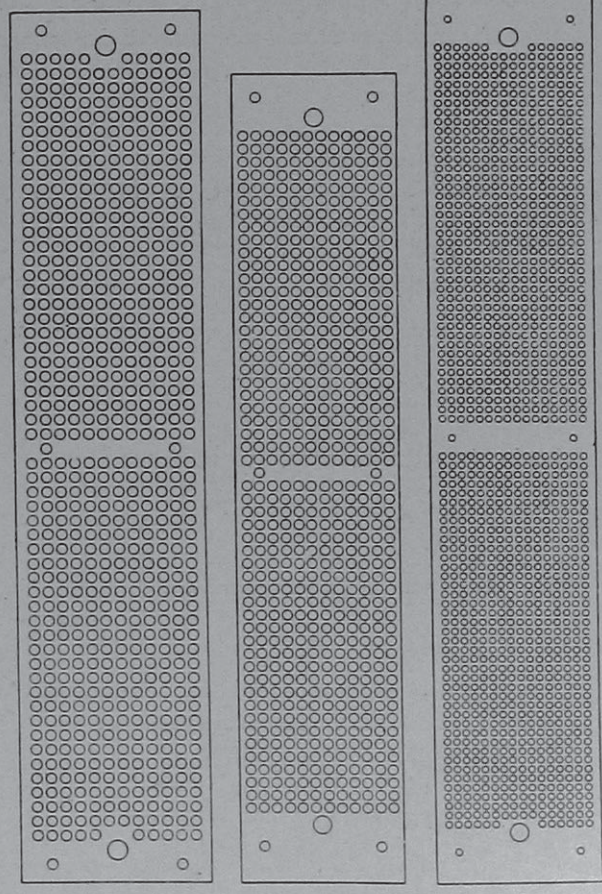


Fig. 16. Fig. 17. Fig. 18.

portions bent so as to form hooks or crotches 2, opening toward each other for the reception of the lace string of the cards, and projections 3 extending beyond said hooks so as to serve to support the wire, and in turn the set of cards on the card rack of the loom.

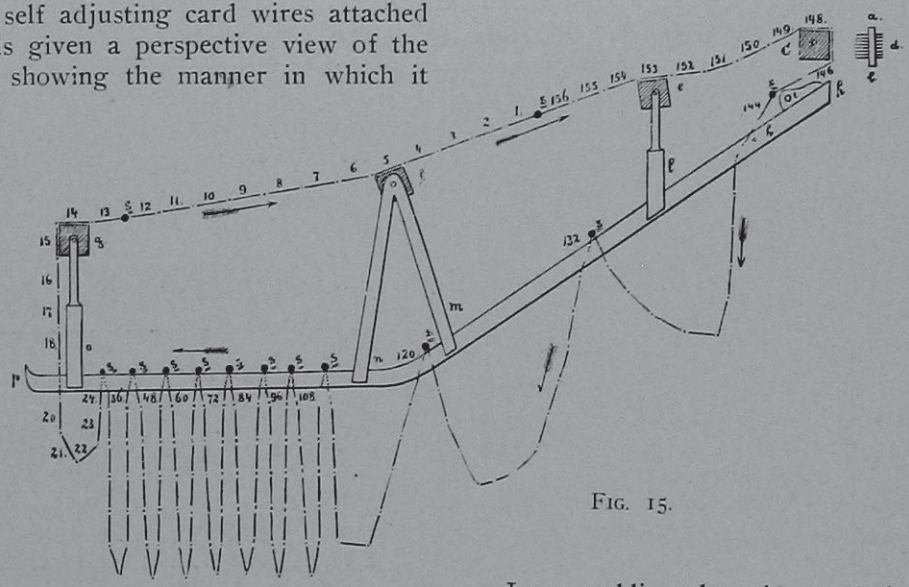


Fig. 15.

In assembling the wires and the laced cards, one hook of each wire is slipped over the lacing between cards and then the two cards are bent somewhat, transversely, until the lacings are brought closely enough together so that the other lacing may be in like manner entered into the other hook. The wires may be used indifferently, either side up, *i. e.*, the body portions above and the projections below the lacings, or vice versa; and whether they are in the one position or the other, the lacings come the same distance from the face of the cylinder as the wires are passing over the latter and the cards engage the pegs on the cylinder at the same elevation.

After the set of cards is thus wired, the same is hung into the rack provided for this purpose on the loom, see Fig. 15, and when the cards fall through the frame, but the wires attached to the cards, being longer, cannot pass through, and the cards will remain suspended, and subsequently fold together in a very compact manner. In our illustration, we have shown 156 cards arranged with wires attached to every twelfth card, as follows: between cards 156 and 1, 12 and 13, 24 and 25, 36 and 37, 48 and 49, 60 and 61, 72 and 73, 84 and 85, 96 and 97, 108 and 109, 120 and 121, 132 and 133, 144 and 145.

At *e*, *f*, and *g* are shown prisms, of the size of the cylinder, by which the cards are guided and regulated in their run towards the cylinder (direction of arrow); *i* and *h* represent round rollers, also placed in rack for guiding cards after leaving the cylinder *c*; *a* and *b* indicate the needle board, and *d* the needles of the Jacquard machine. *S* represents the wires as inserted in cards for holding them in the frame.

With reference to texture of Jacquard cards, *i. e.*, standard gauge of Jacquard machines constructed, we find three different indexes used, *viz:*

(*A*) The *American* Index as is used with carpet work.

(*B*) The *French* Index, comprising the bulk of our Jacquard work, and

(*C*) The *Fine* Index, which is used on machines designed for high textured and more elaborate designs where a great many needles are required, where it is necessary to bring a given number of needles within the smallest possible space, and where otherwise it would be necessary to use too cumbersome a Jacquard machine, or two or more machines.

To illustrate these textures of Jacquard machines in comparison to each other, the Crompton and Knowles Loom Works show in their catalogue these three indexes side by side and which we reproduce in the interest of our readers, in connection with Figs. 16, 17 and 18.

Fig. 16 shows an *American* Index card, *viz:*

52 full rows @ 12 holes = 624 holes
2 reserve rows @ 10 holes = 20 holes

644 holes, *i. e.*, needles, total capacity.

Fig. 17 shows our standard *French* Index card in proportional comparison; it is a smaller size card, containing:

52 full rows @ 12 holes = 624 holes, *i. e.*, needles, total capacity.

Fig. 18 shows us the proportional representative of a *Fine* Index card, *viz:*

80 full rows @ 16 holes = 1280 holes
2 extra rows @ 12 " = 24 "

1304 holes, *i. e.*, needles, total capacity.

It will be noticed that although the Fine index card is only slightly larger than French index and smaller than the American index, it contains more than twice the number of holes compared to either of the other indexes.

(*To be continued.*)

GRANITE WEAVES OBTAINED BY MEANS OF FOUR CHANGES.

Combining Two Different Weaves for Obtaining a New Granite Weave.

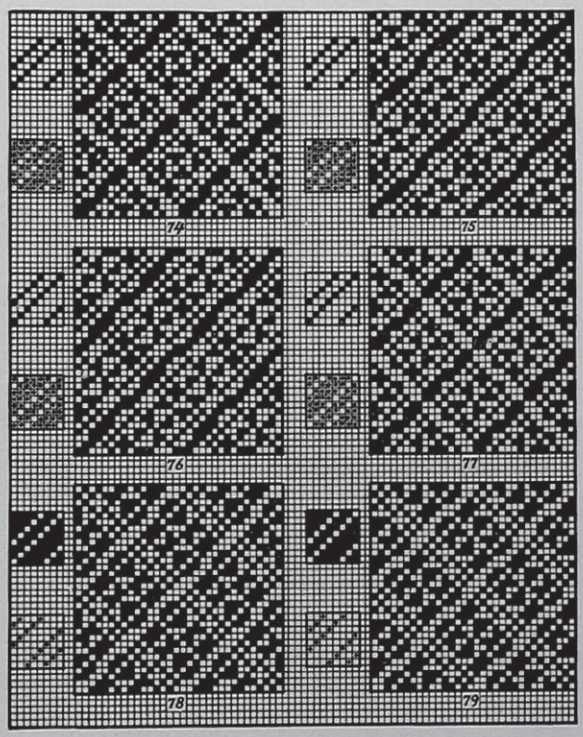
(*Continued from page 8.*)

In connection with weaves Figs. 74 to an inclusive 79, a collection of six new 16 by 16 Granite Weaves is given. They all have for their foundation, the $\frac{1}{2}\frac{1}{4}$ and its mate the $\frac{2}{1}\frac{4}{1}$ 8-harness regular twills.

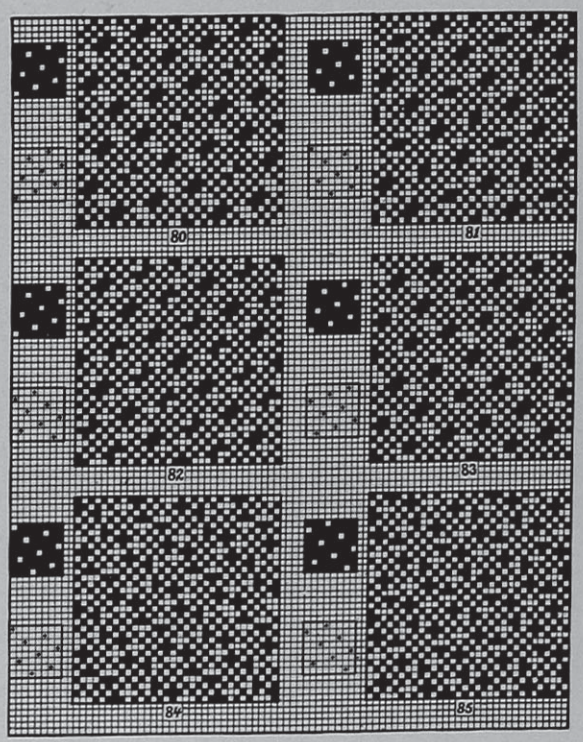
The different effects shown are produced by means of starting these two foundation twills, in every instance, in a different position, as compared to each other, *i. e.*, using a different combination of the two foundation weaves in producing the new granite.

In connection with each new granite weave, there is shown at the left, the combination of the two foundation twills used, *i. e.*, the various points of starting the two 8-harness twills previously referred to. The repeat of each granite is 16 by 16, two repeats each way being given, in order to more clearly show their value to manufacturers.

As will be readily understood, an endless variety of these weaves may be produced by using other 8-harness twills.



In connection with weaves Figs. 80 to an inclusive 85, an excellent collection of 16-harness granite weaves



is given. They represent well broken up effects, produced by combining warp and filling effect of our

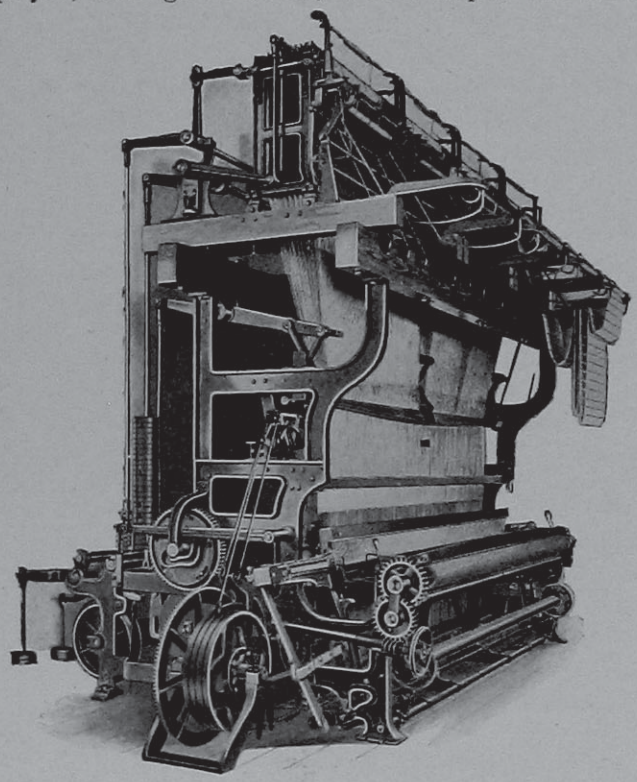
regular 8-leaf satin, varying the starting of one or the other of the weaves in every instance in order to produce a new effect.

The repeat for each new granite is 16 warp threads and 16 picks, two repeats each way being given to clearly show their beauty. In the same way as using the regular satin for foundation, we may use our double satins with excellent results, in every instance producing new granite weaves impossible to be obtained otherwise.

Explanations of weaves given during the last four issues of the Journal will clearly show the reader the immense scope open for the designer for producing new granites, a system of weaves for textile manufacturers of the greatest of importance, a system of weaves where new effects are always at the disposal of the designer.

BRUSSEL AND WILTON CARPETS.

Considering both fabric structures in a general way, they are similar in their construction, are woven in the same loom, in fact the case may present itself that the same texture and count of yarn may be employed, although as a rule, Wilton carpets call for a



Crompton & Knowles Stationary Wire Brussels and Wilton Carpet Loom.

better quality of yarn and for a higher texture, the wires used being somewhat deeper, to produce the lofty velvet pile.

The difference between them consists in that in connection with Brussel carpets, smooth edged wires are used, which, when withdrawn, leave a loop to the pile warp threads, whereas in connection with Wiltons, the wire has its edge somewhat enlarged and formed into a knife, which when withdrawn, cuts its way through the pile warp by which it was bound to the body structure of the carpet, in turn forming the characteristic velvet pile, which to the average person appears to be the only difference between it and Brussel carpets.

This, however, from a technical point of view, is not the case, since on account of the cut pile, in connection with Wilton carpets, the tufts of the pile warp must be more solidly secured (interlaced) to the body structure of the carpet as compared to the loops of the Brussel carpet, since otherwise the small tufts of the Wilton carpet would easily be pulled out from the body no matter what care was exercised in cleaning them while on the floor. For this reason, in Wilton carpets the first and third pick rest over, *i. e.,* bind down each row of tufts, whereas in Brussel carpets only one pick rests over, *i. e.,* binds down each row of loops.

Brussel or Tournai Carpets.

The same comprise the most often met with better grade of carpets. Their manufacture had its origin in Tournai, Belgium, and from which fact they derived their name *Tournai* or *Brussel* (the latter the capital of Belgium) Carpets; Brussel being the name generally used.

They are *terry* (loop) warp pile fabrics, in which the design is produced by raising over wires different solid colored warp threads and in their general appearance resemble Tapestry carpets, but are of a far superior construction. If the construction of both fabric structures is taken under consideration, it will be seen that they differ vastly, since with Brussel carpets the pattern is a woven effect, whereas in Tapestry carpets the same is only a printed affair. In Brussel carpets the colors used are generally *fast* colors, the pile yarn being hand-dyed and not printed as is done with Tapestry carpets. At the same time the pile in Brussel carpets is fuller (higher textured as to number of loops to the square inch) and made of a better grade of stock than Tapestry carpets; the body of the fabric is not as much due to strengthening, *i. e.,* stuffer threads, than is the case with Tapestry carpets. In Brussel carpets each pile warp thread is simultaneously also used as stuffer threads to impart body to the fabric, making the fabric more pliable and thus in turn more wear resisting. Another feature greatly in favor of the Brussel carpet is the smartness of design, the pattern is more pronounced, each portion of the design is most distinctly developed, especially at the outlines of figure and ground, caused from the way the design is produced in the fabric. In Tapestry carpets the design is printed (enlarged) onto the pile warp threads previously to weaving, with the result that the change of one color to the other cannot come up distinct in the loops as is the case with Brussel carpets where different colored threads change positions as regulated by the pattern.

As regards cost in production, the cost of dyeing the pile warp single colors is certainly more economical than printing of a pattern on it, but at the same time, the money invested in a Brussel carpet loom is considerably more, the expenses for weaving are more, the amount of valuable pile warps used is more, but the result is the most satisfactory carpet produced.

Brussel carpets are graded by *frames*, the latter indicating the number of pile warp threads called for in one row of loops—warp ways—in the fabric, or what is the same in a vertical row of squares in the design on the point paper. One thread of the frame is only raised at one time for producing the loop; the other threads of the frame at that time not called for, rest

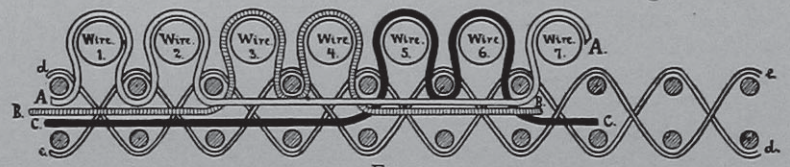


Fig. 1.

in the body of the carpet, taking the place of stuffer threads. This will explain that the body of the carpet is not to such a great extent due to linen, hemp, jute or cotton thickening, *i. e.,* stuffer threads, as is the case with tapestry carpets, but that the worsted warp as forms the pile, *i. e.,* face of the fabric at the same time forms a considerable portion of the body of the fabric.

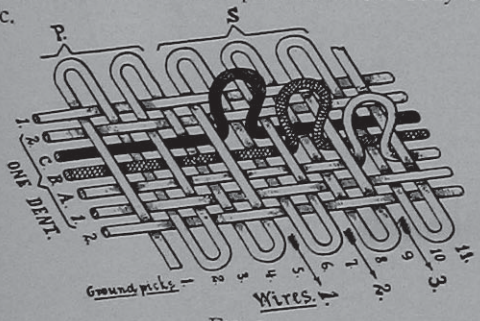


Fig. 2.

Besides the pile warp we meet with in Brussel carpet a ground warp, and in some cases with a stuffer warp, either warp being not visible on the face of the fabric. The ground warp is interlaced with the filling on what we call the 4-harness basket weave, arranged to have each two successive picks inserted in one opening of the shed, separated by the loop of one of the pile warp threads. One pick passes above and its mate pick (same shed of the 4-harness basket weave) below all the pile warp threads, holding the latter firmly between.

We previously mentioned that Brussel carpets are graded by frames: 3, 4 and 5-frame carpets being those most frequently met with, 6-frame refers to the best grade met with in the market.

By a 3-frame Brussel carpet it is understood that there are 3 different colors in one row of loops, warp ways, met with in one repeat of the pattern. Any of these 3 colors can be changed in another row of loops to another color without departing from the principle of a 3-frame structure.

Meeting with 4, 5 or 6 colors, in place of 3 colors as thus far explained, one row of loops warp ways, indicates that the fabric in question refers respectively to a 4, 5 or 6-frame structure.

The quality of a Brussel carpet depends chiefly on the number of frames used and the wires per inch. The full Brussel Jacquard permits the use of 264 points width ways to be used, of which however only 256 are made use of. This texture is known as $9\frac{1}{2}$ pitch ($9\frac{1}{2} \times 27$ width of carpet $= 256$). 10 wires per inch refers to the best grades of 5 and 6-frame carpets hence the best carpet met with will call for $256 \times 10 = 2560 \div 27$ (inches—standard width of carpet) $= 94\ \frac{22}{27}$ or practically 95 loops per square inch are met with in our best grades of Brussel carpets. For cheaper grades this number of loops per square inch is reduced to suit the market price, reducing in turn the number of points in width of carpet as well as the number of wires inserted per inch. Textures thus frequently met with in the market are 234 points by 8 to 9 wires; and 216 points by 7 to 8 wires; the latter being what is known as a low grade texture.

With reference to counts of yarns used an average example calls for: ground warp use a 3 ply 20's or 22's cotton, for pile warp use a 3 fold 2 ply 16's worsted; for stuffer warp (if needed) use a Jute thread and for the filling a 5 linen or flax thread.

Fig. 1 shows a cross section of a 3-frame Brussel carpet. In the same, letters of reference indicate thus:

A, B and *C,* the three pile warp threads of the frame, said three threads being shown respectively in outline (color *A*), shaded (color *B*) and in black (color *C*).

d and *e* are the ground or body warp threads.

No stuffer warp thread or threads are shown—if such are used they rest in a straight line below the three pile warp threads.

The ground or body picks of the fabric are shown by shaded circles.

Wires 1 and 2 show color *A* forming loops, colors *B* and *C* forming stuffer warp.

Wires 3 and 4 show color *B* forming loops, colors *A* and *C* forming stuffer warp.

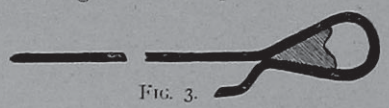


Fig. 3.

Wires 5 and 6 show color *C* forming loops, colors *A* and *B* forming stuffer warp.

Fig. 2 shows a perspective view of the interlacing of a 3-frame Brussel carpet. Part *S* shows the formation of loops, in Part *P* the loops are omitted. The pile warp threads are indicated corresponding to those in cross section Fig. 1. Two ground or body warp threads are shown on either side of the set of pile warp threads.

The face of a Brussel carpet consists of loops, produced by the pile warp threads being passed over a stout wire, resembling in appearance a metal meat skewer having a looped end, and being somewhat more than 27 inches in length.

Fig. 3 shows such a wire, which, after having been

placed in the shed of the loom, as if it were a filling thread, is in turn covered by the two hundred and fifty-six (or whatever number the texture (pitch) of the fabric may be) warp threads, after which a comparatively thin linen, hempen or jute, pick (ground filling) is passed across. This procedure forms a series of loops over and around the wire, being woven into the body of the fabric structure as though it were a thick filling thread, designed to produce a coarse corded or rep-like effect in the fabric. In weaving the fabric, wire after wire is thus covered by the pile warp threads, till twenty or more rows of loops have been formed, and when the first covered wire is automatically withdrawn by a hook which catches in its looped end, thus presenting another set of loops from which another wire is withdrawn and the method thus continued until the warp runs out. During the process of weaving, a sufficient number of wires are always kept in the portion of the fabric which was last woven, so as to keep the loops intact, *i. e.*, prevent them from being pulled out.

From this explanation it can be readily seen that when a thread of pile yarn is not active in the formation of the figure, the wire and ground picks of filling cover or conceal it. Each class of pile threads are interwoven with the ground pick on the same principle, giving a uniform strength to the carpet, and presenting a surface in which every loop is equally permanent.

One repeat of weave formation in a Brussel carpet is thus:

1ST PICK. *Single shed;* formed by lifting harness 1, thus raising one-half of the ground or body warp.

2ND PICK. *Double shed.* The lower shed is formed by lifting harness 1, the comberboard and thus all the pile warp threads, also the harness carrying the stuffer threads. While the bottom shed is being formed, the Jacquard machine, acting in conjunction with the cards, raises those harness cords which carry the pile threads required to form the figure, thus producing a second division or the upper shed of the warp. While the two sheds are formed, the shuttle is entered into the lower shed and the pile wire into the upper shed.

3RD PICK. *Single shed;* formed by lifting harness 2, raising the other half of the ground or body warp not raised by pick 1.

4TH PICK. *Double shed.* These two sheds are formed by the same method as pick 2, only that in this case harness 2 is raised for forming the lower shed.

(*To be continued.*)

Worsted yarns have for their standard measure 560 yards to the hank. The number of hanks that balance one pound indicate the number or the count by which it is graded. Hence if 40 hanks each 560 yards long, weigh 1 lb., such a yarn is known as 40's worsted. If 48 hanks are required to balance 1 lb. it is known as 48's worsted. In this manner the number of yards for any size or count of worsted yarns is found by simply multiplying its number or count by 560.

THE FINISHING OF CARPETS AND RUGS.

A most important process in the manufacture of carpets and rugs is that of finishing.

While weaving them is a most important process, yet it remains for the finishing to bring out the clear, concise effect that is so much desired, transforming the uneven, dingy surface of the carpet or rug as it appeared on the loom, to one of beauty and desirability.

Imperfections in carpets and rugs can frequently be traced to the finishing department, for which reason, the object, like in any other line of textile fabrics, is to eliminate as far as possible such imperfections. In connection with this, one of the most essential details is the use of most improved and up-to-date finishing machinery of recognized ability.

In order that an idea may be obtained of this class of machinery, we will follow the roll of carpet or rug, from the loom to the shipping department.

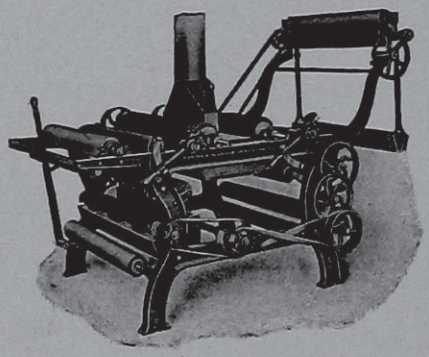


FIG. 1.

One of the first processes in the finishing of carpets and rugs is the shearing process, when in connection with Tapestry and Brussel carpets and rugs, the loop pile is cleared from fuzz, *i. e.*, protruding fibres, whereas, in connection with Wilton, Axminster and Moquette carpets and rugs the pile is then reduced to an even density and height, all over the face of the fabric.

Brushing.

Previous to shearing, the face of the carpet is brushed, on what is known as the Carpet Brusher, especially if dealing with cut-pile fabrics (Wiltons, Axminsters and Moquettes) in order to then take out a great deal of the twist in the yarn, presenting the fibres in an open state, for securing best results, also to remove from the carpet under operation the loose dirt which otherwise would be carried to the cutting blades of the shear, in the next process, in turn dulling them.

The use of these Brushes, a specimen of which is shown in Fig. 1, illustrating the machine as built by the Curtis and Marble Machine Co., Worcester, Mass., greatly facilitates the work later on at the Shear, and aids in imparting to the goods a better finish.

A Carpet Brushing Machine is generally arranged with two brush cylinders filled with stiff bristles, which act upon the carpet as it turns a corner over a roller, so that the pile is more or less spread open while being brushed. The refuse matter falls into a flock-box, located in the centre of the machine, and from which

connection is made by piping to an Exhauster for sucking off the flocks and dirt thus liberated, and which keeps both the machine and work room clean.

The amount of contact on the brushes is regulated by hand wheels, and by means of levers the carpets may be quickly thrown away from the brush cylinders to allow seams to pass through, and then returned to the same position as before. Friction and draft rollers, covered with short pointed pins or spurs, maintain a uniform tension on the carpets as they pass through the machine. A spiral brush, located in the front part of the machine, cleans the dirt from the back of the goods, a folding arrangement at the rear of the machine laying the goods off in loose folds.

In connection with a few lines of Axminsters and other soft faced fabrics, a steam-box is attached to the Brusher for steaming the carpets simultaneously with brushing them, in turn increasing the lustre of the colors. Other lines of carpets do not receive this steaming process until after they have been sheared.

Shearing.

Fig. 2 shows the shear for handling regular width carpets, as built by the Curtis and Marble Machine Co., Fig. 3 showing their shear for handling rugs up to four yards wide.

With reference to their standard shear, shown in Fig. 2, the same is very rigidly and practically constructed, and has shown itself to be able to take care of production as well as quality of work.

The carpet in its run through the machine is fed face up; passing over a spreading or tension roller, the fabric passes the first brush which cleans out and raises the pile when dealing with cut pile structures, in order that the shear blades will do their work more properly. Passing on upward, the carpet then comes in contact with a second brush, which accomplishes any work left undone by the first brush, after which the fabric passes over the cloth-rest, and when its pile comes in contact with the blades of the revolver, it is sheared.

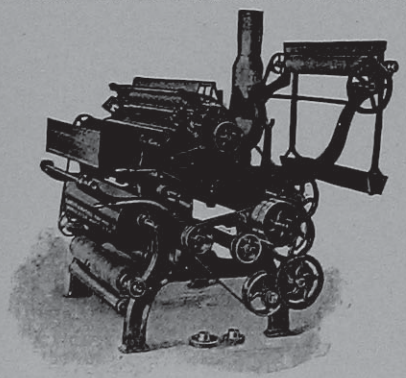


Fig. 2.

To give an even pile, or uniform shearing, the distance of the rest from that of the blades of the revolver must be uniform throughout the run of the goods. A worm and worm gear is provided in the shear shown, for adjusting the position of the cloth-rest to the cutting point of the blades,—different grades of carpet or lengths of pile, requiring the pile to be thrown into the bite or cut of the blades in different ways. The distance for the height of the cut is controlled by raising screws under the revolver frame.

The cloth-rest is made with two different shaped edges, either of which may be used to best suit the goods under operation.

The spiral blades of the revolver are made either smooth or file cut, on the cutting side. For loop pile

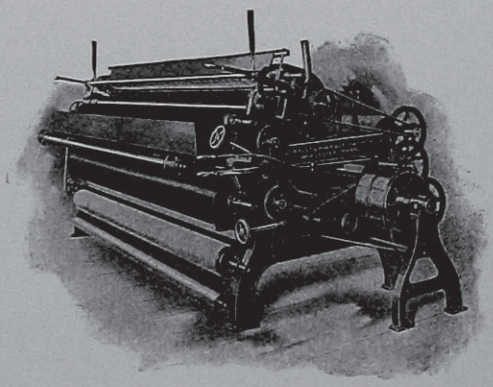


Fig. 3.

carpets, such as Tapestry or Brussels, the smooth spirals are used, while for cut pile carpets, such as Wiltons, Axminsters and Moquettes, the file cut spirals are necessary, in order that the spirals may not slip on the blades.

Before passing the cutting device, the carpet passes to a third brush which removes the dirt and flocks from the back of the carpet, which would have a tendency to raise the pile while going over the cloth-rest and cause irregular shearing.

The lint and dirt is then taken from the machine by means of a blower, instead of being allowed to accumulate in a box and filling the room with dust.

After passing the draft roller the carpet passes onto the folder which lays it in folds, to be in turn conveyed to the next machine.

In order that a uniform tension may be had, and the goods drawn through without the liability of slipping and thus spoiling the carpet, friction and draft rollers are covered with short pointed pins or spurs, which mesh into the back of the carpet structure and hold it firm.

A speed changing device is also provided, whereby the speed of the machine can be regulated to suit the character of a carpet under operation. This device is also used very largely for varying the speed of the carpet on the first and second cuts. The first, or heavier cut, being usually run at a slower speed than the final or finishing cut.

In connection with rugs, the larger shears known as their 9 feet and 12 feet carpet shear are used, the same being shown in its perspective view in Fig. 3. It is similar in its principle construction to their narrow carpet shear, previously explained, but it is built much stronger and heavier throughout and adapted to handle all kinds of carpets and rugs up to nine feet wide.

The brushes and cutting parts are made extra stiff so as to run as nicely as those on ordinary narrow shears. Cloth-rest is trussed to prevent sagging. Levers are provided so that the operator can easily raise the revolver from either side of the machine when seams go through. Folding attachment fastened to the ceiling directly back of the machine is provided, to lay the goods off in loose folds.

Figs. 4 and 5 show the Pile Carpet shear as built by the Parks & Woolson Machine Co. of Springfield,

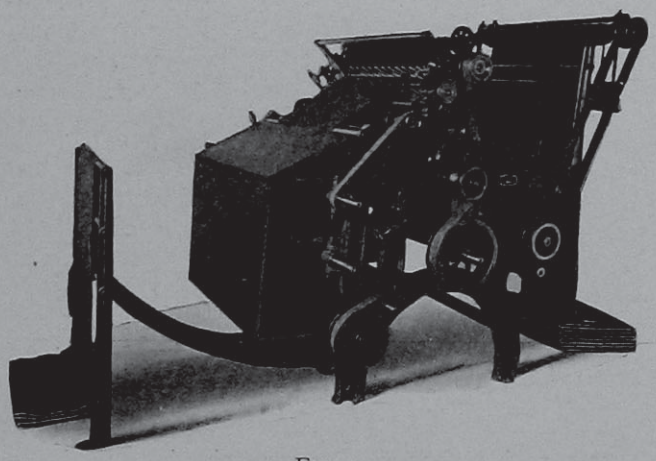


Fig. 4.

Vt., in their right and left hand side elevation, respectively.

The running parts, consisting of large diameter rolls, wide faced pulleys and cut gears, are mounted on heavy frames rigidly connected by girts.

The blades are of the regular Parks & Woolson heavy carpet style with the particular number of file faced cutters and twist that experience has shown are

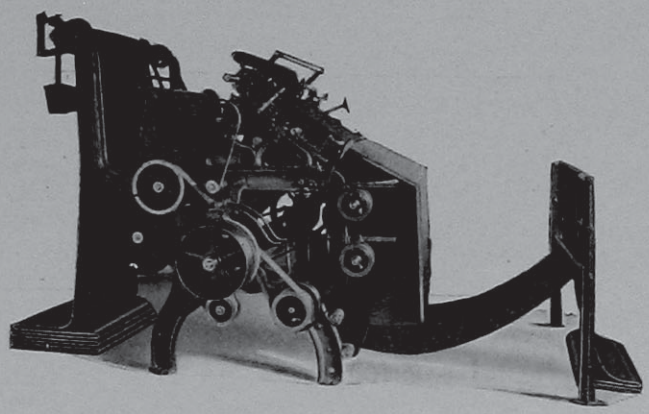


Fig. 5.

best adapted for this work. The rest has two edges either of which can be quickly brought into position by means of worm and hand wheel and close adjustment can be made by the same means. The regular dial screws with adjustable dials for raising and lowering the blades are included.

There are three brushes, one face cleaner, one back cleaner and one face raiser, all set with stiff Russian bristles. Large and accessible flock boxes are furnished to each brush.

The cloth-feed is positive and made so it can be readily changed to suit the work in hand. A flock conveyor with piping and fan are furnished when wanted.

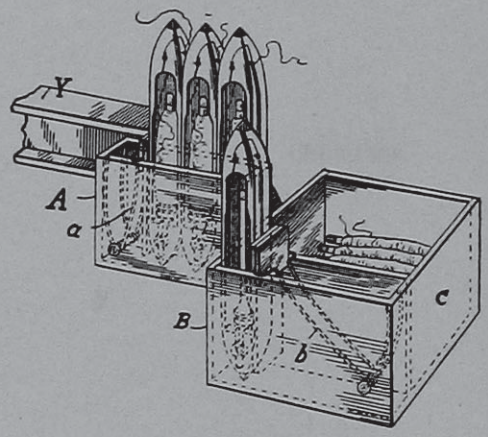
These machines are built by the Parks & Woolson Machine Co. in all widths from 27 inches to 120 inches, and above if desired, to take care of the regular width carpets as well as of rugs in their varying widths.

After the carpets have been sheared the first time, they go to the burler who mends them, *i. e.,* corrects any imperfections caused during weaving, by drawing-in and otherwise the proper threads, thus getting them in condition for the final process of steaming, drying and shearing; the first, or preliminary shearing, having been done for the purpose of giving the fabric a fairly even surface, so that the burler can better see the pattern and any mistakes in the structure.

(*To be continued.*)

A Shuttle Holder.

The purpose of this holder is to use the shuttles supplied to a loom one after the other in regular rotation so that they are uniformly worn; at the same



time the weaver can see at a glance whether the loom has a proper supply of filled shuttles, and thus can govern his work, keeping his section of looms running to its fullest capacity of production.

The accompanying sketch shows the holder in perspective.

At the loom, the holder is secured upon a bracket, secured to loom arch *Y*.

The holder consists of two boxes, *A* and *B*, one being higher than the other. Into box *A* are placed shuttles having full bobbins, while box *B* contains the shuttles having empty bobbins.

The shuttles are secured in position in either box by spring members *a* and *b*. In rear of box *B* is a receptacle *C* for holding the filled supply of bobbins or cops.

The weaver operating a certain number of looms, each provided with such a shuttle holder, by looking at the various shuttle holders of the looms in his section, can at once see the number of filled shuttles, and the number of unfilled shuttles at each loom, and thus regulate his work to keep a uniform supply of filled shuttles conveniently handy at each loom of his section.

NOVELTIES FROM ABROAD.

Figured Dressgood.

Warp: 4864 ends.

Weave: See **Fig. 1**; repeat 64 warp threads and 40 picks; 10-harness fancy draw.

Reed: 25½ @ 4 ends per dent; 102 ends per inch; 47¾ inches wide in reed.

Dress:
4 ends 2/72's worsted, light modern } × 3
4 " " " , clear white
4 " " " , light modern
1 end spun silk , light modern } × 3
1 " " " " , white
1 end 2/72's worsted, light modern } × 12
1 " " " " , clear white
1 " spun silk , light modern } × 3
1 " " " " , clear white

64 ends in repeat of pattern.

Filling: 64 picks per inch, arranged thus:
4 picks 2/72's worsted, light modern
4 " " " " , clear white

8 picks in repeat of pattern.

Finish: Scour, dry, shear or singe, press; 44 inches finished width.

Melton Cloaking.

Warp: 2800 ends; 2-ply 4½ run woolen cheviot yarn and 2/36's worsted.

Weave: See **Fig. 2**; repeat 24 warp threads and 48 picks; 24-harness straight draw.

Reed: 13 @ 3 ends per dent; 39 ends per inch; 72 inches wide in reed.

Dress:
6 ends 2-ply 4½ run, dark gray mix
59 " " " " " , gray mix.
1 end 2/36's worsted, green.
1 " 2-ply 4½ run, gray mix.
1 " 2/36's worsted, green.
52 " 2-ply 4½ run, gray mix.

120 ends in repeat of pattern.

Filling: 40 picks per inch, all 2 ply 4¼ run black, woolen cheviot yarn.

Finish: Melton finish.

Covercoat Diagonal.

Warp: 5650 ends; 2/64's worsted, gray-green.

Weave: See **Fig. 3**; repeat 13 warp threads and 26 picks; 13-harness straight draw.

Reed: 20 @ 5 ends per dent; 100 ends per inch; 56½ inches wide in reed.

Filling: 68 picks per inch; 36's worsted black.

Finish: Worsted finish; 52 inches wide.

Diagonal Dressgood.

Warp: 4450 ends; 2/72's worsted, white.

Weave: See **Fig. 4**; repeat 8 warp threads and 24 picks; 8-harness straight draw.

Reed: 21 @ 4 ends per dent; 84 ends per inch; 53 inches wide in reed.

Filling: 85 picks per inch; 48's worsted, green mix.

Finish: Scour, dry, shear, press; 48 inches finished width.

Homespun Dressgood.

Warp: 1830 ends; 2/20's worsted, olive green and red brown mix.

Weave: See **Fig. 5**; repeat 12 warp threads and 12 picks; 12-harness straight draw.

Reed: 15 @ 2 ends per dent; 30 ends per inch; 61 inches wide in reed.

Filling: 32 picks per inch; 2/20's worsted, olive green and red brown mix.

Finish: Cheviot finish; full, clip on shear; 52 inches finished width.

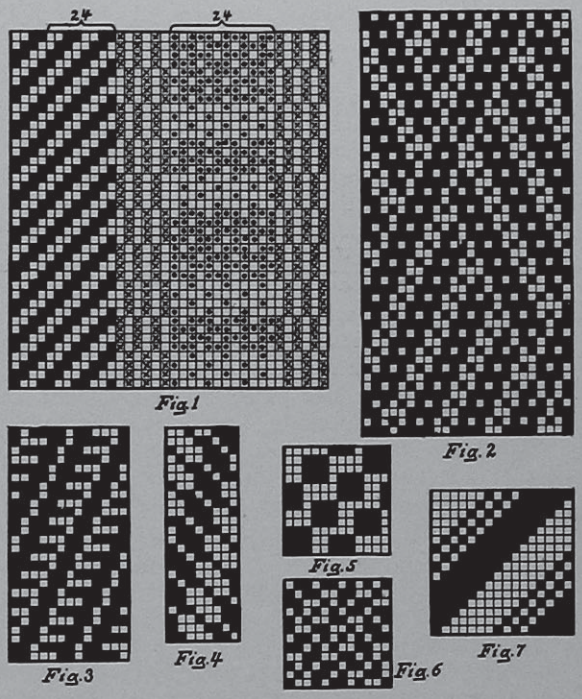


Fig. 1 Fig. 2 Fig. 3 Fig. 4 Fig. 5 Fig. 6 Fig. 7

Granite Dressgood.

Warp: 3200 ends.

Weave: See **Fig. 6**; repeat 12 warp threads and 12 picks; 12-harness straight draw.

Reed: 17 @ 4 ends per dent; 68 ends per inch; 47 inches wide in reed.

Dress:
16 ends 2/72's worsted, black.
16 " " " , red (scarlet).

32 ends in repeat of pattern.

Filling: 70 picks per inch, arranged thus:
16 picks 36's worsted, black.
16 " " " , red (scarlet).

32 picks in repeat of pattern.

Finish: Scour, dry, shear, press; 44 inches finished width.

Diagonal Dressgood. (*Piece Dye.*)

Warp: 4116 ends; 2/72's worsted, in the gray.

Weave: See **Fig. 7**; repeat 16 warp threads and 16 picks; 16-harness straight draw.

Reed: 24 @ 4 ends per dent; 84 ends per inch; 49 inches wide in reed.

Filling: 85 picks per inch; 48's worsted, in the gray.

Finish: Worsted finish; singe, piece dye blue-green, clear face on shear; 44 inches finished width.

THE SIZING OF COTTON CHAIN WARPS.

Sizing is one if not the most important department in a cotton weaving mill, since upon it depends quantity as well as quality of work turned out, requiring for this reason: (1) the proper ingredients to be used, (2) the greatest care and attention on the part of the operator, (3) the most approved machinery; for unless warp yarn is properly sized and handled, it will not weave well.

The object of sizing is to penetrate the yarn and to form a film on the surface of the yarn prior to weaving, which besides giving additional strength to the thread, in order to withstand the tension necessary for weaving, at the same time prevents the loosely adhering fibres from rubbing up, and thus causing what is generally known among weavers as *buttoning*, which is produced by the rubbing action of the heddles and the reed during the operation of weaving, especially when dealing with single yarn and more so in connection with high textures.

Sizing is the immersion of the yarn in a prepared size mixture. The ingredients of this mixture are boiled and placed in a size box; as the yarn is drawn through the box, the size penetrates and adheres to it. Thought must be given to the quality and quantity of the ingredients that form the size for the various kinds of yarn and the resulting fabrics. A careful overseer, however, who desires to know what he is using, will study the component parts that form a good size. This often results in economy, for local needs are best known by a wide-awake man.

Yarns for bleaching or dyeing should be only very lightly sized, and besides only the best quality of size used, since otherwise the goods, when finished, will be faulty in appearance for the reason that the fibres and the size will be diifferently affected in these processes.

The size must be of such a character that it will adhere firmly to the yarn, both while wet or dry, and retain this attachment to the yarn during weaving. For this reason, the size, whether for light, medium or heavy sizing, must therefore be of uniform thickness or fluidity and consistency throughout, in order to saturate the yarn thoroughly.

The quantity and strength of the size to be put on to yarn depend upon circumstances, and can only be regulated by experience; but when this is once determined upon, the operator of the slasher must look after and keep the temper of the size regular and at one thing.

The weight of size which can be added to yarn depends upon the class of yarn, the class of cloth into which it has to be woven, the amount of twist in the yarn, the kind of size used and *the manner* in which the same is applied.

The principal material used for sizing warps is starch.

The only means of distinguishing one starch from another is a microscopical examination, the difference in appearance and size of the granules affording the distinguishing test.

Starch granules are not dissolved by cold water, alcohol or ether, but when starch is heated with water from 114.6 deg. to 165.2 deg. F., the granules swell and split open, forming a thick mass called starch, paste, or size.

By boiling the paste with a larger quantity of water, the starch particles become so finely divided that they pass through a filter and if boiled for a long time the solution becomes clear and the starch is rendered soluble.

The sizing power of corn starch acts more uniformly on warps than either potato starch, wheat starch or any other starch. The size itself remains constant and dependable, its strength remaining uniform, standing over night or over Sunday in kettle or size box, whereas, potato starch turns acid, falls down and separates into a gelatinous mass, if left in size box or tank over night. A corn starch sizing after standing from Saturday until starting time Monday can be re-boiled without affecting the sizing value.

Corn starch makes a size which is uniform in its results, gives body to the warp, penetrates the fibre thoroughly, strengthens and lays the fibre, smooths the yarn, and lets the individual thread separate freely without clinging, in a manner unequalled by size made from any other starch.

The proper boiling of the starch (and its additions) is of the greatest importance, a feature which,

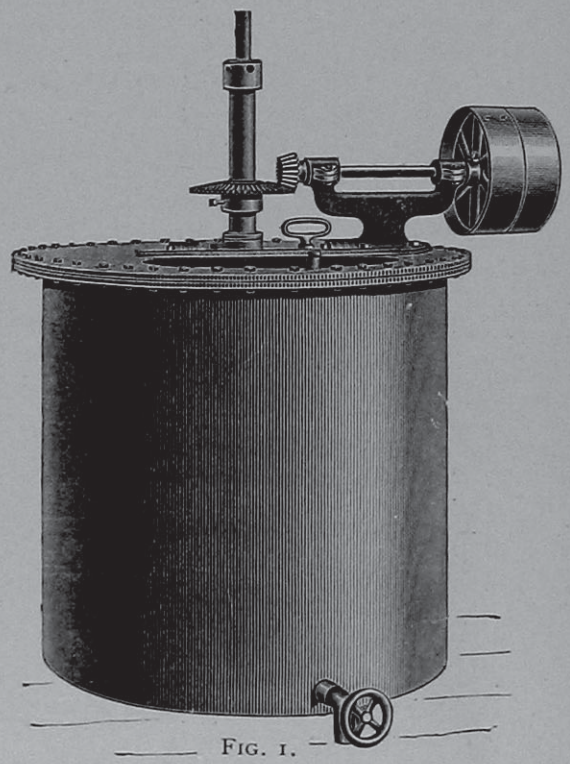


FIG. 1.

however, is frequently lost sight of in many a cotton mill, considering the affair simply as an unimportant process, which can be done in any old haphazard way; sometimes for sake of saving in wages being performed by a common laborer and when then a good prepared starch may be considered more of an accident. More often, however, the foundation is then laid for a poorly weaving warp.

It must be remembered that the boiling of the size is the important item in the sizing department of the mill, the overseer will have to look after it himself, except he has it in the hands of a reliable, careful person, who knows what he is doing, also the reason why. The by-products used with the starch for softening and antiseptics must also be taken into consideration.

Successful sizing requires not only a thorough penetration and saturation of the yarn, but also thorough and rapid drying without scorching, the proper distribution of the yarn and the making of a hard, uniform compact ball. The value of the size lies in the strengthening, lubricating and softening of the yarn, so as to render it strong, smooth and easily

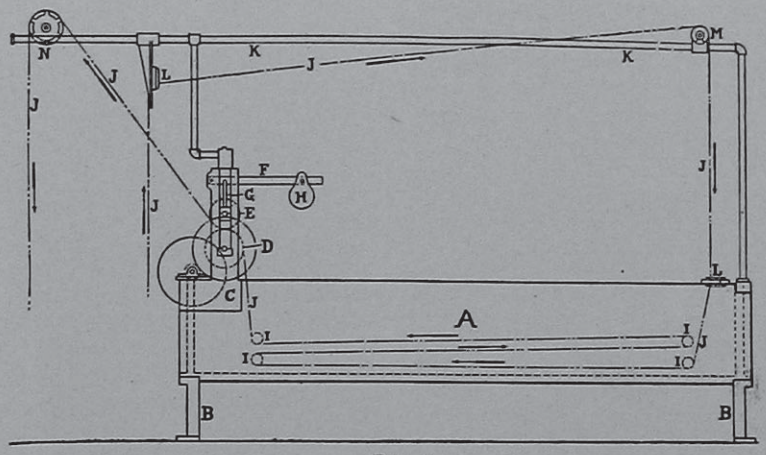


FIG. 2.

For this reason the boiling, *i. e.*, preparing of the starch and its composition must be studied in connection with every new material that comes under the hand of the overseer.

If boiling with direct steam, it is necessary to place a water outlet just previously to where the steam enters the size or starch kettle, in order to only use a dry steam and this under an even pressure, so that for a certain time a known quantity of condensed water enters into a known quantity of already boiled size or starch mixture in the kettle. It might make the latter too thin, and to add fresh starch to an already boiled mixture, in order to make it thicker, remains always a questionable procedure.

Many overseers consider a hot soaking of the starch as boiling. Real boiling will be noticed by the composition being of an even thickness and when it begins to become transparent, a feature more readily noticed if a blue dye has been added to the mass, for tinting, *i. e.*, a blue dye is sometimes used, in very small proportions, for the purpose of tinting, *i. e.*, correcting a tendency to yellowness in the mixing, and when said blue dye changes the starch to a bluish white. In this instance, as long as the size does not boil, the color remains a dull affair, a beautiful blue only being noticed after the complete amalgamation of the starch with the water, etc., has been accomplished, *i. e.*, sufficiently boiled. The dull blue, previously referred to, although well mixed in the size was caused by the presence of the many undissolved granules of starch, which not only dull the color, but at the same time have no adhesive properties, hence a double disadvantage.

However, if boiling is overdone too long and too excessively, the starch will also lose in adhesiveness. it being then transposed into soluble starch, dextrine, etc., and which have less adhesiveness.

separated.

Since the preparation of the size is of such great importance, it will be readily understood that the use of a proper size kettle is a necessary adjunct. The standard type of such a size kettle is shown in illustration Fig. 1, the same being built by the Textile-Finishing Machinery Co., of Providence, R. I. The kettle is constructed of iron, with a cover, and is provided with mechanical means for boiling and stirring the size, the latter consisting of hollow stirrers with holes for delivering the steam to the size or starch and distributing it evenly through the mass. By means of such a size kettle, the boiling of the size or starch can be done in less time and at less expense than with other arrangements now in use; again, size or starch if correctly prepared in one of these kettles is sure to be in proper condition for perfect sizing.

The size thus prepared in the kettle is used in connection with what is known as a Chain Sizing Machine, the same being shown in its side elevation in Fig. 2, illustrating the machine as built by the Textile-Finishing Machinery Company. The same consists of a wooden tub *A*, supported on iron legs *B*, fitted with iron nip stands or housings *C*, supporting squeeze rollers *D* and *E*, supplied with levers *F*, *G* and weight *H*, so that the chains will be thoroughly squeezed after being sized in the tub *A*, which for this purpose contains a brass immersion frame (not shown) which supports brass rollers *I* and the necessary brass guides for leading the chains *J* through the size (see arrows for indicating the run of the chains through the machine). These machines are sometimes made with a single compartment, but usually two compartments, side by side, are those mostly in demand. These machines are fitted with light, but strong pipe overhead rigging *K*, carrying pot eyes *L*, guide rollers *M*, and reels *N*, to receive size and deliver one chain in each

compartment.

After being sized, the chains are dried on a Chain Drying Machine, as shown in its perspective view in Fig. 3, which is built by the Textile-Finishing Machinery Co. 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.

For the purpose of applying this information, regarding sizing and accompanying machinery given, to actual conditions, a number of formulas relative to sizing cotton warps, which are in use in some of the large progressive mills are herewith presented.

The amount of starch, etc., entering into the combination will vary as conditions warrant it, some mills manufacturing the same class of goods using somewhat less starch and vary the consistency in boiling.

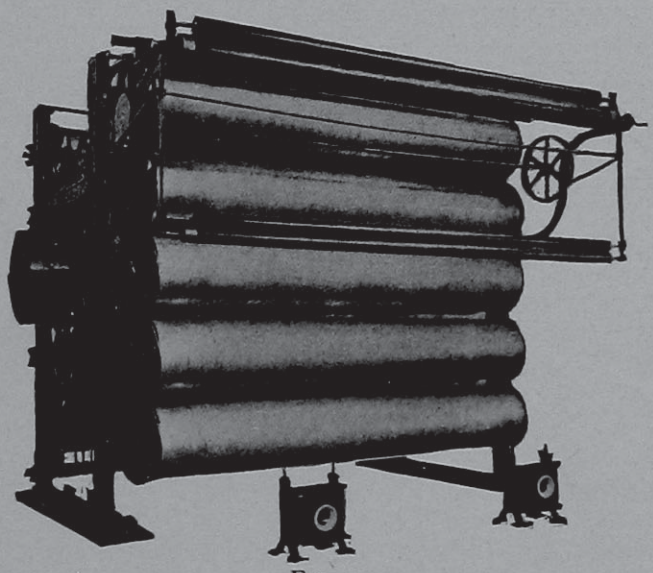


FIG. 3.

At the same time, the old fallacy that certain starches must be used should be removed, because the value of the size lies in the starchy contents, and not in the name of the starch. It has been proven that corn starch in proportionate quantities will produce the same effect and will successfully replace any other known starch.

In these formulas *C. P. Special* Warp Sizing Starch is quoted. *Globe Pearl* Starch, the famous *"N"* Starch and *Eagle Finishing* Starch are also successfully used.

MADRAS.

26 to 80's; Texture 50 to 100 ends per inch.

For 26 to 40's:

75 lbs. C. P. Special
4 " Tallow
120 gal. kettle, boil from 1¼ to 1¾ hrs.

For 40 to 80's:

54 lbs. C. P. Special
6 " Tallow
100 gal. kettle, boil from 1¼ to 1¾ hrs.

GINGHAMS.

26 to 40's; Texture 44 to 56 ends per inch.

For 26 to 40's:

50 lbs. C. P. Special
2 to 4 lbs. of Tallow, according to the atmospheric conditions. Sizing compound, antiseptic and deliquescent, in proportion as needed.
100 gal. kettle, boiled at least 1 hour.

OUTING FLANNELS, DOMETS AND COTTON FLANNELETS.

10 to 26's; Texture 49 to 56 ends per inch.

Standard Construction: 20's Warp and 12's Filling.

Medium Sizing.

62 lbs. C. P. Special
5½ " Tallow
Sizing compound, antiseptic and deliquescent, in proportion as needed.
100 gal. kettle, boil 1½ hour.

Light Sizing.

40 lbs. C. P. Special
2 " Tallow
Sizing compound, antiseptic and deliquescent, in proportion as needed.
100 gal. kettle, boil 1 hour.

SEERSUCKERS.

26 to 30's; Texture 56 to 76 ends per inch.

55 lbs. C. P. Special
3 " Tallow
Sizing compound, antiseptic and deliquescent, in proportion as needed.
100 gal. kettle, boil at least 1 hour.

COTTONADES.

20's; Texture 50 ends per inch.

45 lbs. C. P. Special
2½ " Tallow
Sizing compound, antiseptic and deliquescent in proportion as needed.
100 gal. kettle, boil at least 1 hour.

CHAMBRAYS.

30 to 40's; Texture 60 to 80 ends per inch.

45 lbs. C. P. Special
5 " Tallow.
Sizing compound, antiseptic and deliquescent, in proportion as needed.
100 gal. kettle, boiled at least 1 hour.

COTTON DUCKS.

8 to 21's; Texture 44 to 52 ends per inch.

Light Sizing

50 lbs. C. P. Special
3½ " Tallow
Sizing compound, antiseptic and deliquescent, in proportion as needed.
100 gal. kettle, boiled at least 1 hour.

Medium Sizing.

65 lbs. C. P. Special
4 " Tallow
Sizing compound, antiseptic and deliquescent, in proportion as needed.
100 gal. kettle, boil 1 to 1½ hours.

CHEVIOTS.

16 to 22's; Texture 40 to 62 ends per inch.

Medium Sizing

60 lbs. C. P. Special
4 " Tallow

Sizing compound, antiseptic and deliquescent, in proportion as needed.

100 gal. kettle, boil 1½ to 1¾ hours.

Light Sizing

45 lbs. C. P. Special
3 " Tallow

Sizing compound, antiseptic and deliquescent, in proportion as needed.

100 gal. kettle, boil 2 hours.

Size, especially during warm weather, is very apt to putrefy. Corn starch enjoys the distinction of retaining its freshness longer than any other starch, but for the purpose of preventing fungoid growths, without deteriorating the sizing properties of the ingredients, an antiseptic must be added.

Cresylic Acid (a commercial term for carbolic acid of a cheaper and less pure condition) is used considerably, but the article most frequently used is Chloride of Zinc, or Muriate of Zinc, which fulfills two purposes, *viz:* as an antiseptic for the prevention of mildew, and as a weighting body, hence its superiority over other substances used as antiseptics only. It is placed on the market in two forms, liquid and solid, and is prepared by dissolving zinc in muriatic acid, and as there is always some little free acid present this is neutralized by means of soda ash; the slight trace of iron that may be present is precipitated out, the liquor allowed to settle, then run off into vats to age. It is a pale yellow liquid, and the color should only show slightly by transmitted light. It should be perfectly free from iron and free acid. It is precipitated in the form of an oxychloride when water is added to it, and the white turbidity or milkiness is redissolved in excess of the chloride of zinc. It attacks iron with great rapidity, and should never be allowed to come in contact with that metal, as it at once begins to take it in solution. The liquid is often of 49 deg. B., or a specific gravity 1.51, or a gallon weighs 15 7/10 lbs. At this strength it should contain from 44 to 45% of pure zinc chloride. It is liable to adulteration, the chief aduterant being common salt. The solid form is simply the liquid form evaporated down until the solution attains a temperature at which the percentage of the zinc chloride is a constant, when it is then packed in lead lined casks and hermetically sealed. At the destination the stuff is dissolved in water and made to a convenient strength.

Other antiseptics are formaldehyde, salicylic acid, arsenious acid, and perchloride of mercury, which however are of little, if any consequence for sizing.

RIBBONS, TRIMMINGS, EDGINGS, etc.

(*Continued from page 10.*)

Conical Shaped Ribbons.

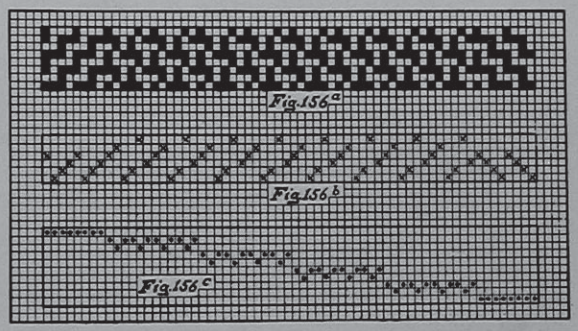
Fig. 156[a] shows the weave for such a conical woven ribbon.

For the interlacing of the centre-threads we find used (intermixed) double taffeta (double plain) and warp rib weave.

Since the ribbon is short on one side, becoming longer towards the other, the warp threads must be every time, on account of their varying length, in the shape of stripes bunched into one warp. The wider the fabric the more warp threads required.

Diagram 156[b] shows the fancy draw for six harnesses.

In weave Fig. 156[a] the complete number of warp threads, as shown below it in diagram 156[c] are divided upon ten warps.



THE TAKE-UP FOR THESE RIBBONS.

Various designs for the take-up of conical ribbons have been constructed, diagrams Figs. 156[d] and 156[e] showing one construction, inside and front elevation respectively. The construction of the loom for weaving these conical ribbons, in its other parts is the same as for regularly woven ribbons.

The device shown in illustrations is secured to the breast beam of the loom. The uppermost located conical roller *a* (as shown) is placed in an oblique position in order that its top face line is parallel with the face of the lay of the loom.

The lower situated conical roller *b* presses with its face closely to that of the upper roller *a*, being held in contact with the latter by means of weighted lever *c*

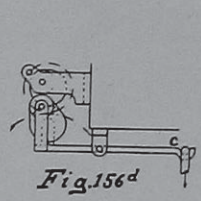


Fig.156d

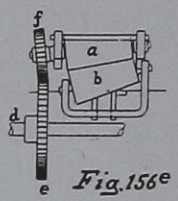


Fig.156e

The regulator (take-up) of the loom acts upon shaft *d* which carries a series of gears *e*, each in turn meshing with a gear *f*, which operates mate roller *a*. As many of these individual take-up devices are provided as there are ribbons to be woven on the loom.

As will be readily understood, the conical rollers *a* and *b* take up less fabric structure on their portions presenting smaller diameters compared to such presenting larger diameters, this variation in diameter of the take-up rollers being the cause of the formation of the conical ribbons.