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Posselt's Textile Journal

A Monthly Journal of the Textile Industries

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TRADE MARKS RELATING TO THE TEXTILE INDUSTRY.

REGISTERED JANUARY, 1910. (Complete.)

1. Woolen and Cotton Piece Goods.—Hamilton Woolen Co., Boston.

2. Undershirts, Drawers, Pajamas, Night-Robes, both Knitted and of Textile Material.—Theodore F. Baulig, Egg Harbor, N. J.

3. Coal Tar Dyes.—Farbenfabriken of Elberfeld Company, New York.

4. Dress, Work and Negligée Shirts and Undershirts.—Rauh Bros. & Company, Pittsburg, Pa.

5. Silk Ribbons.—J. W. Streeton Company, New York.

6. Shirtings, Cambrics, Drills, Checked and Striped Cotton Fabrics, White and Colored Cotton Prints, Cotton Velvets, Cotton Merino, Satin and Batiste, and Knitted Cotton Piece Goods.—Arnold Otto Meyer, Hamburg, Germany.

7. Curtains, Curtain and Novelty Net, Pillow-Cases, Bedspreads, Pillow-Shams, Drapery-Scarfs, Panels for Draperies, and Lambrequins made wholly or in part of Lace.—Patchogue Manufacturing Company, Patchogue, N. Y.

8, 9 and 10. Hosiery.—Chas. Chipman's Sons, Easton, Pa.

11. Wool Blankets.—The Pittsburg Dry Goods Company, Pittsburg, Pa.

12. Men's Undershirts, Drawers and Socks, and Knitted Shirts.—Neustater Brothers, San Francisco, Cal.

13. Piece Goods composed of Cotton, Flax, Silk, Wool, Vegetable Fibre, or Combinations thereof.—R. B. MacLea Company, New York, and Jersey City, N. J.

14 and 15. Fancy Yarns.—Farbenfabriken of Elberfeld Company, New York.

16. Wool Blankets.—The Pittsburg Dry Goods Company, Pittsburg, Pa.

17. Hosiery.—Chas. Chipman's Sons, Easton, Pa.

18. Ladies' Shirt-Waists and Dress-Waists, Ladies' Outer Suits, and Ladies' Dresses.—Samuel M. Foster Company, Fort Wayne, Ind.

19. Hosiery.—Glidden, Hyde & Co., Boston.

20, 21, 22, 23, 24 and 25. Hosiery.—Marshall Field & Company, Chicago, Ill.

26. Handkerchiefs.—Brown Durrell Co., Boston.

27. Cravats, Ties and Bows.—Levy & Marcus, New York.

28. Hosiery.—Ipswich Mills, Boston.

29. Hosiery.—Carson, Pirie, Scott & Co., Chicago, Ill.

30. Ginghams. The trade mark consists of a yellow band woven into the goods adjacent and parallel to the edge of the selvage of the cloth.—Parkhill Manufacturing Company, Fitchburg, Mass.

31. Ladies' Dress-Waists, Shirt-Waists and Dresses.—Gory & Heller, Chicago, Ill.

32. Blankets and Spreads.—André F. Bornot, Philadelphia.

33. Hosiery.—Ipswich Mills, Boston.

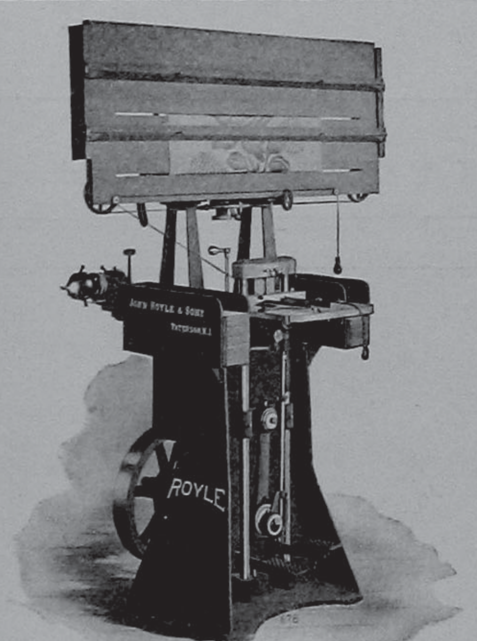
The Artificial Silk Industry is assuming large proportions, the world's output being given at about 3,000,000 kilos (6,612,000 lbs.) per annum at the present rate of production, against 1,700,000 kilos (3,746,000 lbs.) in 1906, and 600,000 kilos (1,322,400 lbs.) in 1896. The nitrocellulose product heads the list with an output of between 1,300,000 and 1,600,000 kilos (2,865,200 and 3,526,400 lbs.). The copper-ammonia process accounts for 1,100,000 to 1,300,000 kilos (2,424,400 to 2,865,200 lbs.). The production of viscose silk now amounts to about 500,000 kilos (1,102,000 lbs.).

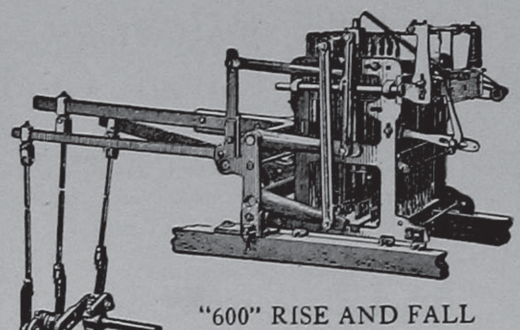
Up to the present time artificial silk has hardly come into competition with true silk, a feature which has been an important factor in favor of its development in the past, increasing in this way uses for itself; although with artificial silk now being spun in finer counts, the same may sooner or later somewhat enter into competition with true silk. In this instance the artificial product must then be able to chiefly claim advantage on account of a considerably lower price.

The last fifteen years have seen developed a marked improvement in strength and so-called elasticity in artificial silk, and without question the same will be still further increased by the chemists employed in that work.

A most important point to consider when comparing artificial silk to true silk is the question of the relative *"covering power"* of the yarns when woven. Ordinary fabric structures made of artificial silk have only 60 per cent of the covering power of that of true silk. With an increase in the number of filaments in each thread, a corresponding improvement in this respect naturally follows, as in the cellulo silk product, and where the limit to-day may be put at 60-75 per cent of that of true silk. The density of the cellulose substance is about 10 per cent in excess of that of true silk, so that a covering power of 90 per cent may be regarded as the maximum under equal conditions.

It will be interesting to note that the leading companies of the continent, engaged in the manufacture of artificial silk, have paid steady and increasing dividends up to 50 per cent or more.





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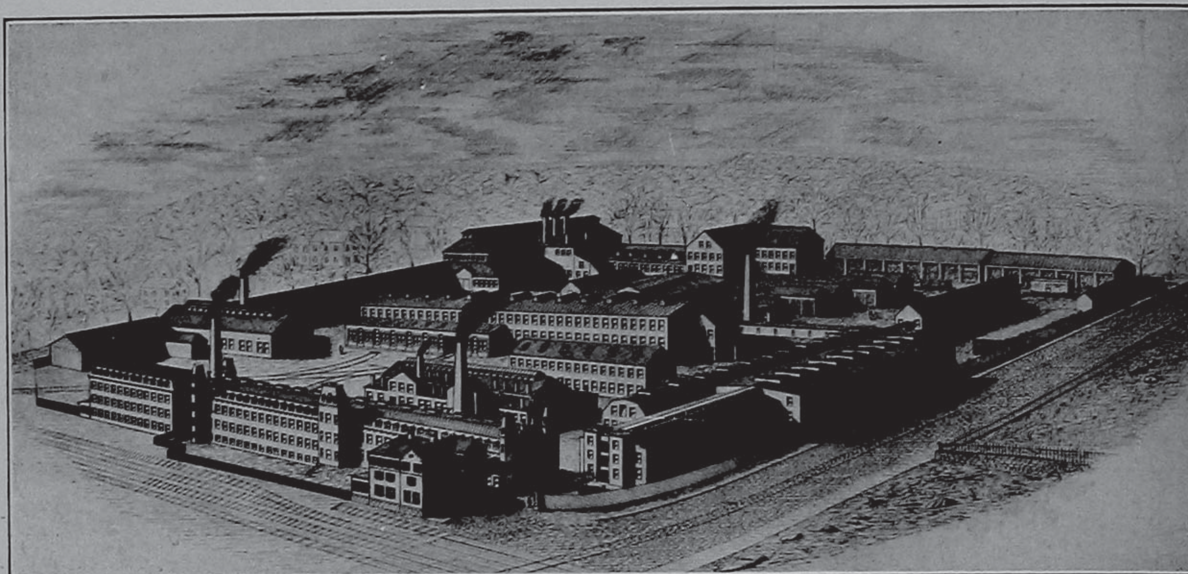

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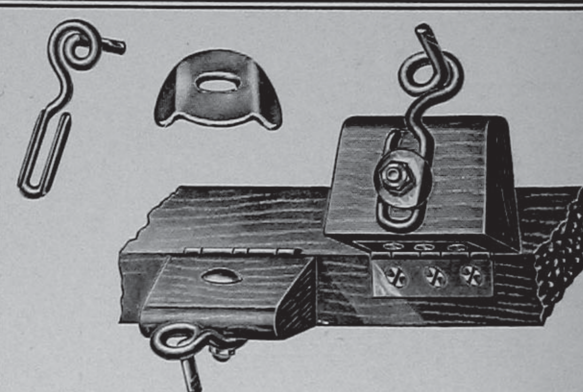

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Posselt's Textile Journal

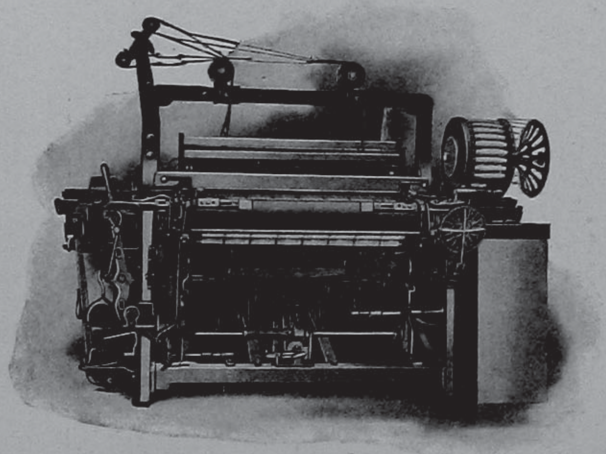
Vol. VI. **February, 1910.** **No. 2.**

PRACTICAL IDEAS ON THE NORTHROP MODEL E LOOM

By E. T. Saulnier, *Master Weaver.*

The purpose of this series of articles is to assist the novice loom fixer, by simple methods, to master all fine points required for the successful running of this loom.

Starting with the floor plan, I shall endeavor to help the loom fixer over all problems met with in the weave room.



The Northrop "Model E" Loom

Although these articles are chiefly intended for the beginner in the art of loom fixing, they will at the same time be found of incalculable value to the more experienced loom fixer in successfully starting new sections of these looms.

Planning the Erection of Looms.

We will take for illustration, a floor space of 100 feet in width by 500 feet in length, as shown in the accompanying diagram. The columns supposed to be 24-26-26-24 feet apart respectively. These dimensions allow for 16 looms, each loom being 42¼ inches in width across foot by 79¼ inches in length, from lay end to lay end, using the 7⅜ inch bobbin with double fork.

First Bay 24 Feet.

By setting the feet of the first loom 27 inches from wall, and allowing 30 inches between feet, for broad back-alley, 24 inches for weavers' alley in next row of looms, 14 inches from outside foot of loom to center of column, it will be seen that the entire space of 24 feet has been taken up in this bay, leaving sufficient alley space for the loom fixer to easily wheel warps down the side alleyway. The broad alley between looms will be found sufficiently large for the trucking of warps and filling.

Second Bay.

The second bay being 26 feet, we will start by leaving a broad alley of 32½ inches from center of column to foot of loom, with 24 inches between feet for each of the weavers' alleys, and 30 inches for back alley, leaving 32½ inches from foot of loom to next column, making three broad alleys in this bay.

Third Bay.

The third bay being 26 feet wide, will allow 32½ inches from center of column to foot of first loom, 24 inches for each of the weavers' alleys, and 30 inches for broad back-alley, leaving 32½ inches for broad alley between loom and column. This bay, having three broad alleys, will have taken up the 26 feet of floor space.

Fourth Bay.

Starting with 14 inches from center of column to foot of loom, and 24 inches for each of the weavers' alleys and 30 inches for a broad back-alley, will leave us 27 inches for outside alley.

Measurements given will show that the floor space in each bay has been covered thus:

First Bay:

27 -42¼-24-42¼-30-42¼-24-42¼-14 = 24 feet

Second Bay:

32½-42¼-24-42¼-30-42¼-24-42¼-32½ = 26 feet

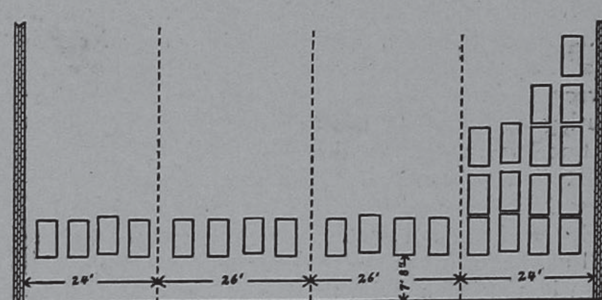
Third Bay:

32½-42¼-24-42¼-30-42¼-24-42¼-32½ = 26 feet

Fourth Bay:

14 -42¼-24-42¼-30-42¼-24-42¼-27 = 24 feet

A total of 100 feet across the room has been covered with ten broad alleys. The middle ones being together, can serve for the placing of loom fixers' benches and storage of warps, as readily shown by consulting diagram of floor plan. It will also be seen that there has been left at each end of the room



Floor Plan—for the erection of looms

sufficient floor space for the storage of warps, there being seven feet eight inches (7 ft. 8 in.) from wall to lay end.

Levelling the Loom.

In levelling a new loom, it is a good plan for the erector to start by squaring up loom sides, girts, both front and back, breast beam and bottom shaft.

Lining the Lay.

The first thing for the erector to attend to is the lay, the most important item for a good running loom. See, by means of the spirit level, that the lay is perfectly true, so as to insure the shuttle, as travelling through the shed, against an up and down hill motion. Then use the straight edge on the lay so as to detect any warping in the race board, sometimes caused during transportation by the influence of the weather.

The loom having been tested thoroughly and so far found accurate, place the reed in the lay, being careful in adjusting it so that it will be at right angles with the shuttle race. The hand rail *or reed cap* is then filed to fit, using a small square to assure accuracy, the latter being essential as the reed besides beating up the filling has to guide the shuttle in its motion back and forth, through the shed.

In lining the reed to the box guide plates, it may be sometimes found that, although the reed is in line with the box guide plates at the race board line, it will not be in line at the top near the reed cap. This must be put in line with the reed, since it must be at right angles with the race plate. The box plates, not being in line with the reed, will cause the shuttles to wear at the shoulder, and rattle or *click* on entering the box.

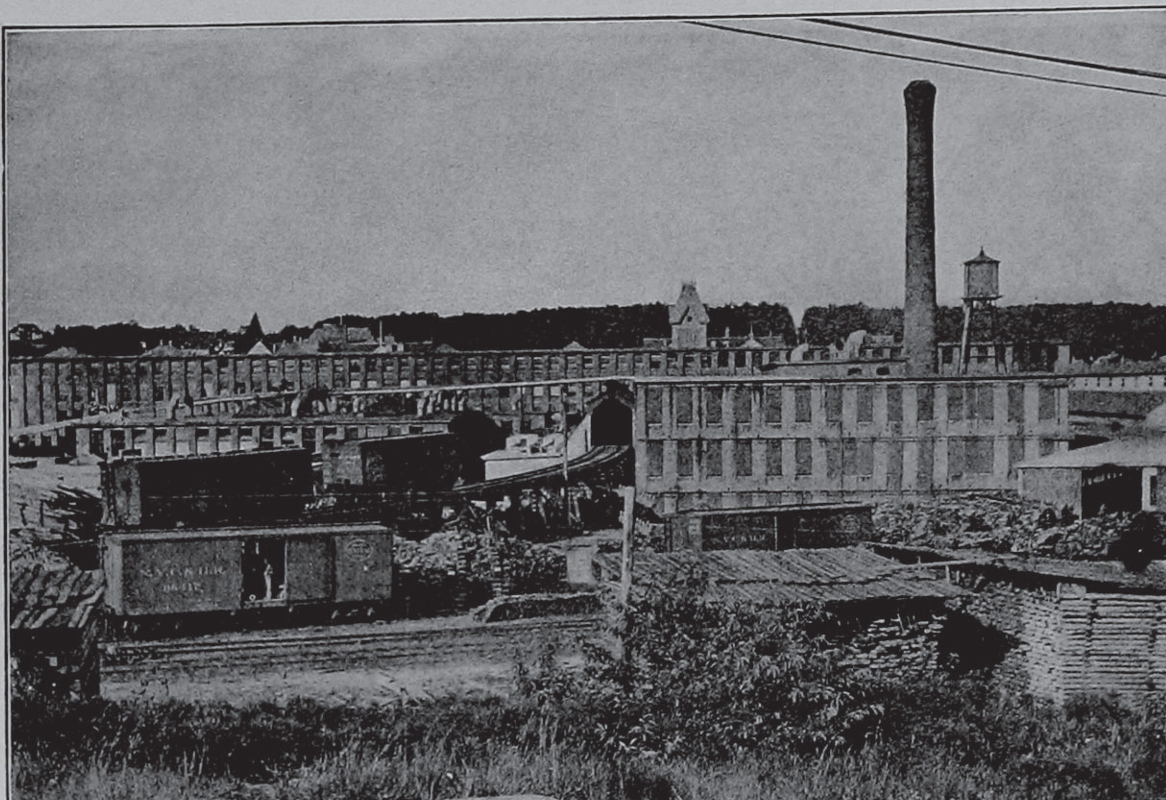
SHUTTLE BOXES.

Set the back box plates at right angles with the lay ends. By filing at the back of the plates they can be easily made true. It is now necessary to use a long steel straight edge to see that the box plates are in line with each other, also in line with the reed.

After getting the picker stick to running true in center of slot in the lay, and adjusting lug straps and the timing of the pick cams, the loom is ready for limbering up. This should take about three days, care being taken in having all parts well oiled two or three times a day with a good oil.

The fixer must be always on the watch for any loose nuts, thereby reducing the breakage of castings to a minimum.

(To be continued.)



THE DRAPER WORKS, Hopedale, Mass.

The above illustration is reproduced more particularly in the interest of the thousands of textile workers, here and abroad, who never have visited Hopedale, but to whom the words *"Draper," "Northrop," "Dutcher,"* whether referring to Looms, Temples, Bobbins, Shuttles, Spindles, Twisters, or other textile machinery or labor saving devices, are words met with every day in connection with their various occupations.

The illustration shows in black the view of the Draper Works that appeared in natural colors on the front leaf of their 1910 calendars, which was taken from a color photograph by the new Lumière process and was the first of the kind ever taken in connection with their line of business.

The South installed during the past year 932,320 spindles, 19,237 looms, calling for an investment of $23,000,000, which figures compare favorably with those of 1908, when 148,808 spindles, at an investment of $2,700,000, were added.

JACQUARD EFFECTS IN LARGE DIAGONALS

Produced by the Harness Loom.

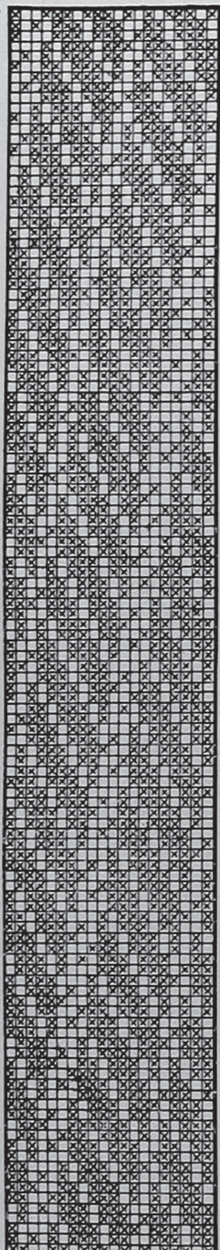


FIG. 1.

FIG. 2.

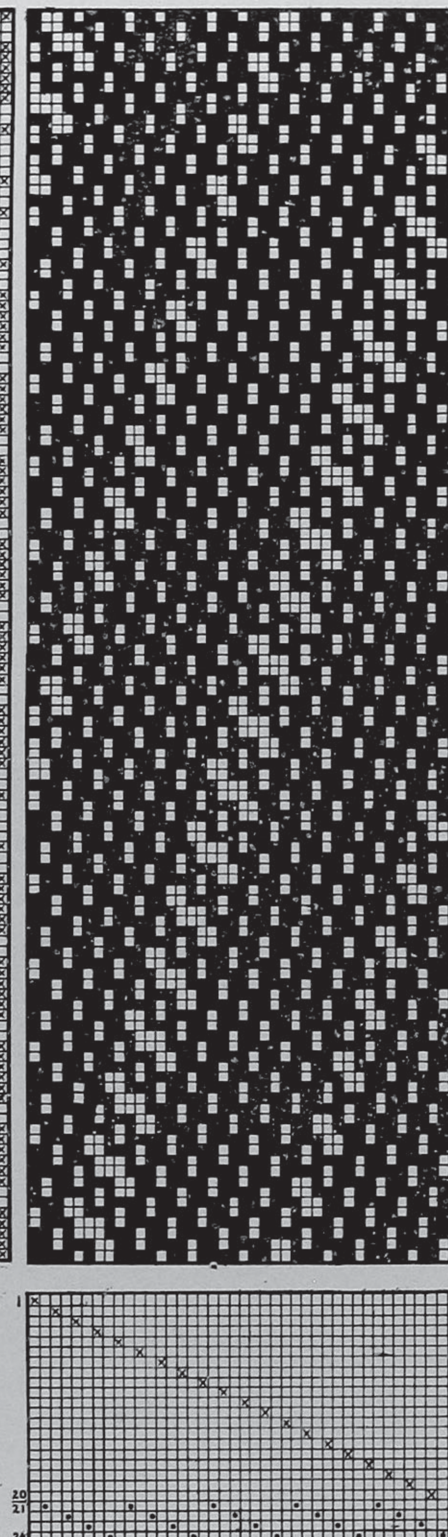


FIG. 3.

For illustrating this subject, we will take the combination of 82 deg. twills in the formation of large diagonals of 70 deg. grading, producing in turn, weaves closely resembling Jacquard work.

The subject is readily explained in connection with the accompanying three diagrams of weaves and one draft.

Weave Fig. 1 is shown by means of *cross* type, and will readily explain itself as an 82 deg. steep twill. Weave Fig. 2 shows, in *dot* type, another 82 deg. steep twill if considered thread for thread in the same direction as you have Fig. 1. Do not consider the twill effect as is running in the reverse way, or you will designate this weave as a 63 deg. steep twill.

Provided alternately one warp thread from weave Fig. 1 and one warp thread from weave Fig. 2 are taken until *both* weaves are used up uniformly complete, the results will be a new large diagonal, as shown in Fig. 3. The draft below the weave corresponds to the drafting of the two weaves previously referred to; indication of type in draft corresponding to those used in the two foundation weaves.

Weave Fig. 1 repeats on 20 warp threads and 120 picks.

Weave Fig. 2 repeats on 4 warp threads and 8 picks.

This will indicate that with reference to the repeat of the combination weave $(20 \div 4 = 5)$, on account of the repeat of weave Fig. 2 being a multiple of weave Fig. 1, twice the number of warp threads as used in weave Fig. 1 are required for the new, large diagonal, and which repeats on 40 warp threads and 120 picks.

The repeat of weave Fig. 1, filling ways is 120; the repeat of Fig. 2, filling ways is 8, and since 8 is a multiple of 120, no increase in the repeat filling ways in the new diagonal compared to that of foundation weave Fig. 1 has taken place.

The draft below weave Fig. 3, and which we quote as the foundation draft, in practical work is the drawing-in-draft for executing weave Fig. 3 in connection with 20 harnesses on the loom.

Substituting other 82 deg. steep twills for foundation weaves, will give the student an endless chain of motives for producing new large diagonals having steep twill effects.

A PRACTICAL TREATISE ON THE KNOWLES FANCY WORSTED LOOM.

By E. P. Woodward, Master Weaver.

(Continued from page 58, Vol. V.)

The Knowles Positive Shuttle Box Motion.

The Knowles positive box motion comprises essentially the following parts: Cylinder gears, actuating vibrator gears to raise or lower the shuttle boxes by means of suitable levers, sectional gears and connectors, all subject to the call of the box indicating on filling chains.

To prevent breaking of the different parts of the box, changing mechanism *give-away* springs are placed on the box rods. If for any reason the boxes should become fixed, the *give-away* springs should allow the box changing mechanism to work regardless of the direction or distance the boxes may be going, thus proving its name—*a give away device* to prevent breaking of the parts which may be in action. The other spring is used on the positive box motion, a counter balance spring it might be called, since its purpose is to relieve all working parts involved in the moving of the shuttle boxes of the weight of the shuttle box. This device is the cause for a longer life of the box motion.

Described in detail and beginning with the cylinder gears, the parts are as follows:

(1) Two cylinder gears, *i. e.*, top and bottom—each having eighteen teeth.

(2) Two vibrator gears with their connectors—each vibrator gear having sixteen teeth to each side of its gear.

(3) Two levers—one of their ends being fitted to the vibrator connector in the usual manner—the other end formed as the sectional part of a gear similar to a quadrant gear.

(4) Two bevel gears meshing with the quadrant gears. These two bevel gears have sleeve extensions (reaching to the loom side) and carrying adjustable cranks which are made to turn (by means of the gears) about one-half of a revolution.

(5) Two levers coupled to the cranks by connectors, one lever giving a certain motion or changing distance to the shuttle box, the other lever giving twice as much.

(6) Bearings for these two levers, which can be readily adjusted, to do away with all looseness caused by wear.

(7) A spring mounted on the box carrying rod and fitted on this rod between two sleeves, thus allowing the spring to be compressed by pushing the shuttle boxes down and also by raising the shuttle boxes.

(8) A swinging connection from the compound lever to the box lifting rod, so arranged as to give the minimum amount of motion to the shuttle boxes—caused by the swinging of the lay.

When adjusting the different parts of the positive box motion, care should be taken with each part that it may take its true position in relation to the rest of the parts involved.

Beginning to adjust from the levers which first transmit motion from the vibrator gears, *i. e.*, the levers of which the quadrant gears are a part. These two levers should give the same amount of motion to the gears with which they engage. By means of the gears which turn the shafts on which the cranks are fixed, each crank should be given the same part of a revolution. This setting has given the number of degrees of the circle through which the cranks move, but it has nothing to do as yet with the *sweep of the cranks*.

There is an object in adjusting the parts, viz.: It is to so adjust the throw of the quadrant gears (by means of their adjusting tips) that they will cause the crank to throw just far enough to sufficiently pass the dead centre line when the cranks are up, *i. e.*, above the shafts on which they turn.

They should also approach as near the dead centre line when down as will insure their steadiest carrying of the shuttle boxes. In neither position, *i. e.*, up or down, should they pass the dead centre line more than absolutely necessary for the steady changing of the shuttle boxes, since to do so means time and motion lost unnecessarily in passing dead centres—two things which retard the changing time of the shuttle boxes, and also cause them to change quicker than they otherwise would.

In setting these parts to get the desired throw of the cranks, the adjusting tips will be set about midway of their extremes and the cranks can then be positioned, both for length of sweep and their relation to their centres, *i. e.*, their locking positions.

The rods connecting the compound lever with the cranks come next, and the bearings of the compound lever should be kept nicely fitted. This can be readily done by means of the special bearings provided. They should not be fitted to pinch the shaft, but should be so fitted as to take out all lost motion only.

The boxes can now be leveled in the usual manner by means of the adjusting places on the compound lever. The give away device should need no further explanation as it is simple enough to explain itself. The give-away spring should be stiff enough to carry the boxes through all changes steadily and the makers of the loom have so made it that it will do its work well. The same can be said of the counter balance spring.

The makers of the loom have designed a box motion which is positive, *i. e.*, the boxes are pushed down as well as lifted. They must go where the levers send them.

To review briefly, this article has been written to try to demonstrate the setting and timing of the parts as follows: Both adjusting tips should give equal movement to the cranks and both cranks should give the same sweep. The tips should be so adjusted as to give the required throw and at the same time to leave the cranks in their best locking positions. With these levers set as described, the compound lever should then take care of the rest of the desired motion so far as leveling the boxes is concerned. All bushings should be adjusted to fit their shafts and not to pinch them. In this article has been described the mechanism which operates one shuttle box. Its mate is operated by a similar device. The indicating chains are put on in exactly the same way as for the chain lift box motion; the same indications give the same results in both styles of box motions.

(To be continued.)

The New Orleans Cotton Exchange quotes that for one year, southern mills consumed 2,560,000 bales of cotton, or 60,000 bales more than were consumed by northern mills. Still, foreign mills used in the same period over 8,000,000 bales. There are to-day in the South, according to recent statistics, 762 cotton mills, capitalized at $115,771,000. Since these mills contain 11,720,000 spindles and 267,430 looms, this capitalization is only about $10 per spindle, said to be remarkably low. North Carolina holds the lead in the number of mills, having more than twice the number of those of South Carolina. Georgia has about as many cotton mills as South Carolina, but only about one-half as many spindles.

Motives for Stripes for Harness Work.

(Continued from page 22, Vol. V.)

In the accompanying plate of designs are given 30 new reproductions of stripes suitable for all classes of Textile fabrics. They are a continuation of the collections given in the November, January, February, May and July issues of the Journal; being furnished in the interest of the Designer for Figured Harness Work, Cotton, Worsted and Silk Dress Goods, Shirtings, Ribbons, Tapes, Edgings, etc., and where the harness capacity of the loom is limited.

The collection refers to designs for from 2 to 16 harnesses, for their execution on the loom. Explanations given on page 133, Vol. IV, refer also to this collection of motives.

About 200 of these designs for stripes for harness work have thus far been given in the Journal.

RIBBONS, TRIMMINGS, EDGINGS, ETC.

(Continued from page 157, Vol. V, No. 6.)

4. Cross, Gauze or Leno Weaves.

Two different systems of warp threads are used in connection with these weaves:

(1) The Standard threads, also termed stationary threads (these are weighted heavily).

(2) The Whip or Douping threads, which twist or doup back and forth, around the standard threads. They work with a loose let-off.

The twisting, *i. e.*, the douping of the whip thread around the standard thread may be done either from above or below, around the latter. In connection with ribbon weaving, the latter system is the one most frequently made use of, *i. e.*, the whip thread is raised from below alternately once on one side and then on the other side of its mate standard thread, being in either instance held in position by one or more picks.

The standard and its mate whip thread, or threads, of either system, as twisting against each other, must be threaded into one dent.

The raising of the whip thread or threads, as will be readily understood, cannot be done by means of common heddles, requiring for this work douping devices, of which we will refer to such as most frequently met with:

(a) Douping Harnesses Provided with Half Heddles, *i. e.*, Douping Cam.

This arrangement of douping is best explained in connection with diagram Figs. 131, 132 and 133. Two empty harness frames 1, 1′, 2 and 2′ are used. The whip thread *a* is threaded into a round glass or porcelain eye *b* to which on either side is also threaded a douping heddle *c* secured respectively to the top rod of the harness frame 1 and its mate doup heddle *d*, secured in turn to the top rod of the harness frame 2. The standard warp thread (*x*) is threaded above eye *b* as carrying the whip thread *a*.

Raising, in the course of weaving, harness 2, 2′ and lowering harness 1, 1′, see Fig. 132, will cause the raising of the whip thread *a* at the right of its mate standard thread *x*.

Fig. 131

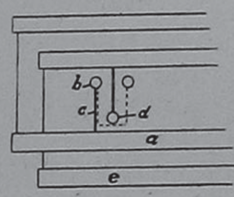


Fig. 136

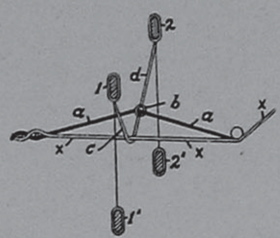


Fig. 132

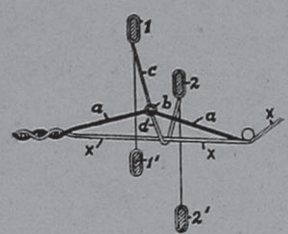


Fig. 133

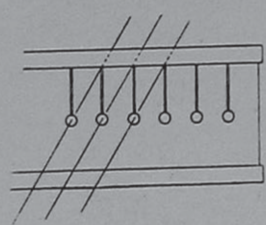


Fig. 134

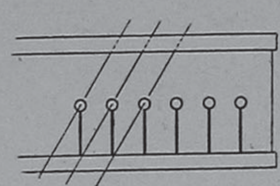


Fig. 135

Reversing the lift, see Fig. 133, raises the whip thread *a* at the other side of its mate standard thread *x*.

In either case, the standard thread remains *down*.

If the twisting is to be done from above, secure the doup heddles to the lower rod (1′ and 2′) of its respective harness frame, placing the standard warp thread then below the glass or porcelain eye, as carrying the whip thread. In order to more clearly show up the twisting of the whip thread *a* around its mate standard thread *x*, the first is shown in heavy black lines and the latter in outlines.

(b) NEEDLE HARNESS SHAFTS.

Two skeleton harnesses, as shown in Figs. 134 and 135, are required. Examining these two diagrams, we find in one of this pair of harness shafts (see Fig. 134) needles provided with eyes inserted into the upper framing of the harness shaft. In connection with the other (mate) harness shaft (see Fig. 135) similar needles, provided with eyes, are inserted into the lower harness frame.

To produce the douping from below, enter into the eyes of the needles, as secured to the lower framing of one of the harnesses (Fig. 135) the whip threads, drafting the standard threads in turn into its mate harness (Fig. 134).

The douping of the whip threads (see Fig. 136) is accomplished by the following three motions of the harness frame carrying said whip threads:

(1) Lower harness *a* sufficiently so that the eyes *b* of its needles *c* come below the eyes *d* of its mate harness *e*.

(2) Move harness *a* in a horizontal direction until its needle eyes *b* are situated at the other side of the needle eye *d*, carrying the standard warp thread *x*.

(3) Raise harness *a*; inserting then the filling.

The travel of the needle eye *b* of harness *a*, as thus referred to, is illustrated in connection with Fig. 136 by means of dotted line.

To doup from right to left (1) lower harness *a*, (2) move it to the left, (3) raise it; all being done under similar conditions as previously explained in connection with douping to the right.

The harness frame (*e*) carrying the standard warp threads *x* remains stationary during either process of douping referred to.

If so desired, harness *c* carrying the standard warp threads can be made to travel partways against the motion of harness *a*, in this way reducing the amount of motion (lift) of the latter, correspondingly one half.

To twist from above reverses the procedure; the needles which carried the whip threads then carry the standard threads and vice versa.

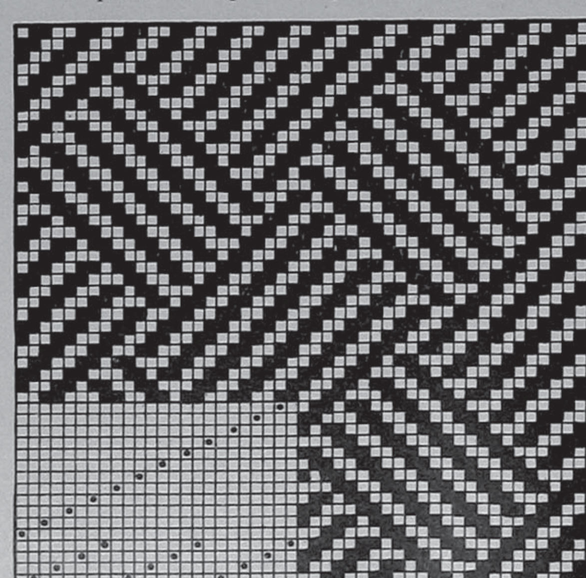
(To be continued.)

NOVELTIES FROM ABROAD.

Cheviot Dressgood. *(Color Effect.)*

Warp: 2048 ends, 2/28's worsted.
Weave: Repeat 24 by 24; 16-harness fancy draw.
Reed: 16 @ 2 ends per dent; 32 ends per inch; 64 inches wide in reed.
Dress: 1 end natural white cheviot,
1 " green and red mix.
—
2 ends in repeat of pattern.

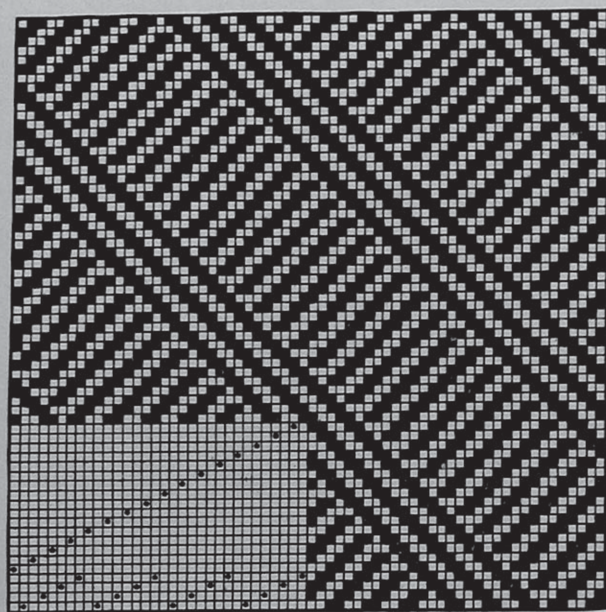
Filling: 30 picks per inch, 2/28's worsted, arranged thus:
1 pick natural white cheviot,
1 " black cheviot.
—
2 picks in repeat of pattern.



Finish: Cheviot finish; full, clip on shear; 56 inches finished width.

Summer Cloaking.

Warp: 2304 ends, $4\frac{1}{2}$ run woolen cheviot yarn.
Weave: Repeat 32 by 32; 20-harness fancy draw.
Reed: 16 @ 2 ends per dent; 32 ends per inch; 72 inches wide in reed.



Dress: 31 ends, light gray mix,
1 end, dark gray mix.
—
32 ends in repeat of pattern.

Filling: 32 picks per inch, $4\frac{1}{2}$ run woolen cheviot, dark gray mix.

Finish: Cheviot finish; full slightly, clip on shear; 56 inches finished width.

COTTON SPINNING.

The Ring Frame.

(Continued from page 4.)

Bobbins.—There are two kinds of bobbins used on the ring frame, known as the warp bobbin and the filling bobbin, each kind being of a different shape to accord with the different method by which the yarn is wound up on it. Yarns used for warps are wound upon the warp bobbin, yarns used for filling on the filling bobbin, each kind being wound upon its special bobbin in a different way.

The two varieties of bobbins are shown in Figs. 275 and 276, in which Fig. 275 is a warp bobbin (here shown set in place on its spindle) and Fig. 276 is a filling bobbin. It will be noted that the warp bobbin resembles in its shape somewhat the roving bobbin, while in the filling bobbin, the main barrel is tapered at the bottom (but not as a perfect cone) and is made with steps or ridges. These steps are located in such position that when the yarn is pulled off the bobbin in the shuttle, it will come off in one layer at a time and not tangle.

Figs. 277 and 278 show the two varieties of bobbins when wound full of yarn, the lines representing the successive layers of yarn. Fig. 277 shows the warp bobbin, in which it will be noted how each successive layer, or traverse of yarn is a trifle shorter in length than the one preceding it. In Fig. 278, the filling bobbin, the length of the layers will be seen to be the same, but each successive layer starts a little higher up and ends a little higher up, thus keeping the angle of the layers the same throughout. This peculiar shape of bobbin and wind has been found to be best adapted to the unwinding of the bobbin when in the shuttle of the loom.

The methods and mechanism by which the yarn is wound upon the two bobbins will be explained fully in the chapter on *Builder Motion,* to which the reader is referred. When the bobbins are wound full of yarn, the frame is stopped and the bobbins are removed by *doffing,* which will be also explained in a separate chapter.

Bobbins should have a steel ring or equivalent at the bottom, to prevent them from splitting. The upper bearing should never fit tight on the spindle, and should be at least $\frac{3}{4}$ inch long. The bobbin should fit the sleeve bearing from $\frac{1}{2}$ inch to $\frac{5}{8}$ inch, at the same time entering the cup about an eighth of an inch, but they should fit the sleeve bearing rather than the cup. Bobbins made in this way never will rise up on the spindle. Where it is practicable, the long traverse bobbin can be bored back at the top, leaving the walls with sufficient strength for usage. This will make the bobbin light at the top.

Bobbins ought to be oiled and shellacked; the length of life of a bobbin will more than offset the difference in cost. Bobbins that are not true should be discarded altogether. Bobbins should be made from the best materials, silver birch makes a first class bobbin, both for filling and for warp.

Filling bobbins should be made according to the diameter of ring used. The top bearing should fit loose and should be at least $\frac{3}{4}$ inch long, an inch would be still better. They should fit the sleeve at least half an inch, same as the warp bobbins, entering the cup about an eighth of an inch. Where filling bobbins are liable to be wet, they should be soaked in pure linseed

Fig. 275

Fig. 276

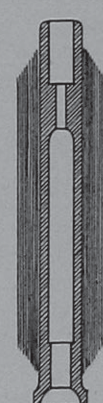


Fig. 277

Fig. 278

oil and receive two coats of good shellac dissolved in pure alcohol. Bobbins should be reamed so that they will be quite loose on the top bearing, this being simply a steadying and not an adhesive bearing. As the filling frame requires straight doffing, more or less waste will collect on the bobbin; this must be kept cleaned off so that the bobbins will stand in line, each in its proper place on the spindle. Filling bobbins often swell or warp from the moisture in the weave room, and require frequent reaming or replacement. In order to keep the supply of bobbins of uniform size, iron samples should be made to order by, and these should be stamped with the mark of the mill.

Warp bobbins are usually made smooth on their outside surface, but filling bobbins have either ridges or grooves about ½ an inch apart on the outside of the barrel, for holding the yarn on the bobbin and preventing it from slipping off when in the loom shuttle. Ridges are better than grooves, as the bobbin is stronger, because its material is not cut away, and the greater diameter tends to relieve the strain on the yarn, while grooves will intensify it. However, it is sometimes an advantage to have slight grooves in warp bobbins to prevent the yarn from being pulled off the bobbin by a careless spooler, or negligent spinner, when a spoiled bobbin is found. These grooves also give the yarn a better grip on the bobbin in starting a new set, preventing slipping.

Bobbins should be thick enough in the barrel to prevent undue strain (traveler pull) on the yarn when it is being wound on the bare bobbin, yet should not be so thick as to reduce the quantity of yarn that can be wound on them, because the less yarn that can be wound on a bobbin, the oftener the frame must be doffed, which reduces production. In case of filling yarn, the loom has to stop oftener to have the bobbin replaced when there is a short length of yarn on it, excepting in the case of automatic filling changing looms. A light bobbin, however, is preferable to a heavy bobbin, as it will consume less power to drive it, provided it is stiff and strong. Bobbins should be well balanced and kept clean on the inside, so as to fit properly in position when running.

Bobbins are carried by the spindle by virtue of their snug fit over the blade of the spindle and the sleeve. The bobbins should be carefully fitted to the spindles. They should be examined and tried on a standard spindle once a year at least, and ill-fitting ones made right by reaming or thrown away.

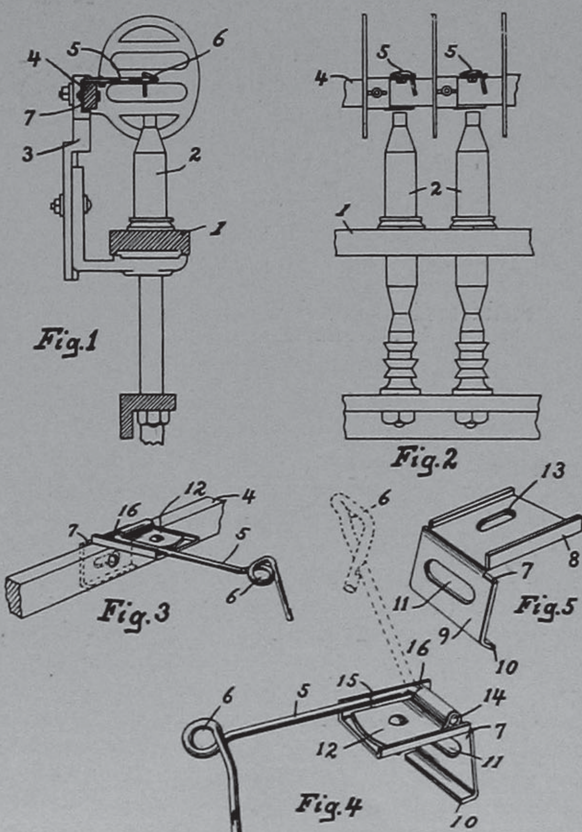
(To be continued.)

Culver's Thread Guide for Spinning Machines.

The construction and operation of this thread guide is readily explained in connection with the accompanying five illustrations, of which Fig. 1 is a vertical sectional view taken through a spinning machine, showing the new thread guide in position over its bobbin. Fig. 2 is an elevation, showing the front of a section of a spinning machine. Fig. 3 is a detail perspective view of the thread guide, showing the method of its support. Fig. 4 is a somewhat larger detail view of the thread guide and its support, and Fig. 5 is a perspective view of the supporting member.

Numerals of reference accompanying our illustrations indicate thus: 1 the ring rail, 2 the bobbins, 3 the supporting frame work which carries on its upper portion the guide wire rail 4 which in the construction shown, takes the place of the well-known thread board.

It is to this rail 4 that the leg 5 of the thread guide is secured. 6 is the eye of the thread guide, its leg 5 being hinged at its rear end to a supporting plate 7, which comprises a horizontal channeled member 8, and a rear vertically disposed member 9 which terminates at its lower edge in an upturned flange 10, and is provided with a longitudinal slot 11. Within the channeled member 8 is seated a hinged leaf 12, being provided with a bolt which passes through said leaf and through a slot 13, formed in said channeled member 8, whereby said leaf may be longitudinally adjusted in said channeled member 8. The rear end of said leaf 12 is curved as shown in Figs. 3 and 4, to provide a socket for a transversely projected end 14 of the leg 5 of the thread guide, said leaf being also cut away at one side, as at 15, to permit the horizontal portion of the leg 5 to lie horizontally against the channeled member 8 between said leaf and one of the upstanding flanges of the channeled member 8.



To limit the backward movement of leg 5, the curved portion of leaf 12 is provided with a projection 16, which forms a stop.

A New Construction of Card-Clothing.

The same is a late German invention and relates to an improved manner of securing the teeth of the clothing to its foundation, more particularly in connection with a card-clothing where the teeth, with a view to develop a great elasticity, must stand in a very thin or very soft cloth. The latter has the disadvantage, that the teeth set into it, during their work, get gradually loose in their holes, the card-clothing in

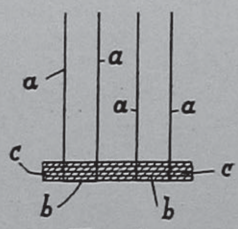


Fig. 1

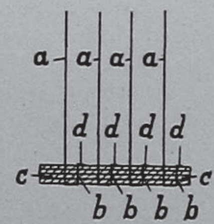


Fig. 2

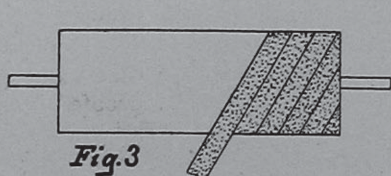


Fig. 3

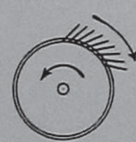


Fig. 4

turn becoming worthless. To overcome this disadvantage is the object of the manner of constructing the new card-clothing. To more clearly illustrate the latter, the accompanying four illustrations are given and of which Fig. 1 is a side elevation, showing the old construction of teeth. Fig. 2 is a side elevation showing the new construction. Fig. 3 shows the cylinder of a carding engine with the card-clothing in shape of a ribbon wound upon it in a spiral line, and Fig. 4 shows the same in end elevation.

The teeth of these clothings, at present in use, are bent in the shape of a **U**, Fig. 1, so that the teeth *a* are connected in pairs by means of a connecting bridge *b*. At work, both teeth are moved considerably in the operation of carding, whereby they act in the holes in which they are secured in the foundation *c* of the card-clothing under a certain leverage and thus widen said holes in such a way that finally the teeth get loose.

The new card-clothing is characterized by the fact that its teeth are quite independent of each other. Each tooth, Fig. 2, is bent **U** shaped at the end, and a limb *b* penetrates into the foundation of the cloth parallel to the limb *a* of the tooth. This structure, the inventor of the new card-clothing claims, renders the fastening of the teeth in the foundation more secure than in the case where the teeth are arranged in pairs as in Fig. 1, since in the operation of carding, the effort exerted upon the fastening portion of the teeth arranged in pairs, is double that exerted upon the fastening portion of a single independent tooth.

To still increase the hold, but especially to prevent the tendency of the teeth to penetrate the foundation beneath the clothing, the limbs *b*, Fig. 2, are bent at right angles at *d* over the surface of the cloth in such a way, that the teeth stand fast, and at the same time that the coatings or layers of the cloth are held together.

The hold in the cloth thus effected for each tooth, is largely increased, because the teeth, even under the greatest strain in the carding operation, are able to yield in all directions.

AIR CONDITIONING FOR TEXTILE MILLS.

Humidifiers.

(Continued from page 165, Vol. V, No. 6.)

Another make of a Humidifier lately brought on the market, is shown in the accompanying four illustrations, Figures 10 to 13, and of which Fig. 10 shows a longitudinal sectional view; Fig. 11 is a front, and Fig. 12 the rear end view; Fig. 13 is traverse sectional view of the humidifier.

This humidifier comprises a cylindrical casing *a*, open in front and rear, and secured by means of standards to the ceiling of the room. Suitably mounted in bearings, and extending throughout the entire length of the casing *a*, is a shaft *b*, having attached to it a fan *c*, brush *d* and driving pulley *e*. Shaft *b* is driven by means of an electric motor *f*, pulley *g* and belt *h*.

Extending through the casing *a*, at right angles to shaft *b*, is a water supply pipe *i*, having a U-shaped fitting *j* at its free end, in which are screwed three perforated branch pipes *k* extending parallel with and in close proximity to the brush *d*. The water supply pipe *i* is also provided with another perforated branch pipe *l* near the inner wall of the casing *a*.

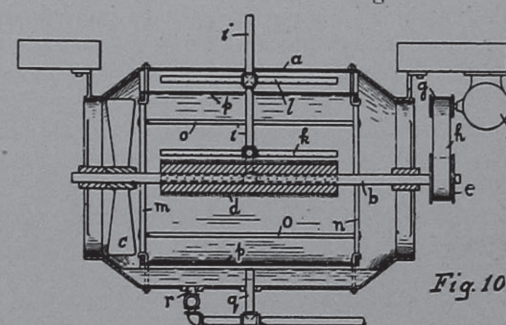


Fig. 10

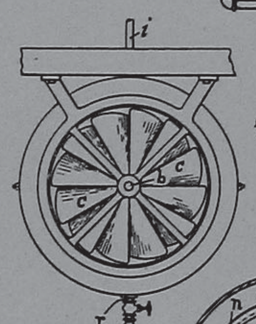


Fig. 11

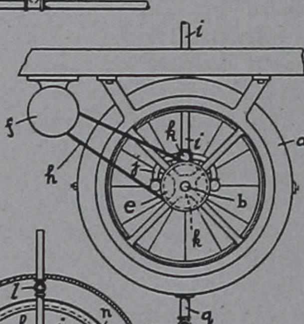


Fig. 12

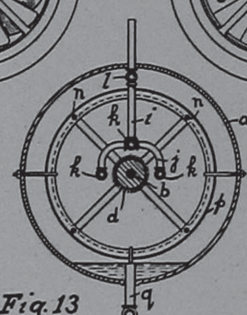


Fig. 13

Within this casing *a* is a supplemental casing, comprising rims *m* and *n* secured together by rods *o*, and held in position by means of clamping bolts and nuts. Secured upon the rims *m* and *n*, and extending between the same, is a cylindrical bag *p* made of a suitable fabric structure, said bag being open at each end and surrounds the brush *d*.

In operation, the water is supplied to the apparatus in small quantities through pipes *k* onto brush *d*, the latter being made to revolve at a very high rate of speed, throwing the drops of water against the inner wall of bag *p*, thereby breaking the drops and creating a mist, which in turn is absorbed by the current of air drawn through the bag *p*, by means of the fan *c*. The water supplied from the perforated branch pipe *k* falls upon the outer wall of the bag *p* and is absorbed by the current of air passing through the casing *a* around the exterior of said bag *p*.

If the supply of water through the perforated branch pipe *l*, falling upon the exterior of the bag *p* is greater than can be absorbed by the current of air upon the exterior of said bag *p*, the surplus water will then be absorbed by and pass through to the interior of said bag, where it will be operated upon by the brush *d*, or said surplus water will fall to the bottom of the casing *a* and pass out of the apparatus through overflow pipe *q*. Drain pipe *r*, at the bottom of casing *a*, drains the water out of the casing.

WATER-PROOFING WOOLENS.

(Continued from p. 145, Vol. 5, No. 6.)

Although it is not customary to impregnate the better woolens with proofing mixtures, the advent of shoddy and cotton combinations has led to an increased use of filling, and to some of these, cotton finishing machinery has become applicable.

Following drying, after impregnation with a metallic soap, some fabrics are improved by heavy pressure in a calender. This consolidates the dressing and causes a closer amalgamation of the fibres. Such a calender is shown in Fig. 1, and consists essentially of 5 rollers *A, B, C, D,* and *E; A* and *D* are of iron; *B* and *C* are of paper; while *E*, which can be heated, is of brass. The material, as is indicated by *a*, after passing between the series of tension and opening bars *b*, then travels around *C, E,* and *B* and is batched at *F*. Other methods of treatment may be given by missing some of the rollers and varying the points of entry and egress. A more or less glossy surface is gotten by regulating the pressure.

Fig. 2 shows a useful form of machine where the cloth is simply passed through a solution quickly without steeping. This type may be used for either metallic impregnation or for soap solutions. The fabric is drawn from the roller *A*, under the small roller *C* at the bottom of the bath and from thence between the heavy squeezing rollers *B* to the folder attachment *E*, where it is plaited down. With such a small passage through this machine, it is found necessary when impregnating with acetate of alumina to use the solution hot so as to obtain even and thorough absorption. As the ordinary acetate made by mixing lead acetate with alum will not stand heating above 38 deg. C, without depositing, a special mixture has to be made. Three parts sulphate of alumina may be added to one part sugar of lead, or ten parts sulphate of alumina nine parts soda and three and a half parts acetic acid. Both the solutions mentioned may be used at a high temperature without decomposition, but the proofing imparted is by no means so thorough as if the goods had been given a long steeping. To increase the resistance to water, it is a common thing to mix Japan wax, paraffin wax or oil with the soap. This mixture however requires the utmost care in blending. The correct method of making these compound soap solutions is first thoroughly to dissolve the soap in a steam jacketed pan, then to add the powdered wax in small portions at a time, stirring the mixture well during boiling, so as to secure a thorough incorporation of the ingredients.

Whenever possible, two machines should be used for this filling, the one containing the alumina having rubber covered iron rollers for squeezing, while the rollers of the soaper should be iron covered with a brass shell. Soap liquors which contain wax may with advantage have a little coloring matter added to them, the same shade as the fabric to be proofed, while the proportions may roughly consist of five parts wax to 25 parts soap with 200 parts of water. A double impregnation suitable for grey or light-colored cloths is given by one authority as the following:—4½ lb. potato starch is mixed with 1 gal. of cold water, to this is added 4½ lb. soda dissolved in 2 gal. water, and the whole warmed but not boiled. To this is added 44 lb. linseed oil varnish and 14 oz. bichromate of soda dissolved in 3 gal. water. After well mixing, the paste is applied to one or both sides of the cloth by the machine shown in Fig. 3, and the material is then dryed, cooled and calendered. Before this paste is applied, the goods should have been bottomed, dried, soaped and dried again previous to spreading. *A* are two rollers carrying an endless rubber sheet kept to the proper tension by an adjustable roller *B* underneath, over this sheet the cloth travels at full width carried forward to the drying chamber by the wench *D*. At *E* is a knife and spreading arrangement for distributing the paste in a thin layer over the whole surface of the travelling fabric, and after leaving this point, the fabric is drawn straight into the dry-house.

Combined Bottoming and Soaping Machine.

Fig. 4 shows a useful combination of two machines for giving two passages through a proofing solution and a fixing agent. The cloth passes first through the tank *A* containing whatever solution of a metallic salt is used, then between heavy squeezing rollers at *B*, and from here to the soap bath *E*. After leaving this, it is again squeezed at *C* and carried forward to the folder attachment *D*. Of course, rapid treatment of this description does not confer such waterproof qualities as if the cloth had been steeped for some hours in the first bath and dried out before entering the soap, but it is considered sufficient for many low qualities of cloth on which it is impracticable to waste much time.

Proofing with Volatile Bodies.

When proofing is carried on with highly volatile solvents, such as benzine, naphtha, or carbon bisulphide, the work requires to be conducted in special rooms well away from any source of heat, and the drying should be done in fireproof chambers having a maximum temperature of 38 deg. C. It is also important to provide the stove with fans for the quick removal of dangerous fumes emitted during the drying process, as in practice it is found that recovery of the solvent may be neglected in favor of clearing away the vapors quickly, and so lessening danger of fire and illness of the operatives.

Fig. 5 illustrates a range for filling, squeezing, drying and cooling material which has been treated with volatile solvents. In this the fabric passes through a covered bath of the proofing mixture at *A*, then around two metal rollers *B*, which may be warmed if required, and away through the chamber *C*, which is closed in to recover part of the solvent by condensation. After leaving the cooling and drying chamber *C*, the final traces of solvent are driven off by running the cloth over the drying range *D*, the cylinders of which, however, must not be heated over 38 deg. C.

Proofing with Rubber.

Before dealing briefly with the outline of this most interesting process, it may be as well to give some details of the chemical composition and various properties of caoutchouc. This product is the solidified gum exuding from a number of plants, chief among which are the Euphorbiceœ, and it comes into the market in blocks or bottle-shaped masses with a nearly black exterior. Chemically it is a complex hydrocarbon with the formula $C_{45}H_{36}$, and physically its construction appears to consist of a highly porous network of cells, having several different gums in their interstices. No single solvent will dissolve it entirely, although it yields different constituents up to various solvents, and it requires two or more to effect perfect solution. At 10 deg. C, raw rubber is a solid body with very little elasticity, at 36 deg. C it becomes soft and elastic to a high degree — stretching to sixteen times its length. When heated beyond 36 deg. it loses its elasticity as the temperature increases, and at 120 deg. C it melts. Raw rubber has several peculiar properties, one of which is that after stretching and cooling suddenly while stretched, it retains its new form and only regains its former shape on being warmed. Another very striking feature is its strong adhesive capacity; this property is so marked, that raw rubber cannot be cut with a knife unless the blade is kept wet, and freshly cut portions will, if pressed together, adhere and form one homogeneous mass.

The first waterproof garments to which rubber was applied were footgear, and *gum boots* were worn for many years before its peculiar property of combining with sulphur was discovered. Previous to this, rubber goods were always sticky and it was impossible to mould it into forms of any permanence. After treatment with sulphur, the gum took on quite new properties, the stickiness disappeared while its elasticity increased, and it could bear greater differences of heat and cold. It is not known in what proportions rubber and sulphur combine, and in the vulcanizing of it much more sulphur is added than what is actually necessary, probably with the purpose of hastening the process. Small articles are made from raw rubber pressed into moulds, and vulcanized under pressure. After this treatment, vulcanized rubber can no longer be moulded nor is it possible to dissolve it again by any solvents. As regards textiles, the form in which rubber interests us most is that of varnish, in which state it may be applied to a fabric and fixed by vulcanizing with steam.

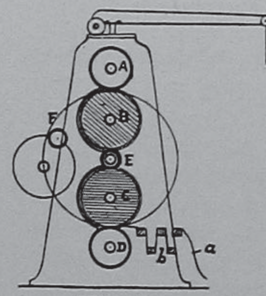


Fig. 1

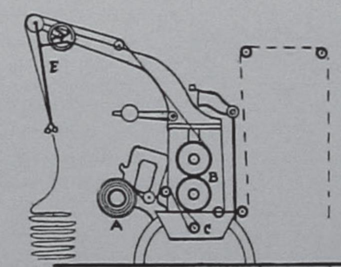


Fig. 2

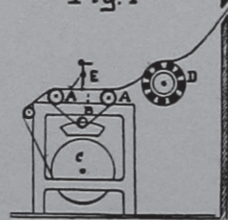


Fig. 3

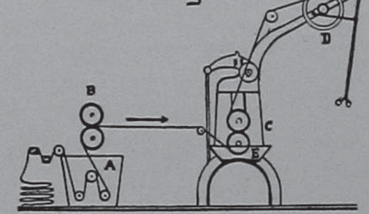


Fig. 4

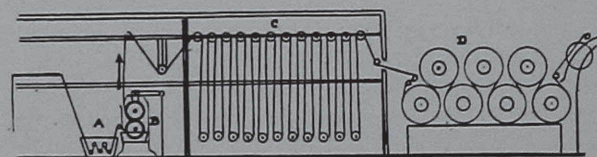


Fig. 5

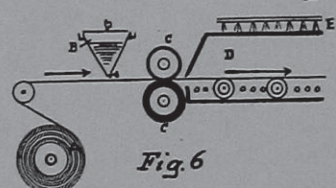


Fig. 6

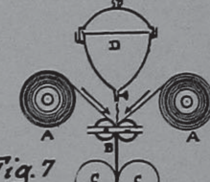


Fig. 7

Figs. 6 and 7 give diagrams showing how a film of rubber varnish is applied. In Fig. 6, *A* is the roll of cloth passing at full width under the V-shaped reservoir *B*, containing the rubber varnish. This reservoir has a narrow slit at its base opened by a thumbscrew, and allows only a wide thin stream to emerge. *C* are two metal rollers for spreading the varnish, and *D* is a steam heated chamber where the solvent escapes and the rubber is vulcanized. Fig. 7 shows the cementing together of two cloths with a film of rubber between the two, a very popular style of waterproof, which has quite superseded the shiny, black waterproofs once so common. *A* indicates the two rolls of cloth to be cemented together, *D* the reservoir holding the rubber varnish; *B* and *C* are two pairs of pressure rollers for transforming the two cloths into one fabric.

The general solvents for raw rubber are carbon bisulphide and absolute alcohol, first digesting the rubber for some hours with CS_2, then adding 10 per

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cent absolute alcohol and warming and stirring for a further length of time. Rubber varnish lends itself very well to admixtures of all kinds. The addition of boiled linseed oil forms a rubber-like film closely approaching that of caoutchouc, and in some mackintosh cloths it is a question whether rubber is not entirely absent, its place being taken by linseed oil.—"The Dyer and Calico Printer."

The Bureau of Manufactures, Washington, wants information in regard to the best quality of dyestuffs for the dyeing of wools for the use of the Navajo Indians in New Mexico and Arizona in making blankets. Such dyestuffs should be susceptible of application without any elaborate process or the use of machinery. The colors desired are black, gray, red, blue, yellow and brown. Further information may be obtained from the Bureau of Manufactures by mentioning No. 4357.

Two bales of Indian cotton have, for an experiment, been sent to the Pelzer mills, Pelzer, S. C., where this cotton will be tested as a substitute for our domestic cotton. This cotton from India costs only 12 cents per pound. If it can be used successfully with our American built cotton machinery, it is rumored that many Southern mills may use it, until the price of home-grown cotton falls to normal.

Business men at Olneyville, R. I., will ask their representatives in the state legislature to urge an appropriation for a textile school.

The Woonsocket Machine & Press Co., Woonsocket, R. I., the largest manufacturers of cotton roving machinery in the United States, will be represented after March 1, 1910, by J. H. Mayes, with offices at No. 1112 Realty Building, Charlotte, N. C. Mr. Mayes is widely known throughout the South.

Underwear and Hosiery.

For some time there has been good business done by woolen and worsted knit underwear agents. The hard winter weather depleted stocks in retailers' hands, and jobbers' reserve stocks had to be called upon.

On lines of cotton ribbed goods, business has been strong, but rather unsatisfactory to the mills.

On cotton fleeces the larger mills are well supplied on fall business, although booked on close figures.

The lighter weights of ladies' goods made to retail at 50 cents are none too plentiful when good qualities are sought.

The best known manufacturers of union suits in medium and heavy weights have had no trouble in securing all the business they could afford to book at standard prices. Eastern buyers have been looking at these goods and have been buying them freely.

The abundance of trademarked boxed hosiery sold under guarantees *never to wear out*, etc., has become a feature of the half hose business that will last, retailers and gents' furnishers finding consumers ready to pay fancy prices for goods that are fitted up in this way, the lines showing honest value being pushed by lines that look better before than after purchasing.

German manufacturers are prepared to continue an active competition on some of the cheaper lines of goods that were to be excluded by the new tariff provisions, but are not meeting with much encouragement. What will happen when the market is cleaned out of stocks rushed in here last year, remains to be seen.

In his annual message to the State Legislature, Governor Ansel, of S. C., mentioned that he will make a special report with regard to the contract with J. M. Graham to supply convicts to a hosiery mill. The contract expires next year and is said to be a source of expense to the State.

Returns to the state labor commissioner show that North Carolina has 312 cotton, woolen and silk mills, with 3,143,511 spindles, 55,692 looms, 130,355 horsepower and 55,128 employees, of whom 23,358 are females. 84 per cent of the operatives are able to read and write. 81 mills use electric power; 63 knitting mills report 74,440 spindles with 6,954 knitting machines, employing 6,867 hands.

The condition of the German cotton industry is reported, by Councilor Semlinger, president of the South German Cotton Manufacturers' Association, as desperate. He does not anticipate any improvement during the first half of the current year, owing to the increased cost of production due to higher wages, the legal ten-hour day for women workers and the rise in the price of raw material.

The treasury of the United States was made $10,000 richer on January 14, by the enforcement of the contract labor law against Amede Bellaire and Aime Richaud, employees of the Manchaug Cotton Mills of Manchaug, Mass., who paid $5,000 each for bringing five aliens from Riviere de Loup, Que., to work in the mills two years ago.

THE MANUFACTURE OF OVERCOATINGS AND CLOAKINGS.

(*Continued from page 64, Vol. V.*)

Having given a description of the construction of these weaves, a few points on the finishing will be of interest.

The characteristics of this class of woolens are bulk, pliability, and softness. With these is combined a full face, the exact appearance and condition of which will vary considerably with the taste of the finisher and the demands of the market. The filling, as mentioned previously, must always be such as will admit of the formation of a good thick nap, upon which the whole finish finally depends. The weave, *i. e.*, the face of the fabric, is smooth.

The first process the fabric, after received in the weave room, is subjected to, is the fulling. Chinchillas and Ratinés must be fulled very little, so as to be absolutely free from hardness or stiffness of any sort. If specking is necessary, and the color will not admit of carbonization or bur-dye, scour the fabric with a thin-bodied soap, using as little of it as possible, and have the water barely lukewarm. However, if the goods can be carbonized, wash as noted, since the soap can act more readily on the grease when not under the neutralizing influence of the acid. After carbonizing, care must be taken not to shrink the goods too much in the scouring, which follows. Before carbonizing use a thin-bodied soap; after the carbonization, a soap of double the consistency can be used. If the goods are carbonized, the acid must be neutralized, first by a run in cold water, after which the scouring as mentioned before, takes place. In connection with all the wet finishing processes the fabric is subjected to, be careful that the goods do not shrink excessively.

The next important process is the gigging. In order to produce perfect work, see that all wrinkles are smoothed out of the fabric before it comes into contact with the teasels, so as to prevent the formation of streaks in the nap. The gigging must be done thoroughly, and every effort must be made in order to produce a good nap. The face threads must not be cut, and yet a full and bulky foundation must be made, on which the after processes may have an opportunity to produce the required finish. In all cases of gigging chinchillas, it is well to go slowly. Cautious working, until a good full nap covers the threads, is the rule. It is best not to use very sharp work or new teasels, for a break in the filling is apt to show up plainly in the face of the finished cloth.

There is some variety of opinion as to the best gig for chinchilla and ratiné work; however the single cylinder gig is the one most advisable to use, since there is no sudden and violent reversing of the nap as is the case with the double cylinder rotary gig, hence much wear and waste on the nap is avoided, resulting also in the formation of a better and more enduring nap. Chinchillas, in gigging, should be kept somewhat damper than other woolens, as this always decreases the amount of waste in flocks which is apt to result from the process. Do not rush the procedure, since the whole appearance of the finish depends almost solely upon the correct raising of the nap.

After the cloth has received the proper amount of gigging, it is taken from the gig and forwarded to the whipping machine. Some finishers prefer to first crop the face of the fabric previously to sending it to the whipping machine.

Fig. 64 shows us such a whipping machine in its perspective view. The same consists of a frame, over which the cloth is passed, and to the frame is attached a series of rods operated by a cam and spring mechanism that raises and lowers these rods similar as one would do in whipping a carpet by hand. Under these rods the cloth is slowly passed, and while it is held tightly in place by the friction rollers, it is violently beaten by the rods in such a way as to cause the nap to be loosened from the bottom and stand erect.

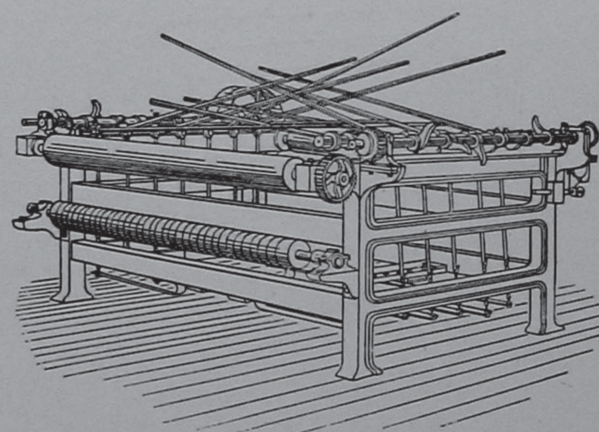

Fig. 64.

The cloth as leaving the whipping machine, whenever possible, is run direct onto a drier, without being folded in its wet state, and dried just as quickly as possible, for if the nap is allowed to become rubbed or matted while it is wet, undesirable results are sure to show in the face of the finished cloth. If such an undesirable effect is produced, nothing can remove it but a rewetting, and whipping over again.

The fabric is now ready for shearing. At the shear the process differs somewhat from that which pertains to other woolens, in that the ordinary laying brush is dispensed with, a wire brush being put in its place, the latter more evenly and thoroughly raising the nap. This brush is a roller, covered with card wire, and its speed is a trifle faster than that of the cloth. The brush rests lightly on the cloth and raises the nap very gently, without any wearing effect on it whatever. The rest is lowered a little so that the revolver will not drop back too much on the ledger blade when running. The amount of shearing depends upon the condition of the nap and upon the finish desired.

The fabric is now ready for the Chinchilla Machine, a specialty of a dry finishing machine, only used for this class of fabrics, and of which a perspective view is given in Fig. 65.

This machine consists of a strong upright frame, with a transverse surface or *bed* about 3ft. from the floor and some 2ft. wide by 5ft. long. This bed is