

Posselt's Textile Journal

A Monthly Journal of the Textile Industries

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ADVERTISING RATES ON APPLICATION.

COPY FOR ADVERTISEMENTS must reach this office not later than the 25th of month preceding date of issue, to insure proper attention.

ALL COMMUNICATIONS WILL BE CONSIDERED AS CONFIDENTIAL.

Letters to receive attention must be accompanied by the signature of the sender, but this will not be published unless so requested.

We will always be glad to receive articles of a practical nature relating to the textile industries, and will publish such as are available.

EUROPEAN AGENTS: Sampson Low Marston & Co., Ltd., 100 Southwark Street, London, S. E., England.

Wash Fabrics for Spring. New York selling agents have completed their next year's line of samples for wash fabrics, and the large buyers either are, or are expected soon in the market to examine them and make their selections. This is quite different from last year when all this work was done as early as March and concluded by the middle of April.

With reference to styles, it is acknowledged that stripes will hold their place in the better qualities. Piece dyes, which sold well during the year, will also do so next year. In the same way, two-tone effects in fine ginghams will sell, however, loud plaid effects, with exception of the finest textures, will receive a set back.

As to colorings, it has been hinted that they will incline again to the pastel shades, light tans, blues and some shades of red, however, these points will be known more definitely later on.

The popular finish in view is the *old linen* effect, that will give a clinging effect and yet be distinct from either silk, satin or the dress linen shine that has been in favor lately. In fine woven colored fabrics, as in the better classes of fine white goods, this finish can be best obtained in ply or twisted yarns, so that they will carry with them a good wearing ability.

Rewinding Yarn for Loom Production is one of the most important items lately come to our notice and which has been solved in connection with a new winder by Mr. Jacob K. Altemus, who has made the building of winding machinery a life long study.

As mentioned, the object is to rewind yarn on bobbins for the loom, in order to increase the production of the latter, accomplished by Mr. Altemus in winding a bobbin, in most instances, which will contain the amount of yarn which two or three bobbins contain in their natural state.

Again, for example, in connection with woolen yarns, the product can be spun on extra large bobbins (as now done with warp yarn) and then rewound on bobbins which can be used in the loom, in this way increasing production in the spinning room as well as the weave room, certainly a most important item for any mill.

There are certain points in connection with this Altemus winder which need special reference:

The quantity and quality are the two pre-eminent points to consider as the merits produced from this type of winder.

A resultant bobbin that will contain the greatest amount of yarn is the secret of the problem.

To materialize the effect is what Mr. Altemus proposes to do and true facts will be given by him to show the merits of his new winder, which can wind any style of traverse desired, slow or fast.

The new type of winder is adopted for quality of work as well as low cost of reproducing.

The traverse of this new winder is quickly adjustable, from a fast to a slow traverse, as regulated by the merits of the yarn to be wound.

The increased amount of yarn put on a bobbin depends upon the count of the yarn, also whether it refers to cotton, worsted or woolen yarn.

There are some yarns which it certainly will not pay to rewind, since the increase varies from 20 to 300 per cent. and when naturally in connection with anything below 50 per cent., it will be advisable to first correspond with Mr. Altemus on the subject.

Besides the superior results of this machine over other winders, Mr. Altemus's life long experience on the subject has resulted in producing a machine at lowest cost, on account of its simplicity of construction, combined with high speed and positive action in manipulation.

The best plan for any manufacturer to solve this all important problem of loom production is to send natural bobbins, *i. e.*, bobbins as coming from the spinning room, to Mr. Jacob K. Altemus, 2824 N. 4th St., Phila., and have him convert this yarn back on to original bobbins, showing then to any Manufacturer, Superintendent or Boss Weaver, the positive condition of the affair *by facts*, which cannot be disputed and will surpass in results any other winders heretofore made at the works, since it embodies all the ideas to get the best result with least labor.

Japan's Cotton Import. The season for the import of raw cotton is now at its height, and with the godowns of spinning mills full of yarn, there is no room for raw material. The bonded warehouses of Kobe are congested with this form of merchandise, and new importations now rapidly arriving have to be sent on to Osaka for storage. At the present rates spinning companies are making no profit and are possibly incurring loss. Moreover, in view of the generally unfavorable financial situation, bankers are hesitating to make advances on bills. In these circumstances spinning companies are reduced to a trying position, and it is believed that reserves may have to be called upon to pay dividends.

Weaving. Besides the regular standard article on the Knowles Fancy Worsted Loom by Mr. E. P. Woodward, Master Weaver, and no doubt a most prominent authority on the construction and management of looms, we also publish in this issue an article on *How to Remedy Some of the Trouble Encountered with the Knowles and the Crompton Thayer Head Motion*, the second article of a series of articles on *Loom Fixing* written specially for the journal by Mr. William Secor, a master weaver of over twenty-five years' experience, formerly connected prominently with Rhode Island mills, and stationed since the last ten years as Master Weaver in Philadelphia. The value of this series of articles on Loom Fixing is shown that The Textile Manufacturer of Manchester, a prominent Textile Journal of England, reprinted the first article in their June issue in the interest of their readers.

Trade-Marks. According to the opinion of experts who have been investigating the subject very carefully, the decision lately handed down by Judge Robb, in the District Court of Appeals, with reference to the use of whiskey trade-marks will apply not only to food and analogous products, but also to dry goods and numerous others of like character. It is believed, says the Journal of Commerce, that the use of a mark indicating that the article trade-marked is "pure" if any adulteration creeps in (as, for instance, where a "pure linen" or "all wool" article is found to contain cotton) will result in depriving the manufacturer and owner of the mark of his rights therein and will put him in a position from which he will never be able to recover what was lost in this way.

There is a strong belief that as soon as this fact becomes generally known it will result in considerable changes in trade-marks in such a way as to avoid the kind of misrepresentation referred to, while in some cases it may be necessary to end adulterations in order to continue the use of a mark which has become well known and which therefore cannot be changed without loss.

Cotton Goods for Morocco. As an aid to any American exporter who desires to attempt competition with English cotton goods exporters, who alone annually sell \$4,000,000 worth of goods in Morocco, Vice-Consul-General G. E. Holt has forwarded to the Bureau of Manufactures, Washington, D. C., a number of samples of English goods such as are generally and largely sold in the Moroccan market, together with details as to their widths, lengths and cost, and which samples may be secured by any cotton manufacturer by addressing the Bureau of Manufactures.

Scotch Linen Market. Reporting from Dunfermline, Consul Maxwell Blake says that it is questionable whether the quarterly statistics have ever shown such a large falling off in exports to the United States from that Scotch district, and where perhaps fully two-thirds of the total output of this district is consumed, as during the three months ended March 31, 1908, the total decrease in exports of linens alone amounted to nearly \$200,000. American buyers on account of a slack home demand, as well as because of anxiety over the disturbed condition of the yarn market are placing no new orders, and in some cases, they are even attempting to cancel orders placed during last year, about which there is much bitter complaint.

At the present time there appear no local indications of improvement in the situation, as practically everything must depend upon the activity of the American buyer, who now not only has his home market to consider, but the additional responsibilities of a fluctuating yarn market.

Cloth Examining. This forms the subject of an article written by Mr. Wm. Horrocks, employed by a most prominent public dyeing and finishing plant. Mr. Horrocks, on account of his years of experience in connection with a concern finishing all varieties of goods, has certainly treated the subject well in the interest of our readers.

We are promised by Mr. Horrocks that at his leisure hours off and on he will favor the journal with more of his experience, and we are convinced that our readers will appreciate such information from a practical man. It will always be the aim of the journal to connect with its text practical men of this type and in which we have thus far surpassed others, promising at the same time to the readers that we will keep up the good work and always try and do better.

Woolen and Worsted Dress Goods. There is little business done at present in woolen and worsted dress materials and dull business may hold on a week or two longer. However, the market is not altogether idle and there is some demand, which however is so broadly scattered, that its effect upon the market can hardly be noticed. What demand there is, is for plain broadcloth besides belated orders in wool challies and fancy worsteds. There is little doing by jobbers. Foreign goods are selling just as slowly as domestics, and in fact slower, a feature which is felt considerably abroad. The mills in Bradford, the centre of this industry in England, are suffering greatly from lack of orders from here. Mohair dress goods have been the best off.

Buyers, during the present season, complain that dress good styles lacked novelty and hope that the coming season will show new ideas. Large checks are shown by some mills, but they do not meet with extra favor, except those produced in a modified form. Plain mixtures are also shown quite extensively, but these articles cannot be considered new. Altogether, broad twills *i. e.* diagonals, it is strongly believed, will take the lead.

Cotton Growers to Protect Prices. C. C. Moore, ex-president of the North Carolina Cotton Growers' Association, and one of the best posted men in the Southern States on general conditions among growers of cotton, said, among other things: "I could not give the exact number of warehouses built in the cotton belt. I can only speak for North Carolina, which, I believe, is a fair sample. Under my administration as president of the North Carolina division of the Cotton Association, the farmers in North Carolina have built and paid for in their own money twenty-four modern up-to-date regulation cotton warehouses, costing in the neighborhood of \$2,000 each. The same active campaign for the building of warehouses, as was conducted while I was president, is being pushed by the present president, A. J. McKinnon, and by the Farmers' Union. I am of the opinion that by the first of September there will be in North Carolina not less than 100 farmers' cotton warehouses, with a capacity of at least 2,000 bales each. The building of these warehouses is for the purpose of placing the cotton grower in a position to name a fair and legitimate price for his staple crop cotton, and to enable him to resist any raids of speculative cliques and bucket-shop market manipulators in the future."

Cotton Spinners Advised to Keep Down Production. Mr. S. B. Tanner, former president of the American Cotton Manufacturers' Association, and who is a close student of the market, gives the following points as his advice to cotton manufacturers:

"We must have more drastic curtailment or we will have hard times in the winter. The converters to whom we have been shipping are not able to dispose of their goods.

Work is slack everywhere and laboring people have not the money to put in clothes. For eighteen months the export trade has been dull, and we are not likely to have any improvement in export trade for months. Taking the above facts into consideration and the fact that this country produces more goods than can be used at home it would be foolish for manufacturers to imagine that the occasional spurts that come in the markets mean a complete recovery of business. My firm belief is that if we do not curtail in the summer months, when the operatives can live cheaply, we will be forced to do so in the winter. Many manufacturing plants are running at a loss. Therefore, those who start up night work at a time like this have no regard for their neighbors and the future of the business."

Embroidery and Sewing Silks. Consul Louis Goldschmidt, of Nantes, France, advises the Bureau of Manufactures that there seems to be an excellent market in France for American embroidery silks and sewing silks, he claiming that the embroidery silks of France are generally not washable and consequently cannot be used (except in some shades) on white washable material, hence he claims that American embroidery silks can be sold there. To a smaller extent sewing silks might also be sold there. Such as found there are usually kept in bundles and tied up each time after a sale is made. Few silks are sold on spools as customary here, and then usually only to dressmakers. Some people may be surprised to learn that American silks could be sold in France in opposition to French goods, but says the consul, "the manufacturer who has enough enterprise to attempt to capture this market, and who goes about it in a proper manner, will undoubtedly succeed not only in France but in many other European countries."

Lists of wholesale and retail mercers, and of retail dealers in women's needlework at Nantes, can be obtained from the Bureau of Manufactures, Washington, D. C.

Belgium's Flax Industry. These industries, considered as the most important in East and West Flanders, are now experiencing a state of affairs looked upon as being one of the most critical ever gone through. Business has almost come to a standstill. The principal cause is attributed to the recent financial crisis in the United States, as orders from America are exceedingly scarce, and orders previously placed are being canceled. Nearly all the mills are working on short time, with a view to decreasing production and the accumulation of stocks. It is already foreseen that if the present situation does not change in a short time the greater number of the mills will be obliged to shut down.

A PRACTICAL TREATISE ON THE KNOWLES FANCY WORSTED LOOM.

By E. P. Woodward,
Master Weaver.

(Continued from page 334, Vol. II.)

Filling the Head Frame.

When putting in the harness levers or jacks, it is well to see that when they are resting on their fulcrum bar the smaller retaining rod does not pinch on any of them but will slide easily through the holes drilled for it without interference from the jacks.

When giving the jacks their position in relation to the vibrator levers and connectors, it should be done with the following ideas in mind:

1st. The vibrator levers and connectors take a line when correctly positioned which is parallel to the sides of the head frame and the loom arches.

2nd. With the vibrator lever thus lined the harness jack should be so located as to allow the connector to hook on without disturbing this alignment and at the same time allow the harness jack to stand easily in the section of its comb and grate through which it passes.

3rd. The comb should be fitted to maintain the jack uprightly in this position and at the same time so fit the comb that all its teeth stand in lines parallel to the loom arch.

4th. The grate should also be so fitted that its divisions will stand perfectly upright.

Thus fitted, both comb and grate will guide the jacks as they are designed to do and the jack will work freely through its entire movement and will not at any time crowd the connector against its vibrator gear and by so doing cause the vibrator lever to fail to work freely and easily. With one jack correctly located as described, the rest will come right and can all be placed in their positions and the head frame is then ready for filling with the vibrator levers and their gears and connectors.

When assembling the parts which connect with the harness lifting jacks or levers, one should be sure that each part is reasonably true to gauge before riveting the vibrator buttons.

As gauges are made by the loom builders to fit the different parts of the head motion which require them, it may be well to say a few words here about their use. The gauge for the harness connector is used for getting the correct length of connector. This length is found by making the pointed end of the gauge reach to the centre of the hole in the end of the connector while the opposite end (which hooks onto the harness lever or jack) is resting on the stud, which is of the same diameter as the lug on the jack. This plan of measuring applies to all vibrator connectors used on the Knowles head motion. The connector should also lay evenly on any plain surface as this test will show it to be true its entire length, *i. e.*, the curve, the boss, the hook all stand as they should. The gear of course is practically true when it will lie on a flat surface without rocking.

The vibrator lever gauge is a bar or plate of iron a little longer than the vibrator lever and on one end has a boss of the same size as the heel or fulcrum pin on which the vibrator lever fits. On the opposite end of the bar is a lug on which the tip of the vibrator lever rests. Between these two positions is a semi-circular boss, the arc of which is the same as that of the chain run on the vibrator lever. The lever when true will rest on these three parts at the same time. When testing levers which have never been in the loom this gauge will be found a true test and the same can be said of it when applied to most of the levers which have seen hard work in the loom. There are cases, however, where the levers will fit the gauge and when placed in the head, they will not take their positions in relation to their meshing evenly in both cylinders. This may be caused by some one unthinkingly filing away part of the lower side of the vibrator lever on the tip or lock knife end.

It may also be caused by the lever getting forced

out of form in the loom. In either case it throws the boss on which the vibrator gear turns out of its true relation with the rest of the essential points of the lever and it will never be true until the four positions, *i. e.*, the hook, chain run, tip, and boss, are all standing in proper relation to each other. This point is brought out here because it will help those who are learning to fix looms the more readily to locate the trouble when all seems right when tested by the ordinary vibrator lever gauge.

The gauge to be reliable should have a point which will locate the bearing for the vibrator gear in connection with the three points already given on the gauge now in use. The lever should now be tested with the straight edge and at the same time care should be taken to see that the vibrator lever is not twisted. When laid plain side down it should lie perfectly flat. While one can get along without a suitable truing surface such as a planed plate about 8" by 24" by 1" such a plate will be found to make the work much easier and better results will be obtained.

The three parts, *i. e.*, the vibrator connector, gear, and lever, are now ready to assemble and it should be kept in mind when setting the vibrator buttons, that the parts through which they drive are case hardened and can be split if one uses the riveting hammer too carelessly. When riveted, the projecting ends of the vibrator buttons should be filed flush with the parts through which they pass. This will prevent any possibility of their interfering with each other when running, since if they were to interfere they would be apt to cause harness misspicks.

With the complete set fitted up as described they are now ready to be placed in the head frame. A chain with all raisers on one bar should now be put on the chain shaft. These raisers should all be equally spaced. This can be done by tying or wiring with fine wire between each raiser. This is not generally done but it is the better way, since each vibrator lever is to be positioned to its own space and the nearer true the lining of the vibrator levers, the safer the regular chain will run when on.

This matter, of being exact and careful when lining the vibrator levers, will be a strong factor in preventing harness misspicks later on. Each vibrator lever is allowed $\frac{4}{16}$ " space and the nearer the vibrator lever run stands midway of this space, the more leeway the raiser has to get safely by and not be in danger of raising the levers on either side of it. This one bar, which is all raisers, for the reasons mentioned, should be accurate. A bar can now follow it composed of sinkers and following this, four bars making a plain weave. This will give a length of chain which will go around the chain cylinder and show, first, all harness up, next, all harness down. The four remaining bars will give the fixer the benefit of seeing how each vibrator lever and all its connections work as he places each one in the head frame and watches them as the gears turn in their order to raise or lower the harnesses.

To get the best results in filling the head frame,

it will be better to begin by placing in the back vibrator lever first and trying it in all positions when hooked to its harness jack. When the harness jack is up, the gear should not bind on the side of the connector nor on the side of the vibrator lever. When the gear is turned away from the boss which checks its throw, it should drop back to its position from any point between the checking boss and a point near the dead centre line. The same rule applies to the gear when the harness jack is down. At the same time the connectors should not bind on the sides of the gears, and it is always best to *spring* them sufficiently to allow the end of the connector which fastens on the harness jack to throw equally each side of its draft line and in both positions clear its gear.

As each vibrator lever is positioned it should be tested as described and after the one which follows it is placed, it should be tested again in order to be sure that each lever has its own working space in the head and all stand true and are not interfered with by any of their counterparts.

It will be found necessary when filling the head frame to see that each gear and vibrator lever stands upright and evenly spaced. This will call for a little adjusting of some of the vibrator levers and connectors as each is placed in its position.

The straight edge cannot bring everything just right in this case and it will be necessary for the fixer to use his eyes to see that the head when completely filled presents a good appearance. He may need to twist a lever a little one way to make the run line with the chain and it may be necessary to twist the lever a trifle for the same reason to make the gear stand upright. Truing the parts before assembling makes the job easier but they need the attention of the fixer when filling the head, in order to make a well finished job.

When filling the head frame one should be careful to know that the chain runs are snugly riveted. These runs are chilled cast iron and can easily be kept closely riveted, but they should not be struck with a hammer.

With the head frame filed as it should be, and as it will be, if the foregoing instructions are followed, one has:

1st. The harness jacks standing properly spaced and upright and in alignment with their respective harness vibrator gears, levers and connectors.

2nd. Vibrator gears, levers and connectors well trued to form and correctly assembled for working easily and with safety from binding from undue contact with their respective parts or with each other.

3rd. Vibrator levers and their attendant parts standing in lines parallel to their working movements; with each vibrator lever standing midway of its allotted space in relation to the section of chain which actuates it, thus giving each raiser the least possible chance of acting on any lever other than its own.

All of the above conditions are essential to the safe running of the head and preventing of harness misspicks and a head frame thus filled will give no trouble from the method of filling.

(To be continued.)

THE FLAT STEEL HEDDLE.

The selection of the kind of heddle to use in the weave room in connection with the various textile fabrics, is a most important item, not only on account of the supply expense, but also on account of production and the general appearance of the face of the fabric. Where one make of heddles used may be the means of a smooth face, another class of heddles used may be the means of a rough, unsightly face to the fabric, not taking into consideration imperfections to the fabric, caused by warp threads breaking during weaving, on account of threads cutting in their travel through the heddle eye, and when one broken end, if not detected at once, may be the means of two or more ends breaking, possibly the cause of the shuttle flying out and breaking more ends—a shuttle smash, etc.; items, which when such a place in the fabric is not properly mended, may be the cause of a *string*, *i. e.*, the loss of from $\frac{1}{3}$ to $\frac{1}{4}$ yard of cloth to the mill.

As will be readily understood, the affair of selecting the proper heddle for a mill becomes so much more important when dealing with a high price yarn, a smooth face of fabric required, a high texture used, although it will repay any mill running on medium or low class goods to also use only the best heddle possible to be procured.

Like any other supply for a mill, when the question of

WHICH HEDDLE IS THE MOST ECONOMICAL TO USE comes up, we must inquire what make of heddles mills are using that are making the best and finest class of goods and have the reputation of success; for instance, take our leading silk mills which have to use a yarn and heddle under the most trying circumstances. We then will notice that silk mills in late years have adapted, principally in connection with the weaving of raw silk yarns and also for their dyed silk yarns where a medium to strong silk is used, a flat heddle; in other words, what ten years ago was considered an impossibility, *i. e.*, weaving silk by a wire heddle, has been accomplished by the flat steel heddle. In the same way has this heddle also found some of its strongest advocates already amongst some of our largest fancy cotton and worsted dress goods mills.

Coming back to silk weaving, it is considered today amongst silk manufacturers not advisable to use the flat steel heddle, *i. e.*, the flat steel harness, in connection with weak silk, neither such as is excessively weighted, and when then the old cotton heddle, *i. e.*, cotton harness, has to be used.

POINTS TO BE CONSIDERED when selecting what make of heddle to use are:

(1) A heddle that in connection with high textures will permit the greatest number of heddles per shaft to be used; thus in many cases permitting less harnesses to be used, with consequent less and besides easier work to the fixer.

(2) A heddle that is liable to rust as little as possible, and with proper care not at all, and remain smooth under all conditions of weather.

(3) A heddle that keeps its position in the harness, *i. e.*, does not bind with joining heddles.

(4) A heddle presenting during its life a perfect smooth eye, *i. e.*, no chance for a warp thread to get caught in the heddle eye.

(5) A heddle that will wear for the longest possible time and thus reduce supply expenses to the mill to its lowest point.

These five points are well covered by the flat steel heddle, *i. e.*, the flat steel harness, hence its continually growing popularity.

CHARACTERISTICS OF THE FLAT STEEL HEDDLE. The same is made out of one piece of cast steel, which construction prevents the warp threads from catching in the eye, since *the eye is one solid piece of cast steel*. The heddle is very thin and the apertures at each end, by which it is supported on the rods of the harness frame, together with the eye of the heddle, are made by swaging. Owing to its smoothness, and being perfectly flat, the heddle offers almost no friction to the warp threads, said heddle turning only enough to allow the thread to pass through the eye. In connection with cotton fabrics as high as 40 heddles per inch per shaft can be used, whereas in connection with silks, as high as 55 heddles per inch per shaft can be used.

The flat steel heddle is deeper than a wire heddle, it is true, but in thickness, and which is the only point to be taken into consideration, it is only about one-half or one-quarter that of the ordinary heddle, and for which reason it does not crowd on the heddle bar, *i. e.*, more heddles per inch on each harness frame can be used than any other make of heddle will permit.

The aperture on top of the heddle, and where the upper harness rod is inserted, has pressed into the wire, a hump, in order to always show which is the top of said heddle; besides this, it will keep the heddle from turning.

To substitute a heddle temporarily, provided one of the heddles in the loom should break, a special heddle is made, known as the repair heddle.

AUTOMATIC SPACING OF THE HEDDLES on the rod. Each heddle is formed on one of its ends with a spring, which when the heddle on the harness frame comes always against the smooth portion of the joining heddle, so as to spread all the heddles evenly apart throughout the entire width of the harness, and which is an advantage, since it keeps the heddles in proper position with the run of the warp threads from the warp beam to the fell of the cloth. It also is the means of the heddle being self-adjusting for a higher and a lower count texture.

TRANSFERRING THE HEDDLES. This is easily accomplished, quicker than with any other make of heddle.

Never take heddles off the rods.

The heddles are sent to you on rods and must remain on rods, whether in the loom or the store house.

Such as are any time *over* on a harness frame and required to be removed from said harness frame, must then be transferred, *i. e.*, pushed directly on the rods on which they are kept in the store room.

Once you begin to remove heddles from the rods, look out for trouble, it is sure to come. Many a mill would now use the flat steel harness, if at the start the

overseer would have seen to it that no removing of heddles from the rods had been done by his help.

However, do not expect that one style of heddle will do for all kinds of weaving, silk as well as cotton or worsted in all its varieties. This is not the case, neither is this the case with other heddles, different sizes of heddles being made for this purpose, the texture of the fabric, *i. e.*, the number of heddles per inch to be put on each harness frame (considered in a fair average) regulates the kind, size or style of heddle to use, also whether a *flat* or an *open* eye is required, no matter whether it refers to silk, cotton or worsted work, the nature of the material used not coming so much into consideration. For instance, the same heddle as used for lower grades of silk will answer also for better grades of cotton textures.

SIZES OF WIRE USED. These heddles are made in any thickness of wire desired, from No. 6 up to No. 21. Numbers usually denote thickness of wire in thousands. For instance No. 9 would mean a heddle made out of wire 0.009" thick.

JACQUARD HEDDLES and lingoos for same. For jacquard work a heddle in all lengths from 10 inches up to 16 inches is made, with its eye placed in centre or off centre, as desired. These heddles, as will be readily understood, require a special lingo, which is hooked on the heddle.

In the interest of this heddle question, the editor addressed two letters to prominent men, one in charge of the weaving department of one of our most prominent narrow ware silk mills in New York, the other in charge of the weaving in a New England cotton mill, regarding their opinion, *i. e.*, experience with this flat steel heddle; the replies of said two practical men were somewhat interesting, hence quoted:

(1) POSSELT'S TEXTILE JOURNAL: Your letter received. In reply to it regarding the "Flat Steel Heddle" I can state that it is the best heddle on the market. In over fifteen years' experience on all kinds of harness work with all kinds of heddles, I consider them the best for several good reasons:

Taking proper care of them they will not rust, remaining perfectly smooth in all kinds of weather. When the common heddle is exposed to dampness, it takes on rust and is almost useless.

They will wear longer than the other heddles, as the eye does not cut or split open, being cut in a solid steel wire.

When properly adjusted on the harness rods, they do not shift position or become bound, thus giving better results in production. And for the manufacture of narrow fabrics in hard silk, they will outwear any other heddle, as they do not cut at the eye.

A. H. R.

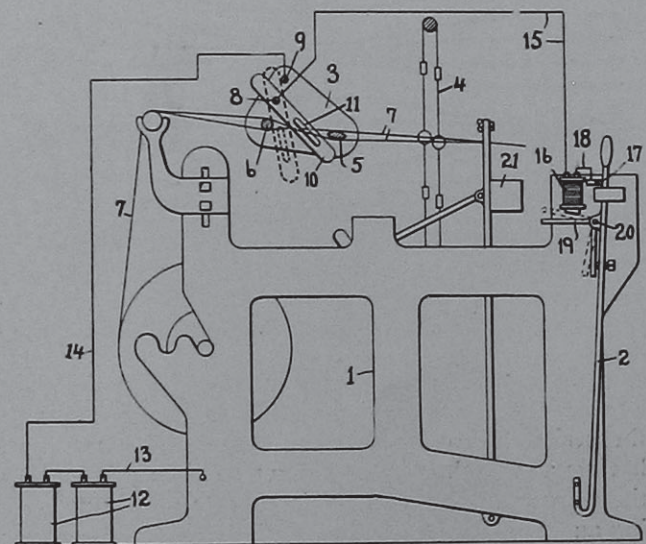
(2) POSSELT'S TEXTILE JOURNAL: In answer to your letter, mention that I am well satisfied with the steel heddle.

S. M.

The Editor would like to hear from other friends of the Journal what they have to say regarding this heddle, *i. e.*, their experience with it in their mills.

Electric Stop Motion for Cotton Looms.

The accompanying illustration is a side elevation of a loom frame provided with this stop mechanism, the construction and operation of which is best explained by quoting numerals of reference accompanying the diagram, and of which 1 refers to one of the two side frames of a loom, and 2 to the shipper lever. Suitably secured at either side of the loom is a fibre reed holder 3. 4 are the harnesses, 5 and 6 the lease rods for separating warp threads 7. Above rods 5 and 6 are two rods 8 and 9, on the lower one of which are pivotally mounted the drops 10, the lower portion of each of which is slotted longitudinally as at 11 for engaging with the lease or crossing of every successive pair of warp threads, the upper portions of each drop being adapted to engage with the upper rod 9. These drops are formed from flat steel $\frac{8}{1000}$ " in thickness, $\frac{7}{16}$ " in width, $4\frac{1}{2}$ " long, and when supported by the threads, they occupy an angle of about 45° , as shown by full lines in illustration. A battery



12 is connected with the loom frame and thereby with the shipping handle 2, by means of a wire 13 and also with rod 9 by means of a wire 14. A wire 15 from (the other) rod 8 leads to an electro-magnet 16, located adjacent to the shipper handle 2. The other end of the magnet is connected with a spring 17, by means of a wire 18, whereby whenever any one of the drops 10 is permitted to fall into a vertical position (see dotted lines) by the breaking of either one of the warp threads with which its slotted end 11 engages the upper end of the drop will then engage with the upper rod 9 and thereby complete a circuit and cause the magnet 16 to be energized, and when its armature 19 is swung upon its pivot 20, so as to cause its free end to be moved into a position to be engaged by the lay 21. This change of position of a drop or warp detector, when a warp thread breaks, is a position in which it can be quickly and readily located by the weaver. When the parts are thrown into this position by the breaking of a warp thread, as soon as the lay is moved forward to beat up the filling, it will engage with the armature and force the shipper handle 2 out of its notch and stop the loom. As the spring

17 forms a part of the circuit, it will be impossible to start the loom so long as any thread is broken and the handle 2 engages with the spring 17 (the circuit is complete) and the magnet is energized, which will cause its armature to be raised and thereby prevent the handle entering the notch, the spring being insulated from the rest of the loom frame. As soon as the shipper lever has been disengaged from the notch and is thrown to the opposite end of its slot the circuit is broken. This stop motion is patented by Mr. James K. Lanning.

An Improved Hairecloth Fabric.

Hairecloth fabrics are used as interlinings, *i. e.*, stiffenings for dresses, coats, etc. The standard haircloth fabric consists of a cotton warp and a horse

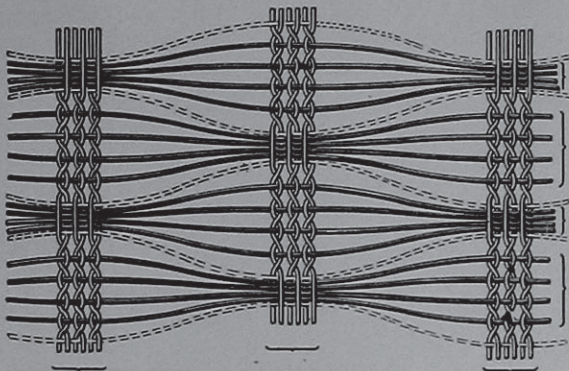


Fig. 1.

hair filling, the structure being interlaced with the plain weave. The ordinary haircloth structure is open to the serious objection that the strands of horse hair, having a smooth surface, cannot be tightly bound by the warp and that the hair frequently pulls out, leaving an open space extending entirely across the warp; or the hair is displaced lengthwise and presenting thus a protruding end, is pulled out. Moreover, after one hair has thus escaped, the binding capacity of the warp is still further diminished, resulting in a constantly increasing tendency to fray, which occurs particularly after the interlining is placed in position. This feature is not only annoying to the wearer, but the stiffening function of the hair, in consequence of it, is seriously affected. To somewhat mitigate this objection, manufacturers of this class of textile fabrics have found it necessary to increase the number of picks to the inch. This, however, does not obviate the fraying evil, but has the disadvantage of increasing the cost of this class of haircloth fabrics, for the reason that horse hair is not only very expensive, but more so is constantly increasing in value, on account of the demand outrunning the source of supply.

The object aimed at in the construction of the new fabric structure is to eliminate the tendency for the fabric to fray and which the inventor, George S. Cox, has accomplished by interlacing the filling in strips or sections of warp threads, weaving gauze or leno. This at the same time reduces the number of picks required in the construction of the fabric by one-half. Inter-

lacing this horse hair filling by means of leno, at the same time imparts to the fabric a superior stiffness compared to common haircloth structures containing an equal number of picks.

The accompanying illustration Fig. 1 shows a plan view of the new fabric structure and from which it is seen that the warp is threaded in strips, series or sets of three pairs of ground and whip threads respectively, there being a considerable amount of space (from 3 to 4 times the width of each interlacing set of warp threads) left empty between the individual sets of warp threads. Considering the latter, we find that every alternate series or set of warp threads interlaces the same, *i. e.*, every pick interlaces for four picks in a shed in one set while weaving gauze in the other set.

In a fabric thus constructed, each of the strands of hair extends from selvage to selvage in a wavy line and the hair, at the outside of each wave, is firmly bound in position. This arrangement not only prevents an accidental lengthwise displacement of the hair, but it is impossible to withdraw a hair, the tension required for withdrawal exceeding the tensile strength of the hair, which breaks off at about the line of the selvage if a slight partial withdrawal is effected. The omission of warp threads does not affect the stiffness of the fabric, as this function is dependent on the horse hair alone. It is not essential to have any particular number of picks of hair in each filling set, although it should consist of an even number of picks, as otherwise the central hair will lie perfectly straight. If desired, additional picks of hair (see dotted lines) may be introduced.

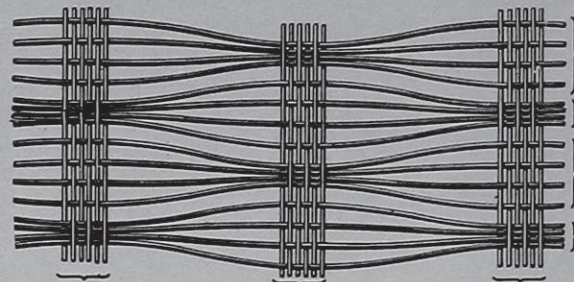


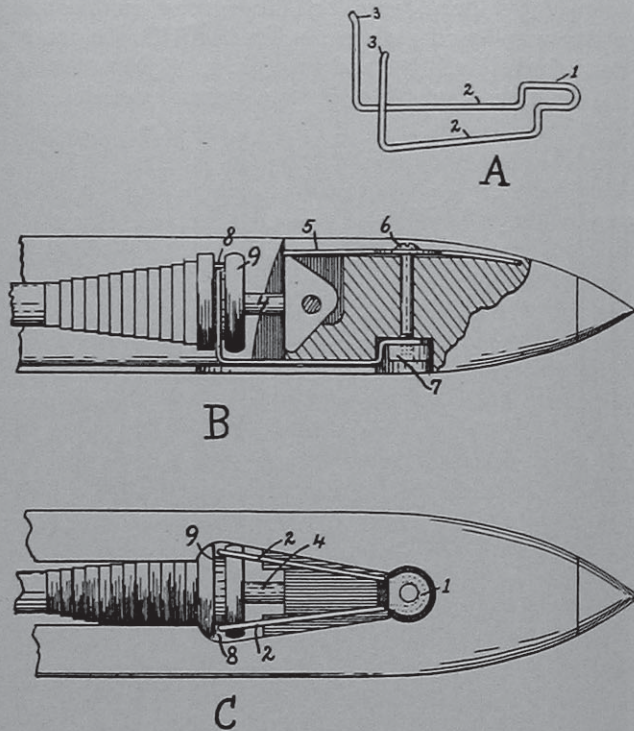
Fig. 2.

Fig. 2 illustrates a modification in which a plain weave is substituted for the gauze or leno weave, but which results in a less desirable fabric than the form shown in Fig. 1, in that the adjacent picks of hair when in different sheds tend to lie comparatively close (although less close than when in the same shed), and consequently more picks of hair are required to fill out the fabric, and the average deviation from a straight line is not so pronounced.

Bobbin Catch for Loom Shuttles.

The object of this new catch, the invention of Mr. O. Landry, is to not only securely lock the bobbin to the spindle of the shuttle, but at the same time will hold bobbins of varying dimensions on said spindle.

Of the accompanying diagrams, A is a perspective view of bobbin holder, B a side view of a portion of a shuttle having a part of its side broken away so as to



clearly show the application and operation of this bobbin holder, and C a bottom view of a shuttle showing the method of securing the holder to the body of the shuttle.

Numerals of reference accompanying the illustrations indicate thus: 1 the holder, consisting of a piece of spring wire bent into arms 2 and uprights 3.

4 is the spindle, 5 the spring, 6 the screw bolt and 7 the nut, all as met with in shuttles of usual construction; the bobbin holder 1 being secured to the body of the shuttle by means of the bolt 6 and nut 7. The spring arms 2 project forward a suitable distance and are adapted to embrace the exterior annular groove 8 in the bobbin 9 by being turned upward as at 3.

From description thus given it will be seen that by means of the spring arms 2, which cause the uprights 3 to closely embrace the groove 8 in the bobbin 9, the smallest as well as the largest bobbin which the shuttle will accommodate will be securely held by the bobbin holder. Provided only one size of bobbin were to be used in the shuttle, the arms 2 can be made rigid, and still hold the bobbin securely between the two uprights 3.

A French Sizing and Drying Machine.

The points of improvements, as claimed for this machine, are:

(1) to quickly and effectively dry the size after it is applied.

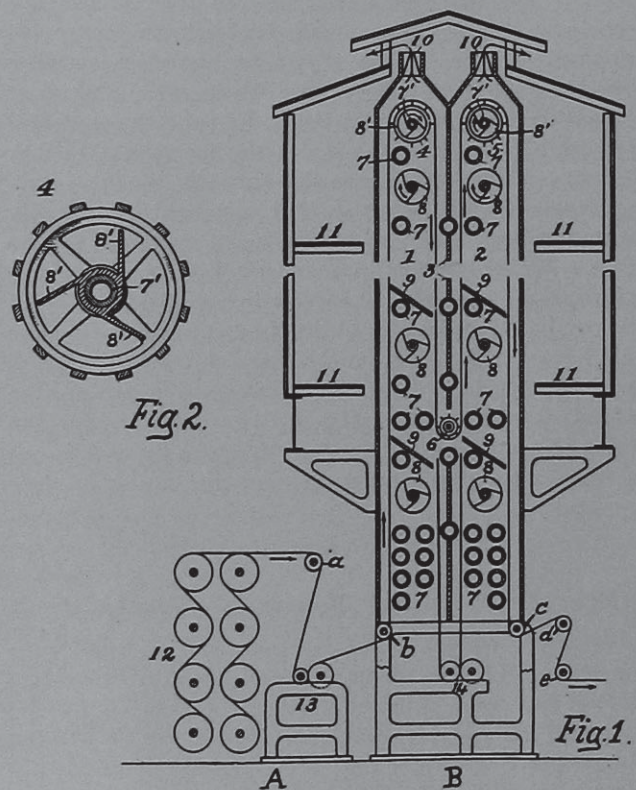
(2) to produce a thick, even coating of size by applying the same in a series of sizing operations, each followed by a drying operation.

(3) to simultaneously size material of two or more different colors.

In order to more clearly understand the construction of the new machine, the accompanying two illustrations are given, and of which Fig. 1 is a vertical section of both the sizing apparatus and the drying chamber. Fig. 2 is a cross section (shown enlarged as compared to Fig. 1) of one of the upper reels, with the associated heating pipe and fan, shown in both compartments of the drying chamber in Fig. 1.

With reference to our illustration Fig. 1, A shows the sizing apparatus and B the vertical drying chamber. The latter consists of two compartments 1 and 2, separated from each other by central partition 3. In the upper ends of these compartments are mounted two reels 4 and 5 (shown enlarged in Fig. 2) and in an opening in the partition 3, near the lower end of the drying chamber, is a reel 6. Each compartment is provided with steam coils or pipes 7, fans 8, and inclined deflecting plates 9, arranged at suitable intervals therein. The compartments of the drying chamber are open at the bottom to admit air, and are provided with chimneys 10 at the top for the escape of air and vapor. Galleries 11 at the sides of the drying tower afford means for the operator to watch the operation of the apparatus and the condition of the work.

IN THE OPERATION of the apparatus for the application of the size in a single coat, the material to be sized passing from the rollers 12 around suitably arranged guide rollers *a*, receives a coating of size as it passes through the sizing vessel 13. From there it is directed by guide roller *b* into the lower end of



the drying compartment 1, passing upwardly therein over the reel 4 in its upper end, thence downwardly around the reel 6, thence upwardly in the compartment 2 over the reel 5, thence downwardly, leaving the

drying tower and passing around the guide rollers *c*, *d* and *e*.

THE DRYING PROCESS. The heating pipes 7 induce upward currents of air through the compartments 1 and 2, and the heated air is blown by the fans 8 and directed by the deflecting plates 9 against the material passing through said compartments, thereby agitating the same and accelerating the drying process. The moisture taken up with the ascending hot air escapes through the chimneys 10 at the upper ends of the compartments.

TO PREVENT THE DEPOSIT OF VAPOR ON the material passing over the reel in the upper part of each compartment, the reel is provided, as shown in Fig. 2, more in detail, with an axial steam or heating pipe 7' and with a fan 8', by which the moisture taken up by the hot air from the material below is blown away and kept off from the partially dried material passing over the said reel.

TO OBTAIN A THICKER AND EVEN COATING, the size may be applied and dried successively in two or more operations, the apparatus being provided for this purpose with additional sizing devices 14, where it receives another coat of size. In this instance, reel 6 is omitted, the fabric traveling down and around the size roller and up again in compartment 2. The second coat of size is thus dried upon the first coat. These operations may be repeated as many times as necessary to obtain a coating of the desired thickness.

IF SIMULTANEOUSLY SIZING AND DRYING MATERIAL OF DIFFERENT COLORS, the material of one color passes through and receives a coat of size from the sizing receptacle 13. It then ascends through the first compartment of the drying tower or chamber, passing over the reel 4 in the upper part thereof. Material of another color passes at the same time through and receives a coating of size from the receptacle 14. It then passes into and upwardly through the first drying compartment, being guided and held by suitably located rollers away from the sized material of the other color, while it is in a moist condition. The two materials of different colors being sufficiently dried during their ascent through the first compartment, pass together over the reel 4 and thence downward around the lower reel 6, ascending therefrom again in the second compartment of the drying chamber over the reel 5 therein, and finally descending and passing out of the last compartment around the guide rollers *c*, *d* and *e*.

Detector for Warp Stop Motions for Worsted Looms.

When using detectors of this kind as until now constructed (*i. e.*, without a recess on top of the inside slot) it has been found that when the take-up was let back and the warp loosened for the weaver to pick out a bad place in the cloth, the shaking of the warp threads by the weaver in picking out such a bad place caused the detectors to jump up and down on the supporting bar, bringing the upper ends of their slots down upon the top of the supporting bar, in turn pinching or nipping the warp threads and cutting them

between the two hard edges, with the result of much annoyance to the weaver and loss of production.

This trouble is overcome with the new detector (patented by the Draper Co.) in a most simple and effective way by providing the detector with the recess previously referred to, and in which the warp thread rests when the detector is in its abnormal position.

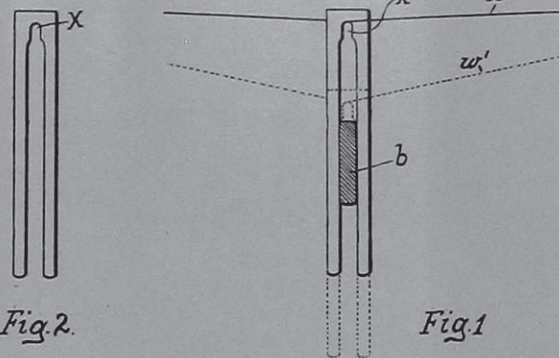


Fig. 2.

Fig. 1

Of the accompanying illustrations, Fig. 1 is a side elevation of this new shaped detector, Fig. 2 showing by solid lines this detector mounted on its supporting bar in normal position, and in dotted lines in its abnormal position.

The detectors as usual are made of thin, flat sheet-metal, of the requisite length and width. The difference of the new make is found in the recess *x*.

As shown in Fig. 2 the detectors are strung on the warp threads *w*, which pass through the recess *x*, the main opening or slot loosely receiving and embracing the supporting bar *b*. Normal warp threads maintain the detectors elevated, as shown in full lines, Fig. 2. If the warp threads are slackened so that the detectors can descend to the maximum amount, its shoulders engage the top of the bar *b* while the warp thread remains free and unpinched in the recess *x*, as shown at *w'*, so that there is practically no possibility of the thread being caught and cut.

PRACTICAL POINTS ON LOOM FIXING.

By Wm. Secor, Master Weaver.

How to remedy some of the trouble encountered with the Knowles and the Crompton Thayer Head-motion.

Take first, *harnesses skipping*. There are a number of causes which are at the bottom of this trouble. For instance, the loom head being out of time will cause skips almost immediately. The head, not properly timed will cause no end of trouble to the fixer. Not only will the harnesses skip, but at the same time it may be the cause of the boxes also skipping, bringing the shuttles together in the shed, probably making a bad smash for the weaver to remedy, besides being the cause of a *string, i. e.*, allowance in the finished piece for from $\frac{1}{4}$ th to $\frac{1}{2}$ yard, according to the amount of damage done.

Another trouble encountered, may be a bad harness chain. I have seen harness chains used in mills, that would have been better for the scrap heap than used in a mill. Especially should care be exercised in that

direction in connection with fine work, and where supplies and fittings should be at their best. Chain balls should be always in exact line with the vibrator levers, for if they are not, they may go between the levers, or a ball may raise two levers. For this reason, every chain should be examined to see if the same is not out of line. If this is found to be the case, loosen up the set screws which hold the cylinder and adjust the latter to the levers.

If the trouble is found to rest with individual bars only, the proper way to adjust them is by rings, which come in two sizes, *i. e.*, such as made of single and such as made of double thickness. A great many rings thus used are what we may call of a home manufacture, *i. e.*, are made by the fixers in the mill, winding a fine wire into a spiral spring and then cutting them apart. However, standard rings for such work are in the market and can be bought about as cheap as they can be made by the help in the mill.

An almost universal practice in lining up a chain that is badly worn, is by tying it up with strings, which certainly is a very bad practice. I have seen fixers work an hour or more tying up a chain, and probably in less time than it took to tie it up, part of the strings were cut and worn off during the running of the loom, probably causing a number of skips to get past the weaver before the trouble noticed, more particularly on fine textured men's wear, made in dark colors, and where I have seen many seconds made, the result of such harness skips, the same not being noticed by the weaver, neither the weave room percher; however showing up on the examiners perch in the finishing room, *i. e.*, in the finished fabric—ready for the market.

Again, bad links may cause harness skips on account of being badly worn or improperly linked together, causing the chain to ride up on the side of the cylinder. Long or badly worn links will cause the bar to ride on the cylinder high and late, throwing the vibrator gear hard up against the top shell, in turn either breaking the gear or springing the lever out of shape, or straightening the connector so that it will not properly lock over the centre, or cut the end off the soft set screw at the outer end of the cylinder gear.

If the levers get twisted or spring either high or low, never bend one without a gauge, whether it is a home made one or one furnished free of cost by the Crompton & Knowles Loom Works, because you can never tell how far you are going, since some levers bend much easier than others. Once you are in the habit of setting your levers without a gauge, you may work into the hours, where it would probably take only a few minutes with a gauge, and this with much better final results. Often the tip of the set screw on the chain cylinder gear will partly cut off, in turn having the chain not move the levers in proper time, causing the lock knife to catch on the point of levers, preventing it in turn from going down into its proper position before the vibrators change.

Again, we may meet with slightly worn vibrator gears; very often the first tooth gets worn and which will not allow the gear to start or turn to the proper distance for connecting with the top shell, causing the

lever to be sprung out of shape and throwing the lock knife out. You will never forget this, for you will not run long when this once commences to move late and your head motion is in time; look out for a bad gear or a rebound and which frequently will cause you considerable trouble before it is caught.

I have an instance in mind where two pieces of fine goods were made seconds by a rebounding gear, causing a skip for about twelve inches from the opposite side from where the shuttle enters the cloth. The fixer could not catch the loom in the act of skipping. When the next cut came to the perch, the same trouble showed itself, and when then the weaver was discharged, the price of weaving the last piece being deducted from his wages. The trouble was later on taken up by a union, it came for trial, the firm lost the case. This shows that what very often seems to be a simple affair, may be finally the cause of lots of trouble.

Another thing which will often cause a fixer considerable guessing is the cam for the lock knife shifting. The cam is pinned to the bottom cylinder from the back and cannot be seen from the front of the loom. The cam will shift, throwing the lock knife out of time. You time it, and it may go for five minutes or for hours, but it will shift again. A very good plan, if you meet with this trouble, is to tap it a few times with your hammer. Seldom you can move it by hand, the pin cutting off will cause it to wedge up. It will probably move only a short distance (but just enough to throw your head out of time), for which reason it is very easily overlooked by the fixer.

Speaking before about rebounding, this may be caused by a connector straightening out, or more frequently by tight strapping, which is a very poor practice and will cause lots of trouble. This more frequently occurs during the heavy weight season, since then more ends or a heavier count of yarn is used, in order to get the weight, causing a great deal more strain on the harnesses and the head-motion, and when sometimes it will be found hard to get the harnesses to shed on a line with the race plate when your lathe is back.

A great many times rebounding can be overcome on heavy work by setting the eccentric gears on the slow motion, allowing the gears to disconnect more steady and which on the slow side will invariably remedy a skip box running from first to third or second to fourth box, providing there is not too much lost motion in your bevel gearing. Always keep them well geared up, it will save lots of shuttles flying out, pickers catching in under the shuttles, breaking of picker sticks, etc.

Remember that you have the movable shells, top and bottom, with a changeable distance from one to five teeth, which will help you out with kinks and filling cutting; running them early for kinks and late for filling cutting, also a medium between both.

We also have the finger which connects the cam and lock knife that will often cause skips by not moving the knife out far enough to clear the levers, it frequently gets bent by the levers getting caught. If such is the case, remove the finger and bend enough so that

it will properly clear the ends of the levers; however, not too much or it will not get home on its return.

There are a number of ways of timing the head, of which I will mention one: Remove the collar pin and gears, turn the chain cylinder forward until point of levers open just enough to clear the lock knife. As it enters, turn the top and bottom cylinders to the starting point, put on the small inside gears, put in the reverse pin and try, since very often there is enough lost motion in gearing that you may have to move one tooth or so. Having the key drift in line, it ought to come right, barring lost motion in setting the outside or largest gear. Turn the chain cylinder backward until the points of the levers clear the lock knife, move the top and bottom cylinder to starting point, put on gear with key drift of gears in line with one in cylinder, try as before, screw on collar and I am convinced that if conditions mentioned are carried out, it will remedy any trouble of harness skipping, caused by the head-motion.

COLOR IN TEXTILES.

Textile fabrics, as is a well known fact, are continually subjected to the whims of fashion, a feature which compels the designer to continually be on the lookout for new patterns. This don't always require a change in the material or the color of the yarn, but may only require the production of new styles by means of new weaves, or method of finishing. Provided the question should be raised by somebody not versed in designing and cloth construction: How many weaves have we in the textile industry at our disposal? The answer to give would be that their number is endless, a feature which possibly might suggest to the party who asked this question that there is no trouble for producing new styles. From a theoretical point of view, we would have to admit that this suggestion hit the nail on its head. However, the manufacturer, from a practical point of view, will have to think further than to using year in and year out new weaves, since the latter would by and by be of little or no practical value to him, for the fact that the more complex a weave, the more complicated its use; the less the production in a given time, the more experienced a weaver has to be, etc., all being items which must increase the cost of manufacturing, and which is a feature in direct opposition to the demand for the bulk of our textiles, *i. e.*, the production of new styles in lower grades of fabrics.

To accomplish this result compels us to look further for such new styles than only a new weave, and which in turn will bring us into contact with the combination of differently colored yarns (warp and filling) in the formation of new styles, *i. e.*, the influence of different color combinations upon the various standard weaves. This to a considerable extent will do away with the necessity of having to use continually new and consequently always more and more complicated weaves, with its consequent increase in expense to the manufacturer; at the same time giving us a chance to use less of a variety of yarns in the mill, a feature which is a great saving to any mill, since in turn less

remnants of yarns at the end of a season, as well as less waste all around in the mill.

A little thought in the matter will readily show to the student how easy and at the same time economically new styles may be produced by means of what we will term *the influence of color upon the weave*.

For instance, consider a plain woven, uni-colored fabric, which in most cases after a while will become more or less monotonous to the eye. Compare to it, for example, a fabric made with a light warp and a dark filling and when a mix will result, which will not be as monotonous to the eye. If again we use the combination of two or more colors, either in warp or in the filling, or in both systems of threads, this monotony of the face of the fabric will still more disappear, for the fact that designs will begin to form themselves. For example, arranging the warp one end dark to alternate with one end light, either with a dark or a light colored filling, will show minute spots either on a dark or a light ground, distributed all over the face of the fabric. If in turn we rearrange this dressing of the warp to 2: 1 or 3: 1 or 4: 1 or 4: 2, etc., used in connection with an uni-colored filling, such arrangements will begin to take the shape of stripes (warp ways in the fabric—technically called hair-lines).

Now, if in turn we are to use also two or more colors in the filling, we drive in turn first towards the formation of small broken up effects, until finally running into checks or other designs. It will thus be readily seen that any amount of new designs, effects, or styles, as we may call them, can be produced with this plain weave, hence so much larger, if not endless, must be the variety of new designs, effects, or styles produced when considering the various twills, satins and its derivative weaves as well as those of the plain weave in the place of the latter.

Having referred to the importance of color and color combinations in the formation of new designs, effects, or styles, it will be readily seen that if colors are not properly blended (or combined) the result will be a failure. Many of the mistakes made by designers in coloring fabrics have their origin in a lack of proper perception of the conditions under which color is seen or the influence colors exercise, one upon the other, when combined side by side in the fabric.

Source of Color. Color is due to light—where there is no light there is no color. Since light is the source of color, it is necessary to commence with an examination of its composition, as the laws of contrast of colors are entirely dependent upon it. When a ray of sunshine, or white light, as it is called, passes through a glass prism, it is decomposed, and if the image formed is received upon a white screen, it will be found to consist of the six colors of the rainbow, viz: blue, red, yellow, green, violet and orange.

The difference in colors is not due to the quantity or intensity of light—a red color will appear red whether we see it by a strong or a feeble light, the difference being due to the fact that there are different colors of light, *i. e.*, red light, blue light, etc. If we look at a piece of red cloth, we see that it is red,

because the cloth throws red light into our eyes; in the same way, a piece of blue cloth throws blue light into our eyes, and so with other colors. Now these colored lights do not come originally from the colored cloth, for if we take the red or blue cloth into a perfectly dark room, no light comes from either of them, and we could not distinguish one from the other; but if we light a lamp in the room we at once see which is the red and which is the blue cloth. Therefore, the light must come from the lamp, fall upon the cloth, and be thrown from the cloth into our eyes. But the light from the lamp is neither red nor blue, but white. Why, then, does the red cloth throw off the red light which falls upon it? Can the red cloth change white light into red light? Suppose we cover our lamp with a blue-glass shade, so that only blue light can get from the lamp and fall upon the pieces of red, blue and yellow-dyed cloth, then it will be seen that only the blue-dyed cloth throws off any light to our eyes; the red and yellow bits appear just the same as if there were no light at all in the room; if we cover the lamp with a red-glass shade then it is only the bit of red-dyed cloth that can be seen; with a yellow-glass shade over the lamp it is only the yellow-dyed cloth that throws off any light, and so with other colors. In this way it can be shown that a certain colored cloth (say red for instance) cannot change the color of the light that falls upon it, and can only be seen to be red when red light falls upon it. How, then, is it that whatever color we dye a piece of cloth, we can always see that color by white light? Because white light consists of all the colored lights combined together; and when the white light falls upon a colored cloth, *i. e.*, red—only the red constituent of the white light is thrown from the red cloth into our eyes. So when we want to dye a piece of white cloth a certain color, we must charge it with something which will reflect only the particular color of light which we want the cloth to appear.

Classification of Colors. The same are divided into Primary, Secondary and Tertiary Colors.

Primary Colors, are red, blue and yellow; so called because it was supposed that all other colors could be made from them.

Secondary Colors, are orange, green and violet, so called because it has been thought they were made from combinations of the primary colors.

Tertiary Colors, are citrine, olive and russet, so called because it was thought that they were made from combinations of the secondary colors.

Neutral Colors, the name frequently given to black, white, gray, gold and silver.

Harmony of Colors, is the pleasing harmonious effect obtained by combining the proper colors in a fabric, one color thus improving the appearance of the other color by this combination.

Color Blindness, or imperfect color perception of persons thus afflicted, varies in kind as well as in degree, the most common defect of color blindness met with being a more or less imperfect sensation of red. To persons having this defect the solar spectrum appears to present various tones of two hues, which they call yellow and blue. They will sort skeins of different

colored yarns in the most awkward way, mixing red and yellow skeins with such as dyed green, again they will mix blues and violets together. When such a person is in doubt as to whether he is choosing a skein of scarlet yarn for a skein of green, all he has to do is to view both through a piece of green glass, or through a piece of rich red glass, and when the scarlet yarn will seem to him nearly black, and the green yarn green, through the green glass, while through the red glass, the green yarn will appear nearly black and the red yarn red. Other varieties of color blindness exist, but they are not as common.

To Test the influence of one color upon another in connection with fabrics, for example, take a black ground warp in a pattern loom and produce upon it a design (check or stripe) in one section of said ground warp in blue, in another section in red, and in a third portion or section of the warp in orange, and when then it will be seen that although the same black is used for ground in either section, the quality of the black will appear different to the eye in each section—due to the influence of the respective colors (blue, red or orange) upon the black ground warp. The same remarks apply to the influence of one color upon another. Not only does the presence of different colors influence each other, but their relative quantity and the amount of light and shade, or black and white also.

In textile manufacturing two methods of color combinations are in use, viz:

(a) by mixing of the fibres in the manufacture of the yarn, or the twisting together of different colored singles.

(b) combining them in the shape of stripes, checks or figures.

Mixing of fibres in the manufacture of the yarn, *i. e.*, by means of carding, affords the best chance for obtaining a thorough mix, the different colored fibres being then united in the most well distributed manner, whereas mixing by means of twist, yarns composed of two or more colors, means dealing with the mixing of comparatively larger particles of color. Always try and give a mix a mellow treatment as to colors selected and see to it that the processes of mixing, picking and carding are carried on properly, in order to distribute the variously colored fibres in the best possible manner, *i. e.*, produce a perfect mix.

Never use bright colors like yellow, light blue or red in large quantities, black and white, medium and dark blues, browns, olives, etc., being the most satisfactory colors to use, bright colors being simply used in order to increase the richness of the mix. It must be at the same time remembered that two colors when broken up into a mix may lose lustre and brightness they formerly possessed. It will be readily understood that the nature of the material has a great deal to do with a perfect clear mix, for the fact that a pure wool dyed in certain colors, and then mixed will give a totally better result than if a low grade wool or shoddy was used in its place.

Color Effects. We now will take up the formation of designs and color effects in fabrics produced by means of combining two or more colors in warp and

filling, in order to produce stripes, checks, or other figures, as the fashion may desire. To illustrate the subject, the accompanying plate of color effects is given, a careful study of which will readily show the student how to plan for any color effect design required. In the various diagrams of this plate of designs, we have shown each individual diagram divided by means of one heavy line, both horizontal and vertical in two squares and two rectangles.

The upper left hand (small) square has been reserved for the weave.

The lower right hand (large) square has been reserved for the color effect produced in the fabric by means of the previously referred to weave, using an arrangement of warp as indicated in the upper rectangle in connection with an arrangement of the filling as is shown in the left hand rectangle.

Diagram Fig. 1 shows us the plain weave placed in heavy dots in its proper square, where we will show the weave hereafter regularly; two repeats of said plain weave each way, *i. e.*, four repeats of the weave being given. In the large square we show this plain weave indicated with smaller dots.

Diagram Fig. 2 shows us the same plain weave as used before, in its small square, showing in the rectangle above the color effect the dressing of the warp to be one end light to alternate with one end dark. Considering the rule: Warp shows in the fabric on the face where there are risers in the weave, and the filling where there are sinkers; in connection with all light filling, as shown in the left hand rectangle of our diagram, will in turn result in the *pin-check* effect shown in the large square. Using all light warp in connection with one pick light to alternate with one pick dark in the filling, will (as shown in connection with Fig. 3) produce the same *pin-check* effect.

Fig. 4 shows us the effect produced in connection with the plain weave, using one end light to alternate with one end dark, both warp and filling; this being what we technically call a *hair-line* effect, *i. e.*, fine stripes.

Fig. 5 shows us the mate to this effect, *i. e.*, the *tricot* effect, *i. e.*, lines running filling ways in the fabric, the same being produced by leaving the dressing of the warp the same as in the previously quoted example, but changing the arrangement of the filling from one light one dark, to one dark one light, without disturbing the placing of the weave.

The two effects as shown in Figs. 4 and 5 are the standard color effects, *i. e.*, horizontal and vertical stripes in the fabric, and which by their proper combination and breaking up will produce the desired figures or designs in any shape or form. This will give us as a Rule: In order to produce stripes in a vertical direction, *i. e.*, warp ways in the fabric, cover the warp with its own filling, *i. e.*, insert the dark filling when the dark warp is down in the shed, and which we have done in connection with color effect shown in Fig. 4; the reverse, *i. e.*, covering each color in the warp by its other color in the filling, *i. e.*, inserting the dark filling when the light warp is down in the shed, in turn

results in stripes running filling ways in the fabric, as shown in diagram Fig. 5.

Fig. 6 shows us the arrangement of these two effects (*hair-line* and *tricot*) combined in the fabric, it being what we technically call a *checker-board* effect. Arrangement of warp and filling, as shown in its respective rectangles reserved for this purpose in our diagram is:

$$\begin{array}{l} 1 \text{ end light} \\ 1 \text{ end dark} \end{array} \times 4 = 8 \text{ ends}$$

$$2 \text{ ends light} = 2 \text{ ends}$$

$$\begin{array}{l} 1 \text{ end dark} \\ 1 \text{ end light} \end{array} \times 4 = 8 \text{ ends}$$

Repeat of pattern in warp and filling = 18 ends.

Fig. 7 shows us a *pin-check* effect in a light color produced on a dark ground (by means of all dark filling) *i. e.*, the mate to the color effect shown in diagram Fig. 2, and where said *pin-check* effect was shown in a dark color upon a light ground.

Fig. 8 shows us a neat entwining of *hair-line* and *tricot* effects, dark figure upon a light back ground, produced by means of arranging warp and filling 1 end dark to alternate with 2 ends light.

Fig. 9 shows us a similar style of effect as given in the previously quoted example, with a light figure, placed upon a dark back ground, produced by means of arranging warp and filling to exchange alternately one end light, two ends dark.

Fig. 10 shows us a star effect, produced by means of arranging warp and filling 2 ends dark to alternate with 2 ends light.

Figs. 11 and 12 show the formation of color effects produced with the plain weave, in which the arrangement of warp differs from that of the filling; both diagrams showing the color arrangement of either system of threads in their proper rectangle, reserved for that purpose in every diagram of our collection of color effects.

Fig. 13 shows us a larger check produced with the plain weave by means of a uniform arrangement of colors, both for warp and filling.

Figs. 14, 15, 16, 17, and 18 show color effects produced by means of three colors, both in warp and filling, white representing light color or color number 1, shaded indicating a medium color or color number 2, and black indicating a dark color or color number 3, both in arrangement of warp and filling as well as the color effect itself.

Fig. 19 shows us a stripe effect produced in three colors in the warp and with two colors in the filling, in connection with the plain weave.

Figs. 20, 21, 22, 23 and 24 are color effects produced in connection with the 4-harness even sided twill, using two colors in warp and filling.

Fig. 25 shows a check produced in three colors in warp and filling upon the 4-harness even sided twill.

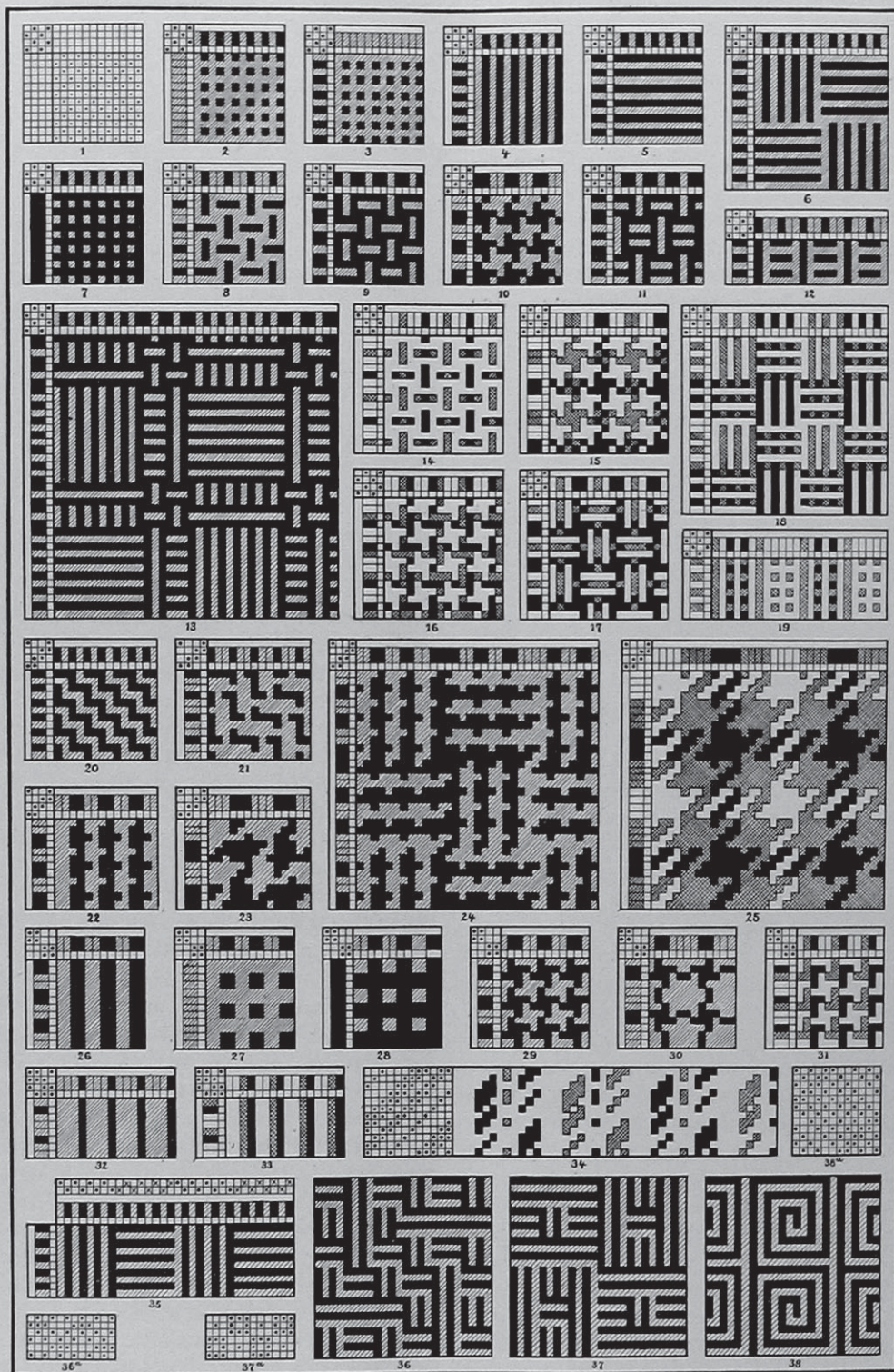
Figs. 26, 27, 28, 29, 30 and 31 show color effects produced upon the 4-harness basket weave.

Fig. 32 shows us a neat *hair-line* stripe produced by

means of two colors in warp and filling upon the 4-harness broken twill warp effect, *i. e.*, the 3 up 1 down broken twill.

Diagram Fig. 33 shows a hair-line effect produced in three colors upon the previously quoted weave. When making this hair-line always be sure to adhere

Fig. 35 shows us a color effect produced by means of transposing the plain weave, using the uniform arrangement, 1 end light to alternate with 1 end dark, both for the warp and the filling, the change from hair-line to tricot effect being in this instance accomplished by means of change of the plain weave, wherever we



to the previously given rule: cover the warp by its own color in the filling.

Fig. 34 shows us a stripe effect produced by means of 2 up 1 down 3 up 3 down 1 up 2 down 12-harness regular twill, as given at the left hand side of the color effect.

want to change from one effect to the other, as will be readily seen from weave given above the warp. Where such a change is required we must have two warp threads interlacing alike—see first and last thread of weave as well as warp thread 16 and 17, and which interlace in each instance alike.

Figs. 36 and 37 are color effects produced upon the plain weave under similar conditions, as explained in connection with the previously given example, only that the affair then explained with the warp only is in the present instance extended also to the filling, 2 warp threads and 2 picks working alike wherever the effect in the fabric requires a change from hair-line to tricot effect, or vice versa. Diagrams 36^a and 37^a are the respective motives for producing these effects, every square indicated with a *dot type* in said motives standing for four warp threads and four picks of 1 up 1 down in connection with the plain weave, and every empty square in said motives standing for 1 down 1 up of said plain weave, *i. e.*, the reverse starting of the former arrangement of the plain weave, both in the direction of warp as well as filling.

Fig. 38 shows us a color effect produced by means of 1 end dark, 1 end light, in warp and filling, upon a fancy weave, the latter being given in diagram 38^a.

CLOTH EXAMINING.

In connection with Public Dyeing and Finishing Plants.

By William Horrocks.

Cloth examination may be looked upon as of minor importance, yet it is the rock on which manufacturers break, unless they realize that this work if slovenly or carelessly done, will cost them thousands of dollars in imperfections and claims. However, there is another trouble in store for the manufacturer and that is that by means of imperfect fabrics placed in the market, there will be a loss of confidence in his goods, all of which could have been prevented, provided the examining was done by an examiner who is alert, practical and insistent on the best, compelling care, in order to prevent defective work and by this create a reputation and in turn a demand for the mill's output. This applies as much to the first examination of goods just out of the loom, as to the final one, *i. e.*, when goods are ready for shipping to the market.

Grey Examination. The fabric, as soon as it leaves the loom, is marked with style and running number, also in some cases with warp and filling numbers, for the quicker identification in tracing the lots of yarns used in its construction.

The piece is next pulled over the cloth perch to be examined for defects. It is looked over very carefully, and all defects are marked, either with chalk or charcoal. If chalk is used, great care must be exercised in selecting a kind that does not contain grease, as great difficulty is found in scouring this out when once in the piece. Charcoal is the best, as it can first be brushed off, and afterward scours out easily. In all cases where creams, whites or pastel shades are dealt with, the goods ought to be marked with *white* chalk, as this yields readily to the same treatment as that given before for charcoal.

A careful record of all imperfections is kept in the grey book, also a record of the length. The length, however, is not taken until the piece has had time to recover its natural condition, after having been subjected to the tension in the loom. In most mills, fines

are imposed on weavers for imperfections. This has a tendency to make the weaver more careful, as most defects are caused either by inattention or gross carelessness.

Some imperfections likely to occur are mixed filling, broken picks, uneven warp and filling yarn, temple marks, slubby yarn, uneven let-off of the warp, ends out in the warp, reed marks, kempy stock, etc.

Mixed filling is caused by mixing bobbins containing a different grade of yarn, other than that intended to be used in the piece. This difference is very noticeable when examining the piece, as a different grade stock will show up darker, making a bar as it were across the piece. This is usually caused by carelessness of somebody in the mill, and is easily overcome by exercising proper care, discharging the person responsible for it on the spot.

A broken pick will leave an opening in the piece, that will not come together after it is finished. This is caused either by weak places in the yarn or the imperfect working of the shuttle.

By uneven warp and filling yarn we mean that which contains heavy and light places. This is caused in the spinning process, and can only be eliminated by a more careful selection of the yarn to be used, *i. e.*, procuring the yarn supply from a more reliable firm. Sometimes these heavy places assume rather large proportions, and are then known as slubs. These oftentimes run through a whole lot of yarn, caused by the spinner not keeping his machinery free from flyings. Slubby yarn is easily detected in the piece. If an attempt is made to burl out the slubs, a hole may be left in the piece. These possibly can or cannot be mended, depending on the size of the hole left, and the number of them to be mended. When these run all through the piece, it becomes rather difficult to mend them, the piece is then fit only for a second.

A piece is sometimes caused to be imperfect by having been woven with a *varying let off*. This will cause the fabric to be woven in some places with more picks than at others, making the cloth uneven in appearance.

Sometimes we find one or more *ends out of the warp*. The cause for this may be either poor yarn or carelessness on the part of the weaver, again the designer may use too tight a weave, or the fixer not have the loom in the best shape running.

Oftentimes a *cotton end* may be found run in a piece of *all wool*, which is hard to detect in the grey, since both then are of the same color (white). This, however, shows up very plainly in the finished piece, after dyeing, causing it to become practically a second. There is one other way to remedy this imperfection and that is to cotton-dye the piece. This will usually cover it up, but is additional expense to the mill.

There are numerous other defects which space does not permit the writer to mention, but as most if not all of them are the result of carelessness, it is obvious that watchfulness is the paramount issue in making a piece of cloth.

Finished Examinations. In connection with piece dyes, after the pieces have been dyed, washed and

dried, they are then ready for the first examination. This examination is made for the purpose of determining whether the pieces are even, shaded, cloudy or stained.

When a piece is shaded it is darker in color in some parts than others. It may be darker along the sides than in the centre, or the ends may be darker than the middle. In the former case we say that the piece is shaded from side to centre, in the latter case from end to end. If in some cases the trouble is only slight, the difficulty may be overcome in the cutting of the garment, although the clothier's examiner will not neglect to put in his claim on that account.

When a piece is cloudy, the coloring matter seems to have concentrated in places in dark masses resembling clouds, hence the name.

Stains when found in a piece usually come from careless handling. They may be either oil stains or dye stains. Oil stains will usually yield to some good stain remover. Care must be exercised in using the remover not to form rings around the stain, as these rings are more difficult to remove than the original stain. Dye stains will have to be removed by boiling the piece again. This process will also have to be used if the piece is badly shaded or very cloudy.

If fancy colored yarns have been used in the fabric, *i. e.*, a fancy fabric, and the colors have not been properly fixed when the wool or the yarn was dyed, such colors are then likely to bleed during fulling and scouring, in turn staining the other yarns in the piece. Stains caused in this manner cannot be removed.

Oftentimes colored fibres are found in piece dyes, which have left small stains. These may be traced back to the branding of the sheep with paint. These small colored fibres may have gone all through the preceding processes unnoticed, but the coloring matter on them is bound to be liberated by the boiling in dyeing. When the foregoing difficulties mentioned are too bad, there is no course left to the finisher but to have the piece re-dyed into a black, in order to make it merchantable.

QUALIFICATIONS REQUIRED OF AN EXAMINER. First, he should be able to determine whether the shade is correct, this is done by careful matching. Second, that the width of the piece measures up to the standard set for that particular cloth. Third, that the piece has been properly finished up to that point. He should also know something about weaving and fabric structure, counts of yarn, as well as the nature and properties of the various different fibres (wool, worsted, cotton and silk) as used in the manufacture of the latter. This knowledge he usually obtains by practical work on the perch and bench, and theory obtained from good books. Our textile schools will also be of great help to him, more so the evening classes, and any examiner who has a chance to take up such a course should never neglect to do so.

If diseased wool has been allowed to enter into the original mixing, it will probably pass through unobserved until the piece is dyed. A piece having this yarn in it, will present a mottled effect, as there will be places which have not absorbed the dye, for dead

wool has lost all its dye absorbing properties. The examiner ought to be able to recognize this trouble when it comes up before him.

Final Examination. We now come to the final examination, supposing that the piece has reached the highest degree of perfection of the dyer's art, up to this point. After the piece is singed or sheared and pressed, it must then be looked over again, as it may be pressed too hard, or it may not be pressed hard enough. This must be determined by the kind of finish to be produced. The piece may also have been glazed in the pressing. Glossy places here and there in the piece is what we mean by its being glazed. When this condition arises, the pressing must be steamed off and the fabric re-pressed. After these points are satisfactorily settled, the piece must again be measured to see that the width is correct.

Whether the piece has the correct finish or not is determined by comparing it with a sample swatch, which represents the finish to be obtained.

A careful record of all maker's and finisher's imperfections is kept by the examiner, at the end of the final examination. Imperfections if not too great are usually allowed for, if too large they are cut out. The above record has a two fold use, first, for the manufacturer's reference, and second, for the finisher's. This is done in case the piece is returned for any reason by the customer. Upon looking up this record, the manufacturer or finisher knows at once whether to substantiate the claim.

A few more difficulties may be encountered in the final examination. For example, the piece may be sheared too close, or on the other hand may not be sheared close enough. Some pieces require singeing, others may need sizing, on account of the flimsiness of the yarn. This is done to give the goods a firmer handle.

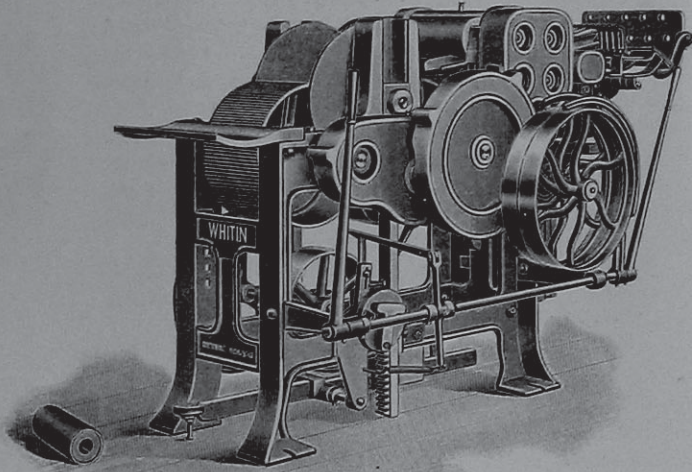
In summing up, let us look at a few of the finishes given to a piece of cloth. There is the *serge*, or clear face finish, the *cheviot* which is produced by fulling and napping. The *half cheviot* is produced in the same way as the cheviot, only not napped quite as much. Other finishes we meet are the *venetian*, the *habit cloth*, the *sponge* and the *waterproof* finish. Pieces are sometimes sponged to keep them from spotting in case the garment becomes wet. The waterproof finish is given to rain cloths to make them impenetrable and is simply a matter of closing up the pores of the fabric.

In conclusion a word about *creams*. Goods that are intended for creams are always made from selected stock. If the stock is not very carefully sorted, the piece after bleaching will contain many black hairs. These will in no case bleach white and to burl them out would be apt to leave holes in the goods, besides if present in quantities, is impossible to do. If such black hairs are there, there is nothing to do but put the piece into a dark shade or possibly black, entailing a loss to the manufacturer.

A SOUTHERN TEXTILE MACHINE BUILDER'S OPINION: In the writer's opinion you have a valuable paper, one which affords much information to the practical mill man.

THE WHITIN HIGH SPEED COMBER and its Preparatory Machinery.

ADVANTAGES OF COMBING OVER ONLY CARDED YARN. The sliver as coming from the carding engine is composed of fibres ranged in fairly parallel order. The next preparatory process to which this sliver is sub-



THE "WHITIN" SLIVER LAP MACHINE

jected, is either drawing, as practised in connection with common grades of yarns, or combing previously to it, provided a smoother thread is required. Within a few years, combing, on account of the expensive machinery and process, referred to 60's and above yarns, which however, nowadays, by the introduction of the new Whitin High Speed Comber, has changed, as low as 20's being now economically combed and this at the rate of about one thousand pounds per machine in a week. The cause for the continually growing demand for combed cotton yarn

to give strength to the sliver and in turn afterwards to the roving and yarn. These conditions, so necessary to the production of even yarns, are readily obtained by the use of the Whitin High Speed Comber.

The operation of combing in itself, as its name implies, is a combing procedure, that is, every fibre of cotton is practically isolated and combed out, and maintained in this condition by the pressure of the surrounding fibres. The process also eliminates from the material all the fibres that are below the standard length to be used in the yarn, and at the same time substantially rids the cotton of impurities which may have escaped the carding process. In this manner, combing has rendered possible the use of cottons formerly regarded as quite unsuited for the spinning of fine yarns, thus increasing the amount of available material, and widening the area of selection, which condition has materially reduced the prices of fine yarns to a lower figure, thereby extending their application and increasing their consumption.

THE WHITIN SLIVER LAP MACHINE. Before the sliver from the card is taken to the comber, it must undergo a preparatory process, since the arrangement of the fibres in the carded sliver is of such a nature that the needles of the comber would be liable to damage if an attempt were made to comb them in this state. Again, owing to the irregularity of the card sliver such would be reproduced in the comber, and at the same time cause unequal work to be thrown on the various parts of that machine, with the result of excess in noils. Again, when the cotton is passed through the comber, it comes in contact with a series of very fine steel needles, each row having a width of $13\frac{1}{2}$ inches in the new Whitin high speed comber, requiring in turn the necessity of making a lap from the slivers for a corresponding width of needles, for which reason a series of slivers as taken from the card are passed side by side through a Whitin sliver lap

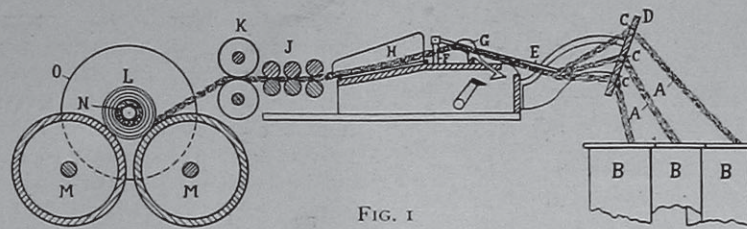


FIG. 1

is found in the demand for an even thread, and which depends considerably upon an uniform length of fibre. Examining closely a carded sliver will convince us that large quantities of irregularly stapled cotton exist therein and which in turn should be eliminated from the sliver (and which is accomplished by the comber) before a perfect yarn can be spun.

The cotton fibre, on account of its natural twist, has a normal tendency to curl up, and consequently readily becomes crossed and tangled during carding, again the individual fibres composing the carded sliver do not regularly overlap each other in such a way as

machine and the laps thus produced afterwards in most instances drawn on a Whitin ribbon lap machine previously to the combing process proper.

The course of the cotton through the Whitin sliver lap machine is shown in Figs. 1 and 2, of which Fig. 1 is a side elevation, with rollers shown in section and Fig. 2 a plan view of the machine.

Starting at the back of the machine, from 16 to 24 card slivers (or drawing frame slivers, provided a process of drawing has been used previously and as in some mills may be practised) *A* are passed from the cans *B*, separately through small round apertures *C* in

the guide plate *D*, which by placing in certain positions will put more or less tension on the slivers *A*. Passing through the guide plate *D*, each sliver *A* goes under a small round bar *E* held by the arms *F* and from there over a spoon lever at *G*, which is a part

by bringing it in frictional contact with the two large fluted iron rollers *M*. The lap *L* is made 16" in diameter and either 9 $\frac{3}{4}$ " or 12" wide, according to size of machine, *i. e.*, whether the lap goes to the ribbon lap machine next or direct to the comber, the lap in

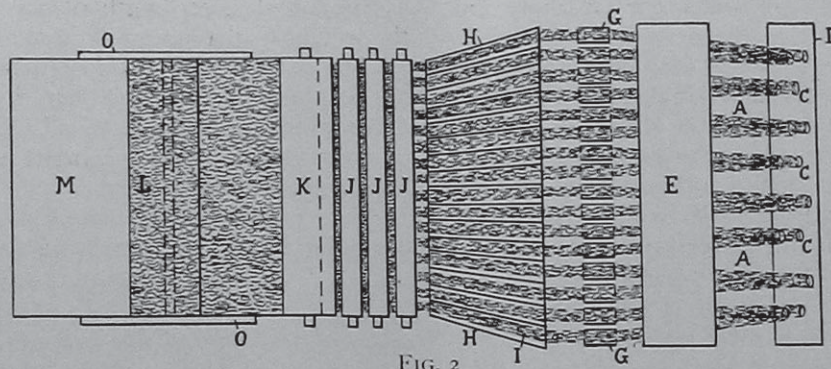
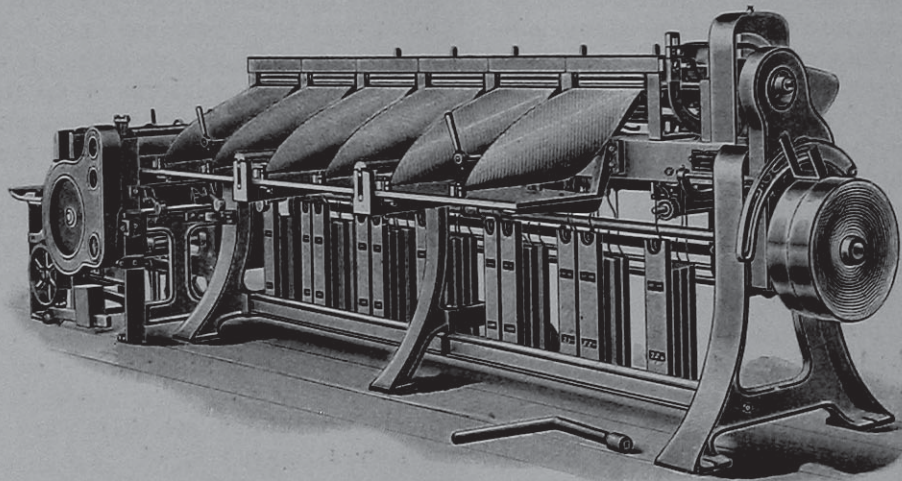


FIG. 2

of the automatic stop motion on the machine, causing the latter to stop when a sliver (*A*) breaks or a can (*B*) runs empty. The small round bar *E*, between *D* and *F*, serves the purpose to keep the slivers better down on the spoons *G*, thus obtaining a prompt action of the stop motion. From the spoons *G*, the slivers pass down a specially shaped guide plate *H*, each sliver being kept separated from the others by means of grooves or channels *I*, through which they pass. The slivers are in this manner brought together and made into a comparatively level sheet without overlapping each other as they enter the series of three or four pairs of drawing rolls *J*, side by side. The object of the machine is not to draw the slivers out, but to lay them side by side in the form of an even lap, for

the first instance being the one made narrower. The edges of the lap, during winding, are kept smooth and even by large, circular, smooth iron plates *O*, placed tightly up to the ends of the wooden spool, and in turn revolving with the spool by means of friction, thus preventing the lap ends from bulging out, also avoiding any friction of the lap ends with the framing of the machine. The machine is fitted out with a *Full Lap Stop Motion* and a *Sliver Stop Motion*, also known as the *Back Stop Motion*. The first mentioned stop motion is provided to stop the machine when the lap reaches its full diameter, thus insuring the laps to be of uniform length, the latter being provided for each sliver fed, and which causes the machine to stop instantly on the breaking of an end.



THE "WHITIN" RIBBON-LAP MACHINE

which reason the draft in the rollers *J* is just enough to prevent bulkiness of the lap and should not exceed about 2 to 2 $\frac{1}{2}$. Emerging from the the drawing rolls *J*, the cotton is conducted between one or two pairs of heavy calender rolls *K* (only one pair being shown in illustration, two pairs being most often met with) which compress it into a sheet or lap which enables it to be rolled up. The top calender roller or rollers *K* are weighted at each end. After the cotton leaves the calender rollers *K*, it is wound in the form of a lap *L*, upon the wooden spool *N*, which is revolved

The sliver lap machine, if used as a finisher for the comber (as is done in few instances in order to save in first cost of the machinery) must then be used in connection with the drawing frame. In this combination of machinery, the sliver is taken from the card and passed through the drawing frame, drawn from 4 to 6, as the case may be, and then put up back of the sliver lap machine and formed into a lap for the comber. This lap, no matter how careful the work done, is bound to be larger in the middle than on the end, for which reason in most cases the lap as produced on the