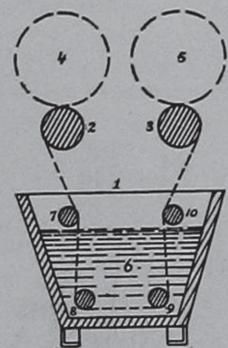
Jig or Jigger:—A dyeing machine.



Jig (Section)
1 Tank; 2 and 3 Feeding and Receiving Rollers; 4 and 5 Reel of Cloth; 6 Dye Liquor; 7, 8, 9 and 10 Guide Rollers

Joseph:—A long coat, with or without a cape, worn by women; especially on horseback.

Jumper:—A loose outer jacket reaching to the hips and made of cotton drilling or coarse linen, worn by sailors, longshoremen, truckmen, and others.
A hooded fur jacket, worn by Eskimos and Arctic explorers.

Jute Plant

Jute:—A plant of the fibre-producing genus *Corchorus*, natural order *Tiliaceæ;* chiefly one of the two species *C. Capsularis* and *C. Olitorius*, which alone furnish the

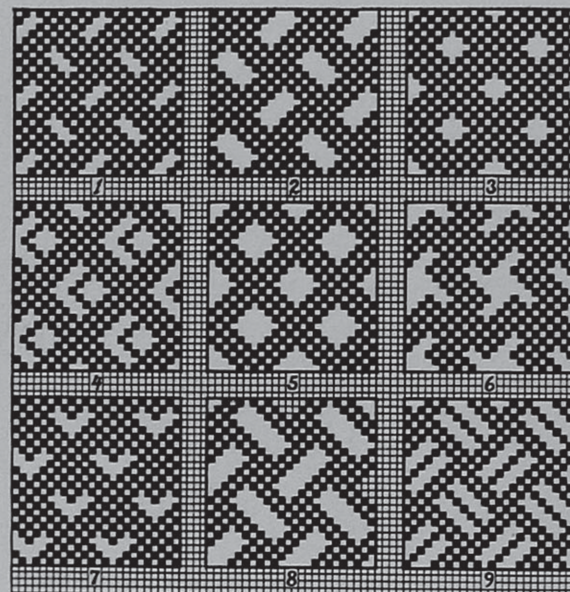
Jute (Fibres Magnified)

jute fibre of commerce. The fibre of the jute plant is obtained by maceration from the inner bark. It is used in the manufacture of coarse fabrics, such as gunny bags, ropes, etc.

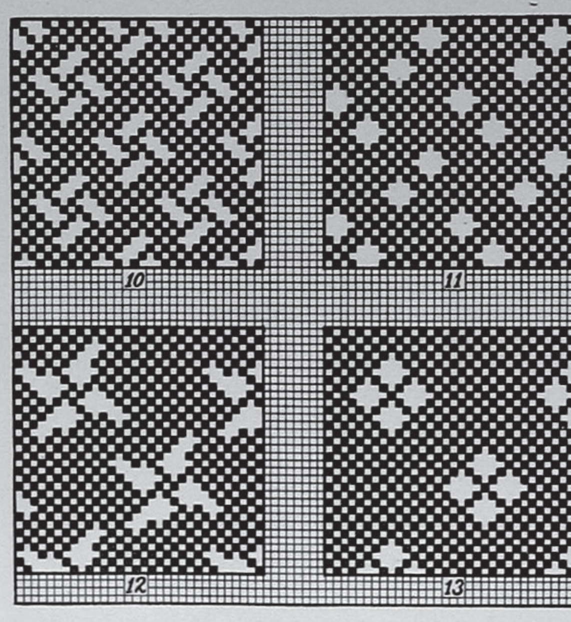
(*To be continued.*)

FIGURING UPON THE PLAIN WEAVE
Harness and Jacquard Work.

The same refers to a system of designing extensively used in connection with figured cotton, worsted, woolen, silk as well as union dressgoods, also



in connection with silk or half silks for necktie goods, etc. In most instances the filling is used for producing the figure by means of floating upon the face of the fabric, interlacing otherwise with the plain



weave; in few cases this figuring is obtained by floating the warp in place of the filling.

If using in place of one color for warp and filling, a different color for each, the effect of the design in the fabric is heightened. Using in connection with the harness loom the proper drawing in draft, in many instances will result in effects which even by experienced manufacturers may be considered as jacquard work, requiring a careful analysis of the weave, to be sure that it is harness work.

To illustrate the subject, the accompanying three plates of weaves are given.

Of the same Fig. 1 shows us a small, entwining float effect, produced by means of floating the filling on a plain interlacing ground, the weave repeating on 10 warp threads and 10 picks. The distributing of the spots, *i. e.,* the filling floats, has been done after the plain motive. Although we could reduce this weave for 8-harness, it is not advisable to recommend this procedure, for the fact that 10-harness straight draw are handled easier in the weave room.

Weave Fig. 2 shows us a somewhat similar spotting, arranged upon a plain interlacing ground, repeating on 12 warp threads and 12 picks. Explanations given in connection with the preceding example will also explain the one given.

Weave Fig. 3 shows a neat little spotting, technically known as polka dot, it being a small diamond spot distributed after the plain motive on a ground interlacing with the plain weave. This weave will require for its execution on the loom either a 12-harness straight draw, or a 6-harness point draw, the first one being the one preferred. Provided the polka dot is too small, the same can be increased by adding a larger float in the centre.

Weaves Figs. 4 to 9 inclusive, show similar styles of spotting for the filling, said spotting being arranged after the plain setting. The weaves obtained repeat on 12 warp threads and 12 picks, hence are within compass of the average fancy dobby for harness work.

Weaves Figs. 10 to 13 inclusive repeat on 16 warp threads and 16 picks, but which if so desired could be woven on less harnesses, using the proper drawing in draft in each case.

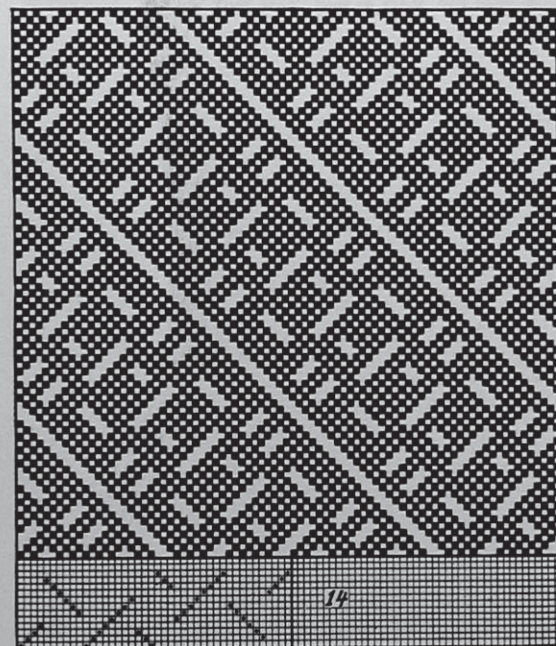
Breaking and turning the drawing in draft will result in the production of large, all over figures, and of which Fig. 14 is an example, the same repeating on 42 warp threads and 42 picks. This weave by means of the drawing in draft given below, can be executed on 12-harness.

Weaves Figs. 1 to 14 inclusive show the floating of the filling by means of *empty* squares, *i. e., full* squares to be raisers in this instance.

In some few instances these figured effects are to be produced by means of the warp, and when in these instances empty squares indicate raisers, or warp up.

As will be readily understood, in connection with this system of designing, the jacquard machine is extensively employed in the manufacture of these fabrics, some of the neatest designs being produced by this system of designing.

Fig. 15 shows us a portion of a jacquard design of this sub-division of weaves, it being a figure to be set after the plain motive, the 5 or 8-leaf satin, as the case may require in the completed jacquard design. In connection with jacquard work, in executing the designs on point paper, the filling float is generally shown painted, since this facilitates the work for the designer, for which reason we have followed this plan in connection with the jacquard design Fig. 15, when the empty squares indicate warp up or raisers, *i. e.,* to be cut on the card stamping machine.



Question:

Construct 2 new examples of this sub-division of weaves, repeating respectively on 8, 10, 12 and 16 harnesses.

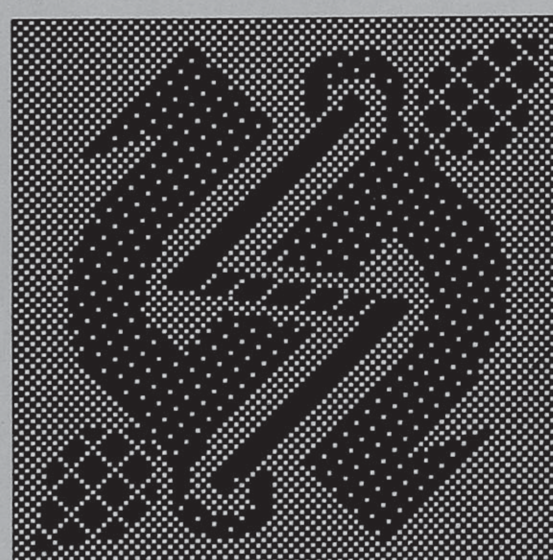


FIG. 15

The Crompton & Knowles Loom Works have received orders from the Kanegafuchi Spinning Co., of Tokyo, Japan for 25 of their latest looms, with additional orders to follow.

Posselt's Textile Journal

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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.

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

Dress goods have lately witnessed a brisk demand. Certain textures were in demand both for prompt and late delivery and considerable orders were booked by mills having the goods desired. Wide serges and other staple fabrics were taken at good price, provided quick shipment was assured by the mills.

Manufacturers who did not sell their entire spring product soon after the opening, report a steady interest in cheap all wool and lustre goods for January delivery.

Leading mills are constantly receiving orders from Western jobbers for additional supplies of goods, but these orders cannot be accepted unless March shipment is satisfactory.

The trade with houses selling garment manufacturers is quiet, but spring goods are moving freely.

The interest of the cutter up has centered on serges, diagonals and panamas. Serges and panamas were at the start the season's strongest possibilities before the diagonals became popular, for which reason mill agents think that the bulk of the business in worsteds will be done in the three mentioned fabric structures; serges and diagonals are in demand by makers of the better class of garments, whereas panamas in navy and black are favorably considered by manufacturers of medium priced garments.

Broadcloths in all variety of styles have just been opened.

About Men and Mills You Know.

The Canton Cotton Mills, Canton, Ga., will erect a 127 by 300 foot addition and install about 10,000 spindles, 274 looms, 54 cards, etc. Stuart W. Cramer is the engineer in charge. The Woonsocket Machine and Press Co. is furnishing their well known speeders, the Whitin Machine Works, the spindles, their superior cards, drawing frames, ring frames and looms. About $250,000 will be the cost of the improvements.

The late Joseph F. Knowles, treasurer of the Acushnet and Hathaway mills of New Bedford, it is said, was the highest salaried textile mill man in the country. A few years ago when he was organizing the New England Cotton Yarn Company his salary was greater than that of the President of the United States and one of the largest ever paid any one connected with manufacturing enterprises.

The dividends of the Acushnet have been spectacular. The Hathaway mills are a family affair and have been tremendously profitable.

When the New England Cotton Yarn Company was organized Mr. Knowles was chairman of the executive committee, and he organized the company and remained with it for a number of years. He was also a director in the Union and Pocasset mills of Fall River and the Mt. Hope Finishing Company.

William T. West, Elliott M. Eldredge and M. R. Snyder will begin business as Eldredge, West & Co. January 1, 1910, with headquarters at 61 Worth St., New York; the firm of Eldredge, Lewis & Co. will be dissolved. The new firm will represent the following mills: Cabot Mfg. Co., Fisher Mfg. Co., Falls Co., Shetucket Co., Grosvenor Dale Co., Woodside Mills, Rushton Cotton Mills, Dilling Cotton Mills, Dallas (N. C.) Mills, Cutler Mills Co. and Victory Mills.

OBITUARY.

Mr. Joseph B. Bancroft was the last of the older generation connected with the Hopedale industries.

He was born in Uxbridge, October 3rd, 1821, and was therefore, 88 years and 22 days old, having passed a life of useful activity until within a few years, when he took his well-earned rest from active business. He was one of ten children of Samuel and Mary (Bubier) Bancroft. His father, who was born in Marblehead, in 1784, was taken prisoner by the British in the War of 1812 and confined in the infamous Dartmoor Prison.

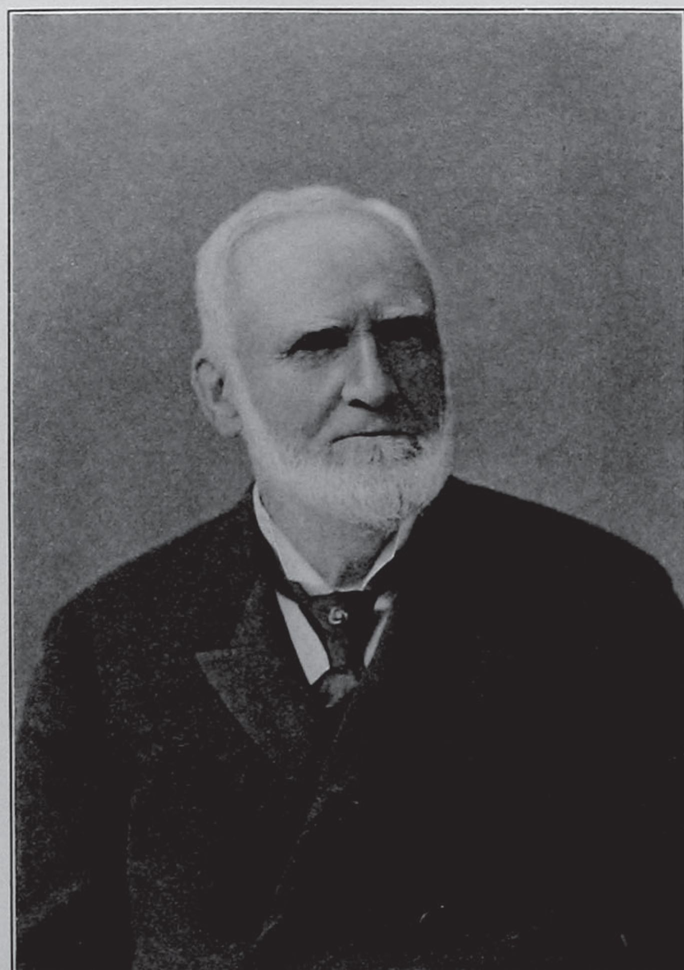
Joseph Bubier Bancroft married Sylvia Willard Thwing, daughter of Benjamin and Anna (Mowry) Thwing, in 1844 and from this union there were ten children, of which there are five surviving. They are Eben D. Bancroft, a prominent official of the Draper Company of Hopedale, Mass., Anna M., unmarried, who since her mother's death several years ago has presided over her father's household; Mary Gertrude, wife of Walter P. Winsor, of Fairhaven, Mass., President of the First National Bank of New Bedford, and one of the trustees of H. H. Rogers estate; Lilla

J. wife of H. W. Bracken of Hopedale, one of the Draper Company Superintendents, and Lura B., widow of Charles Day, who at the time of his death was General Superintendent of the Draper Company.

Before the division of the town of Hopedale from Milford, Mr. Bancroft was one of Milford's valued citizens and was honored with the office of selectman, in 1877-8-9. He represented the town in the legislature in 1864, and was one of the engineers of the fire department from 1875 to 1881, inclusive. In all official connections with public affairs he was thoroughly respected and trusted, as well as esteemed for his ability, and careful work in the interests of the town.

He was for ten years one of the Directors of the Home National Bank, resigning last January. He was also for many years on the management of the Milford Gas Light Co. and resigned as President, May 26, 1909, on account of his failing health.

He was a member of Montgomery lodge, A. F. & A. M., of Milford, taking his degrees in 1868, of Mt. Lebanon R. A. Chapter, in which he took his degrees in 1869 and of Milford Commandery, in which he was knighted in February, 1869. In all of these orders he was an honorary life member, voted to him for special favors he had rendered to the lodge, chapter and commandery. In his death it breaks three generations, belonging to these orders, as his son and grandson are members of the same bodies.



Joseph B. Bancroft.

Mr. Bancroft was liberal with his means and to this fact is due the fine public library, which he erected a few years ago and presented to the town of Hopedale, as a memorial to the memory of his deceased wife. Other benefactions of his in generous amounts are known to a few but of such a nature as not to be used. Mr. Bancroft was essentially a man of the people. Coming from the ranks, an honest workman himself, he knew of the needs and trials of the ordinary workman, and as one of the heads of the large company with which he has been associated for more than half a century, he was always well thought of by the help.

The leading mills will maintain the current price of knit goods for the fall season, both with wool and worsted fabrics; it is impossible for them at this time to quote the price of their cotton textures; however, it is thought that an effort will be made to keep the prices of these on such a basis so as not to interfere too much with the customary retail price. The best news in the market is that jobbers have closed out most of their heavy weight woolen and worsted goods, in fact substitutes had to be provided for some of the standard grades, since as early as August these heavy weights have been in demand.

Although the price of hosiery has recently advanced, most buyers can hold out against this advance as they have purchased considerable quantities previously and thus are covered for their spring demand. Blacks and tans at the present time find ready sale, there being little demand for fancy colors.

Cotton Industry of China.

The cultivation and manufacture of cotton is one of the most important industries of China. It is generally conceded that the area devoted to the cultivation of cotton is only exceeded by that devoted to silk and tea. The country adjacent to Shanghai is the principal cotton-producing district in China for bulk and grade, the staple being about 1" in length. Hankow and Ningpo are also important centers, but the quality is inferior to that grown in the Shanghai district, the staple measuring only about ¾".

Of the cotton exported, Japan takes about 90 per cent. That exported to Great Britain, Germany and Italy is used principally for filling, and there is an increasing demand for it in those countries. The total exports of raw cotton in 1907 amounted to 131,707,731 pounds, valued at $13,398,192, against 85,780,750 pounds, valued at $6,724,250 in 1908. The Chinese customs valued the haikwan tael at 79 cents in 1907, and at 65 cents in 1908, which accounts for a proportionate share in the decreased value for 1908.

A large percentage of the staple remaining in China finds its way to the cotton spinning mills, of which there are now 27 in China, actively engaged in turning out yarn for the native market. Chinese cotton is whiter than Indian, and the product of the Shanghai mills is superior in color and cleanness to either Japanese or Indian yarn, but, being shorter in staple, it is not so strong, nor is it so well reeled, owing to the low class of labor employed. The number of spindles in the 27 mills is, approximately 750,000, and the production per spindle, working day and night, is from 11 to 13 ounces.

In addition to the spinning mills, there are at least 10 cotton-seed oil mills located at Shanghai, Hankow and Tungchow.

The Japanese, who as mentioned before, are the principal buyers of the raw cotton, are deeply interested in the betterment of the local product, and there is now a movement on foot, which, if successful, will improve its grade to such an extent that we may look for a great falling off in the export of American-grown cotton in Japan.

A Japanese firm, close to the Government, began experiments last year at Kangwang, Province of Kiangsu, with cotton seed obtained from several countries. Seeds from India and Japan gave poor results. The American seed, however, has produced a cotton greatly superior to the native. The staple is good, but the color, owing to heavy rains, is poor. If future trials are successful seeds will be distributed to the farmers gratis. The Japanese hope in this way to procure a cotton of American grade which they can purchase at a low price and lay down in their own country with small cost for transportation. This accomplished, American cotton will only be bought by Japan when her requirements exceed China's production.

Canadian Cotton Mills.

The cotton-mill industry in Canada began at Dundas, Ontario, in 1856. Up to 1878 only the coarsest goods were made. From this year the growth began. About 1886 consolidations took place which gave still greater impetus to the industry. To-day the mills make ducks and drills, cotton quilts, prints, dyed goods, linings, and colored prints, in addition to coarser grades. Mills of this kind are great consumers. Besides building material of all kinds, machinery, iron, coal, and raw cotton, they use an immense amount of supplies, such as oil, paper, bleaching powder, belting, twine, electric supplies, and tools. Over $1,500,000 is spent each year on supplies, excluding coal, which costs approximately $750,000. For raw cotton from the United States over $6,000,000 was paid last year. The total income of the industry was about $15,000,000.

The increasing centralization at Montreal of capital and control of great Canadian manufacturing industries is evident. There are 818,542 spindles and 19,324 looms in mills or branches of mills controlled in Montreal.

Of the wool imported here from England, the major portion is grown in that country, for our buyers have long ago made Australasia their direct source of supply for class 1 wool. For instance, during the year 1908 the total purchases of Australasian wool in London for here amounted to but 49,000 bales, whereas during that year we secured 110,000 bales in the Australasian markets.

Our imports from the River Plate during the same period amounted to 28,000 bales.

Our total imports of class 1 wools during the last five years, expressed in pounds, were as follows: 1904, 45,575,993; 1905, 109,888,258; 1906, 86,810,307; 1907, 82,982,116; 1908, 45,798,303.

It will be seen that during 1908 we took but little more than half the average quantity of class 1 wools that we had been accustomed to take during the four preceding years on account of the financial crisis.

Because of the high cost of cotton and a demand for goods, the cotton mill of the Edwards Manufacturing Company, of Augusta, Me., which employs 1,500 operatives, are running on a four-day schedule. The cotton mills of York Corporation in Saco, Me., employing 2,000 hands, also have adopted a short-time policy.

History of Silk Culture in this Country.

Under the supervision of the Department of Agriculture, experiments in the culture of silk worms are at present being conducted at 714 St. Alban's Street, Philadelphia, by E. S. Caravello and E. S. Maroni, both experienced silk raisers from Italy. About three years ago the two men, unaware of the fact that for centuries every effort has been made in this country by individuals, states, as well as the government to promote silk raising, consulted the experts of the Smithsonian Institute, and when then they were furnished with nine hundred white mulberry plants for experimental purposes. Six hundred of the trees were planted at Somers Point, N. J., the others in the yard of the St. Alban's Street house, where the real experiments are being conducted. The eggs of the silk worm they obtained from relations of theirs in Italy. The cocoons obtained are sent to the Department of Agriculture, who is watching the results with interest.

It will be of interest to our readers to mention that silk culture was attempted already in the early infancy of the American Colonies, the object of promoting it being the desire of the English kings to keep the Colonies dependent on England.

The first start in that direction was made by James I, whose two passions were, his hatred of tobacco, and his idea that silk worms could be raised in England; but 14 years of failure gradually assured him that this was impossible.

During this time a colony had been started in Virginia to cultivate tobacco, which grew to such an extent that it became its currency—everything from the smallest item to the largest, being reckoned by so many pounds of tobacco. It was in this colony that James I. thought he could gratify his master passions, by up-rooting the culture of tobacco and introducing the cultivating of the mulberry, and the rearing of the silk worm in this place.

In 1623, King James I. sent over mulberry trees and silk worm eggs, directing the company in charge of the colony to make suitable legislation in order to carry out his orders. This was done, a fine of 10 pounds of tobacco being imposed on every planter who did not cultivate at least 10 mulberry trees to every 100 acres of his plantation. The scheme worked well for some time, Parliament even offering a premium for larger quantities of raw silk.

However at the outbreak of the Civil War, the Stuarts disappeared for some time, and Cromwell being busy with other matters, found no time to bother with silk culture in a distant colony.

In 1656-57, silk worm raising was in a fairly prosperous condition, but in order to still further encourage silk worm raisers, the Assembly offered additional premiums, which, however, were never earned. These premiums were withdrawn in 1666, the Legislature thinking that the culture was well established. They were renewed in 1669, but without success, the culture beginning then to decline rapidly, for the fact that raising tobacco was more remunerative to the planters, and finally silk culture was abandoned in that colony.

The next section of the country where silk raising was experimented with, was Georgia, and when in 1735 eight pounds of raw silk were sent from Savannah to England, woven and presented to the Queen. In 1755 Mrs. Pinckney, the descendant of a prominent family in South Carolina, took with her to England, a quantity of excellent silk which was raised and spun in the vicinity of Charleston. There was sufficient silk to make three dresses. One she presented to the Princess Dowager of Wales, the second to Lord Chesterfield, keeping the third for her own use. According to Ramsay's History of South Carolina, this silk was pronounced equal to the silk raised in Italy, France and the Levant. The dress last referred to was in existance in Charleston as late as 1809, being then worn by Mrs. Pinckney's daughter, and was even then remarkable for its beauty, firmness and strength.

From records kept by Dr. Elliott, he states that in 1759 Georgia exported over 10,000 pounds of silk, the same being of such a good quality that it was sold in London for about 2½ shillings a pound,—more than the amount paid for Italian, French or silk coming from the Levant. In 1790, 200 pounds of raw silk were exported from Savannah at prices ranging from 18 to 26 shillings per pound. After this, little silk was produced in Georgia, and silk culture in the South quickly declined; the introduction of cotton culture was in a great measure responsible for this.

The next section of the country which took up silk raising was Connecticut, although white mulberry trees had been raised as far back as 1755, in Long Island. Mansfield seems to have been the location where silk raising became a fixed industry, although cocooneries were found all over New Haven, Fairfield, Middlesex, Tolland, New London and Windham Counties. Connecticut was the only state in New England, where silk raising ever got footing of any consequence.

The next section of the country which took up silk culture was Pennsylvania (about 1767). History tells us that in 1770 a Mrs. Wright of Columbia, Pennsylvania, made a piece of mantua 60 yards long, from cocoons raised by her, and that the cloth was afterwards worn as a court dress by the Queen of Great Britain. In 1769 a filature for the reeling of raw silk was established in Philadelphia, the *Genesee Farmer*, a paper of those days, stating that in 1771, 2,300 pounds of cocoons were brought there for reeling purposes. Siik raising seems after that to have grown and prospered in Pennsylvania, but the War of the Revolution checked its progress, and it never was revived from that time.

Among other sections of the country which afterwards took up silk culture in the latter part of the 18th century, we find New Jersey, New York, Delaware and Maryland, to be in turn followed by Massachusetts, Vermont, New Hampshire, Maine, Ohio, Kentucky and Tennessee, showing that most every section of the country made an attempt to embark in the industry; however, in every instance without final success.

No history of silk raising would be complete without a reference to the *Morus Multicaulis Mania*, an excellent record of which is given by L. P. Brockett in "The Silk Industry in America", and from which we quote:

"One after another of the experimenters in silk culture began to advocate the Morus multicaulis, and recommended their friends to cultivate the trees, and raise silk if they could; but at all events to raise multicaulis trees. Grave doctors of medicine, and doctors of divinity, men learned in the law, agriculturalists, mechanics, and merchants, and women as well as men, seemed to be infected with a strange frenzy in regard to this mulberry tree. They met in solemn conclaves over bundles of Morus multicaulis twigs, discussing seriously the glorious time when in the not distant future, every farm should be a nursery for the young trees, every house should have its cocooneries attached, its silk worms of the bivoltine, trivoltine, or polyvoltine breeds, yielding two, three or more crops of cocoons per year. The farmers' wives and daughters, when not engaged in feeding the worms, were to reel the silk, and perhaps to spin and twist it, till silk should become as cheap as cotton, and every matron and maid rejoice in the possession of at least a dozen silk dresses. It does not clearly appear where and on what occasions they were to wear these dresses, while their whole time was to be occupied with the care of the silk worms and cocoons.

Gideon B. Smith, of Baltimore, is said to have owned the first multicaulis trees in the United States, which was planted in 1826; but Dr. Felix Pascalis, of New York, was the first to make known to the public the remarkably rapid growth, and supposed excellent qualities of the tree; and so may be said to have opened this Pandora's box, from which so many evils escaped. The excitement in regard to the Morus multicaulis grew steadily; slowly, indeed at first, but increasing with geometrical progression until 1839, when it culminated in utter ruin to the cultivators. The shrewdest and wariest operators, men who did not believe in its loudly heralded virtues, were fairly carried off their feet by the surging tide of speculation. The young trees or cuttings, which were sold in 1834 or 1835 for $3 or $5 a hundred, came soon to be worth $25, $50, $100, $200 and even $500 a hundred.

In the Spring of 1839, Mr. Whitemarsh and Dr. Stebbins, of Northampton, Mass., were rejoicing over the purchase of a dozen multicaulis cuttings, not more than two feet long and of the thickness of a pipe stem, for $25. "They are worth $60," exclaimed the doctor in his enthusiasm.

It is said that a florist and nursery man, on Long Island, who was one of the first to introduce the tree into the country, though he had no particular faith in it, devised a plan for enhancing its price. He had sold small quantities to nursery men in Providence and Newport, and several of the Massachusetts cities and large towns; and one day in 1835, while at work in his nursery, he determined to make a bold push for a speculation. Hastily returning to his house and putting up a change of apparel, he mounted his sulky, drove into New York, and on board the Providence boat. Arriving at Newport, he landed, drove to the first nursery there and asked, in an excited way "Have you any multicaulis trees?" "A few", was the reply. "I will give you fifty cents apiece for all you have", said the Long Islander. The nursery man thought a moment. "If," he said to himself, "Mr. .... is willing to give that price for them, it is because he knows they are worth more." He raised his head, "I don't think I want to sell what few I have, Mr. ...." "Very well" was the reply. "I presume I can get them for that", and he drove off. Every nursery man who was known to have any multicaulis trees in Newport, Providence, Worcester, Boston, or the towns adjacent, Springfield, Northampton, etc., were visited, the same offer made, and the same answer returned.

"I came back", said Mr. ...., "without any trees; but you could not have bought multicaulis trees, in any of the towns I had visited, for a dollar apiece, although a week before they would have been fully satisfied to have obtained twenty-five cents apiece for them." Yet this very man, shrewd as he was, was carried off his feet by the greatness of the demand which followed. He imported large quantities from France, multiplied his cuttings by all the devices known to his profession; and at last, so enormous were his sales, that, in the winter of 1838-9, he sent an agent to France with $80,000 in hand, with orders to purchase one million or more trees, to be delivered in the summer and fall. Before the whole of his purchase had arrived, the crisis had come. The nursery man had failed for so large a sum that he could never reckon up his indebtedness; and the next spring his multicaulis trees were offered in vain to the neighboring farmers at a dollar a hundred for pea brush.

Another incident related of the speculation was, that after the crash came at the East, some of the largest holders of the trees, in their desire to get them off their hands, chartered a vessel notoriously unseaworthy, loaded her with the multicaulis shrubs, and sent the cargo by way of New Orleans to Indiana, insuring it in one of the marine companies at a high price. Greatly to their disappointment the vessel reached New Orleans safely, and the cargo was transshipped at an enormous expense to river boats, and when the trees reached Indiana, they found no one was willing to take them as a gift. This discreditable adventure cost the shippers a large sum of money.

The times were rife with speculation. The great panic and disaster of 1837 had thrown to the surface many restless, unscrupulous spirits, who were willing to embark in any enterprise, however daring or doubtful its character, which seemed to promise the slightest opportunity of regaining the fortunes they had lost. Numbers of these plunged into the multicaulis speculation, and made it more disastrous in its results than it otherwise would have been; but there is this ground of consolation in regard to them, that not one of them escaped the ruin they helped to bring upon others."

TRUE SILK.

(*Continued from page 126.*)

Stifling or Choking the Chrysalis.

The parties who raise the cocoons, as a rule sell them to the reeling establishments before suffocation of the chrysalides is necessary, for the fact that these establishments have better facilities for this work. If, however, the reeling is done by the raiser, or some time must elapse before the cocoons can be sent to a reeling establishment, the chrysalis must be killed before the cocoon is damaged for reeling, by the egress of the moth.

The chrysalides can be killed either by stifling with steam or choking by dry heat. The first is the surest, quickest and best method, provided the facilities are at hand. The cocoons, for this purpose, are laid upon shelves in a tightly sealed box and steam turned on. Twenty minutes will suffice, after which the cocoons are dried, in the sun. The dry heat method takes longer; the cocoons for this procedure are placed in shallow baskets and slipped on iron drawers into an oven which is kept heated in a temperature of about 200 deg. F. Do not increase this temperature, or you may burn the silk. This operation lasts from two to twenty-four hours. A certain humming noise continues so long as there is any life in the chrysalides.

After choking, the cocoons should be strewn upon long wooden shelves in the shade, with plenty of air, and for the first few days, frequently stirred. After remaining on these shelves for about two months, with occasional stirring, the chrysalides become quite dry and the cocoons will preserve indefinitely.

With reference to silk raised in this country, it is claimed that in Southern California dry heat choking is accomplished by simple exposure to the sun.

Sorting the Cocoons.

Previous to spreading the cocoons in the cocoonery, double and feeble specimens have been sorted out, and in turn are either reeled by themselves in lower grades of reeled silk, like Doppione, or are used in connection with the waste made in reeling silk, etc., in the manufacture of spun silks. Those which have passed this examination previous to reeling, are now carefully sorted as to color and texture, so that cocoons of the same color and shade may be reeled together; for the use even of cocoons of the same color but of different shades will give a streaked skein of silk.

Cocoon: Fine Grain.

Cocoon: Coarse Grain.

They should, too, be sorted as to their texture. Those of fine texture, among ordinary cocoons, are considered first choice and are used to produce the finest qualities of raw silk. They are more easily unwound than those of a coarser texture which are called satiny cocoons, and which at the end of the reeling process come off in flocks, resulting in a dirty silk. The accompanying two illustrations of cocoons, explain the subject of difference in texture, showing respectively *Fine* and *Coarse* Grain specimens.

In addition to the features given, some regard must be paid to the reeling of cocoons of the same size, together. An extended experience is needed to make a rapid cocoon sorter, and it is work that should be followed without intermission, that the knack necessary to quickness may not be lost.

According to Dandalo, fresh cocoons consist of, by weight:

Chrysalides.	84.	Per cent.
Castings.	.5	Per cent.
Silken pods.	15.5	Per cent.

It is from this 15.5 per cent, that the reeler draws her silken thread. But a large proportion of even this is lost, so that there is recovered but 8, 9, or rarely

10 per cent of the original weight of the cocoons. From this it will be seen that it takes, in an average, from 10 to 12 pounds of fresh cocoons, or about 3¾ pounds of dry ones, to make a pound of silk.

(*To be continued.*)

SILK FINISHING.

(*Continued from page 103.*)

Craping.

The same is a special finishing process referring only to crape fabrics, the process having for its object to impart a wavy position to the filling in the fabric.

Formerly, this feature was accomplished by wetting the fabric with warm water, pulling it intermittently over an oblique table and rubbing the fabric (upwards only) while the latter was held taut, with the hairy side of a piece of calf's, or dog fish skin.

At present we use for this procedure the Craping Machine, the fabric receiving its characteristic crape effect by passing between grooved rollers, which for this process are heated. The grooves of these rollers may run either warp or filling ways. Frequently raised or depressed effects are added to the rollers.

Watering or Moiréing.

This operation has for its object the transformation of smooth fabrics into fancy effects. By watering, or as also called moiréing, the picks of the fabric are partways pressed flat, imparting in turn to the fabric a peculiar glittering appearance, caused by the different reflections of the rays of light, striking portions of threads pressed and not pressed.

Fabrics, in the construction of which we have used a heavy count of filling and a lustrous yarn, are the ones most suitable for the process.

Broad silks as well as silk ribbons are watered.

Have a fabric, in a double layer, pass under pressure between two smooth calender rollers; it will be impossible to keep the filling in one layer of the fabric parallel with the filling in the other layer, the picks will continually cross each other under varying angles, with the result that the filling will be pressed flat where crossing each other, in turn producing the characteristic moiré or watered effect, which is clearly revealed by examining the fabric thus treated under a magnifying glass and where the lines of light are broken, it will be noticed that the picks have moved a little to one side or the other.

The effect is still further increased if imparting to the doubled fabric, during its passage through the calender, a to and fro motion, widthways, *i. e*, filling ways, since then the pressing of the threads is not left to accident.

A mechanically produced diversion of the filling will also occur, provided the fabric, a short distance before entering the nip of the pressure rollers, is run over a wavy iron rod. The finer in gauge these waves on the rod are, the closer will be the moiré effect produced in the fabric.

Either one of these three cases of moiréing thus referred to, will result in irregular effects, *i. e.*, the characteristic moiré effect, in the fabric.

As will be seen, moiréing is more or less a crushing process to the fabric, at the same time imparting to the latter a more or less thin, glossy and papery effect, for which reason fabrics intended for this treatment must be made with sufficient body. Gros-grains will show the most defined moiré effects on account of their well defined ribs and which are displaced by the process, hence the pronounced effect. Fair textured taffetas will lend themselves to excellent effects; satins however being not suitable for this process.

To get satisfactory results, the ribs to be pressed against each other should be as nearly as possible parallel, which is accomplished by doubling the piece lengthwise, face to face, stitching the selvages at short intervals to hold fabric in the desired position. To get the best results, do this work by having the fabric pass between the eyes of the operator and the light. The doubled fabric in turn is subjected to the moiréing calender, which accounts for the crease noticed in the middle of most pieces of moiré.

Special rich fabrics are sometimes woven 2-ply, one above the other, a fine pick of one ply at short intervals interlacing with a warp thread of the other ply, thus holding the two fabric structures together and accomplishing an exact parallel laying of the ribs for the moiréing process.

The pressure under heat required for moiréing, in place of being given by a calender, may be also most satisfactorily imparted by a Hydraulic Press.

A weak effect of moiréing occasionally appears without being wanted, when woven goods accumulate, lying in stock for some time, piled upon each other; more particularly will such a defect be noticed in connection with the better qualities of gros-grains as used for neckties, etc. To prevent such a defect, tissue paper is placed between the folds of the fabric.

Moiréing may also be done by passing the fabric, in its full open width, under heavy pressure, between finely fluted steel rollers which are heated, the ribs of which correspond, to a greater or less degree, with the ribs of the cloth. This process if used is more particularly practised by ribbon manufacturers.

From explanations given, it is seen that moiréing is somewhat destructive to the fabric, on account of the crushing pressure exerted to it under great heat, and when then the slightest wrinkle or fold in the fabric will cut clear through the fabric, in place of only crushing its structure. This will at the same time show that the greatest of care must be exercised with the selvages in their construction at the weaving, as well as with the moiréing process, since if not perfectly constructed and evenly matched, it will cause them to be cut.

(*To be continued.*)

The worst paid worker in the Lyons silk industry is the weaver of the rich brocades, velvets, etc., used principally for upholstery; and just as the comparatively unskilled *tulle* hand enjoys the highest wages, the skilful and artistic weaver of these elaborate tissues, whose manufacture demands long training and considerable technical knowledge, has at once the lowest pay and the longest hours.

RIBBONS, TRIMMINGS, EDGINGS, ETC.

(Continued from page 86.)

In connection with Fig. 120, two entering threads are shown working in opposite directions on the face of a ribbon, forming in this way, a diamond pattern. To produce such an effect in the best possible manner, place the two entering threads where they will work

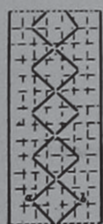


Fig.120

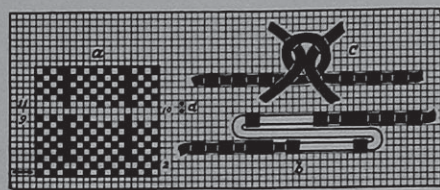


Fig.121

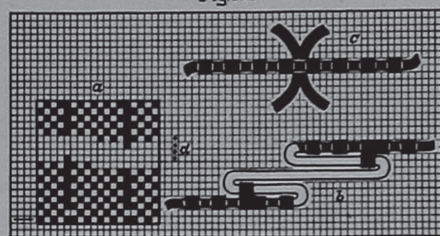


Fig.122

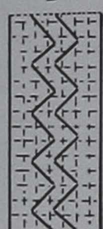


Fig.123

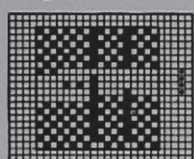


Fig.124

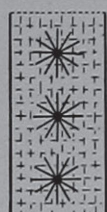


Fig.125

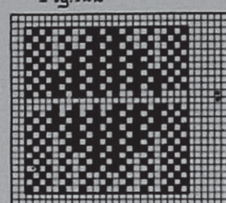


Fig.126

the furtherest apart, *i. e.,* points indicated by *a* and *b* respectively, in Fig. 120. The drawing together of the two entering threads in the center of the fabric, is accomplished either by means of three or five picks, either arrangement equalling in effect one pick on the face of the fabric, the take-up device on the loom, at these picks being arrested so as to equal the introduction of only one pick with reference to take-up of cloth roller.

Fig. 121^a shows us the weave for producing the fabric according to sketch Fig. 120, with three entering picks. On the second pick of this weave, both entering threads are secured to the fabric by means of being pulled into the lower shed. Pick 9, of Fig. 121 is the first pick of the three entering picks. The filling, entering from the left, interlaces in plain, *i. e.,* taffeta until coming to the point where the entering threads have to be drawn into the fabric, passing after this below the right hand situated entering thread, surrounding then with pick 10, this entering thread as situated on the right hand side of the design.

Pick 10, in unison with pick 11, loops around the left hand situated entering thread, pick 11 forming in the body of the fabric the continuation to pick 9.

Fig. 121^b shows these three entering picks. On account of the tight tension given the filling, and the temporary arresting of the cloth take-up for these three picks, the latter will show in the fabric as one pick. Fig. 121^c illustrates the position these three picks occupy in the woven fabric, illustrating at the same time the loop, *i. e.,* securing of the two entering threads to the body structure of the ribbon.

The entering threads which rest in the center of the ribbon, must be added in the advance-reed, the body warp being threaded regularly. Fig. 121^d shows the two picks where the cloth take-up is thrown automatically out of action.

Fig. 122^a shows us the weave necessary for producing fabric shown in sketch Fig. 120 with five entering picks. The second and the third entering pick loop with the entering warp thread as situated at the left hand side, the third and fourth entering pick looping with the entering thread as situated at the right hand side of the fabric, a procedure clearly shown in diagram 122^b. Portions of threads shown in outline are compressed in the loom, resulting in an appearance shown in diagram Fig. 122^c, the compressing of the five picks into apparently one, on the face of the fabric, being accomplished by means of temporarily arresting, at these picks, the take-up motion of the cloth roller. Using five picks produces smoother interlacing of the entering threads compared to using only three. Fig. 122^d indicates the four picks where the take-up of the cloth roller is thrown out of action.

Fig. 123 shows us two entering threads resting parallel with each other on the face of a ribbon, *i. e.,* fabric structure. Either entering thread must be connected to the fabric by means of a separate pick, as shown in weave plan Fig. 124.

Fig. 125 shows us a sketch for a ribbon, executed with six entering threads, all of which, as shown in weave Fig. 126 are drawn together in the middle of the ribbon by means of three entering picks. The entering threads must, in connection with this pattern, on account of their different interlacing in the fabric structure, be divided into 3 warps @ 2 threads.

If using for the entering threads a yarn showing prominent sharp twisted spirals, place the entering

Fig.127

Fig.128

loops of the filling so that the latter will not be caught in the spirals of the entering threads.

Fig. 127 shows proper looping of a left and a right

Fig.129

Fig.130

hand situated entering thread, showing right hand twist spirals.

Fig. 128 shows proper looping of a left and a right hand situated entering thread, showing left hand twist spirals.

Fig. 129 shows wrong looping of two entering threads produced with right hand twist spirals.

Fig. 130 shows wrong looping of two entering threads, produced with left hand twist spirals.

Palmer's Improved Shuttle Picking Mechanism.

The object of this mechanism, the invention of Mr. I. E. Palmer, of Middletown, Conn., is to impart an even, smooth shuttle actuating movement to the picker stick; maintaining the latter in contact with the shuttle during the shuttle actuating movement of the picker stick, imparting in turn an initial, elastic, gradually accelerated shuttle actuating movement to said stick.

Of the accompanying illustrations, Fig. 1 is a side elevation of a picker stick and a portion of the operating mechanism, representing the position of the parts prior to the commencement of the shuttle actuating throw of the picker stick. Fig. 2 is a view of the same parts, but representing the position assumed during the initial, yielding, shuttle actuating movement of the picker stick. Fig. 3 is a similar view representing the position assumed by said parts toward the completion of the shuttle actuating throw of the picker stick. Fig. 4 is a side elevation representing Mr. Palmer's invention in its relation to the usual picker cam.

Letters of reference accompanying the illustrations indicate thus: *a* the picker stick, *b* the picker strap connected to arm *c* fast upon rock shaft *d*, from which extends picker roll *e*, contacting with the periphery of the picker cam *f*, fast upon the cam shaft *g*, to which motion is imparted in the usual manner.

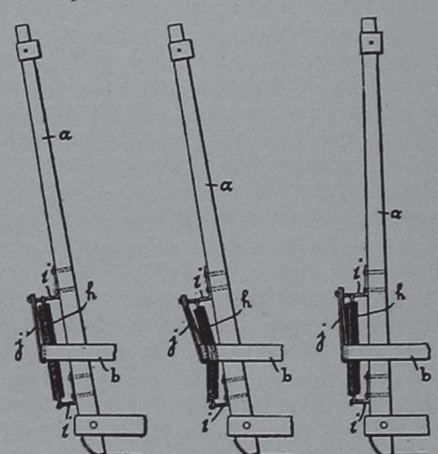


Fig. 1 *Fig. 2* *Fig. 3*

To produce the even, smooth, steady throw of the shuttle previously referred to, there is interposed between the picker stick and the picker cam a resilient or yielding member, to be preliminarily engaged by the picker strap *b*.

The same consists, by preference, in a coiled spring *h*, the ends whereof are connected to hooks *i* secured to the picker stick. A loop *j* supports the outer end of the picker strap *b*, to position the same properly with respect to the spring *h*.

Prior to the picker actuating movement of the picker cam, the parts assume the position represented in Fig. 1, wherein the spring *h* is in a normal or non-distorted condition.

When the picker cam *f* is operated, it draws upon the strap *b*, with the result that the spring *h* is distended, effecting in turn an initial yielding movement

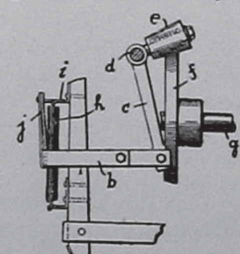


Fig. 4

of the picker stick, which moves gradually from its position of rest until the spring is fully distended, whereupon the full movement of the picker strap is conveyed to said picker stick *a*, which thereupon completes its movement.

It will be apparent that the tendency of the spring *h* is to return to its normal position. If, therefore, the periphery of the cam *f* have nicks, the picker stick is maintained in contact with the cam, owing to the straightening of the spring into the position shown in Fig. 3.

From explanations given, it will be seen that the spring *h* absorbs substantially all jar, so that a smooth and even pick results; the throw of the picker stick is rendered more snappy and the resiliency of the wood of the picker stick has not to be relied upon as heretofore.

The Heddle.

The same plays a most important item as to quantity and quality of poduction in the weave room. Using common wire heddles may be the cause of warp threads breaking during weaving, threads cutting the heddle eye; wire heddles may also be the cause of yarn chafing during weaving, with the result of an unsightly appearance of the face of the fabric, shuttle smashes, etc., all features minimized or overcome if using the Flat Steel Heddle.

The success of this heddle, as is manufactured by the Steel Heddle Mfg. Co., of Phila., has been demonstrated best in connection with its use in silk mills—mills which have to use a heddle under the most trying circumstances, and where in connection with the weaving of raw silk yarns as well as that of dyed silk yarns where a medium to strong silk is used, the flat steel heddle has supplanted the twine heddle; or in other words, what fifteen years ago was considered an impossibility—weaving silk by wire heddles—has been accomplished by this flat steel heddle. Certainly in connection with weak silk yarns, or such as are excessively weighted, the twine heddle is found still in use. In the same way as the flat steel heddle has become *the heddle* for the silk industry, it is forcing its way continually ahead of other heddles, in connection with our fancy cotton and worsted mills.

The flat steel heddle possesses five cardinal points in favor of its use compared to other heddles, *viz:*

It permits the greatest numb r of heddles per shaft in a given space to be used, giving the weaver in many instances, a chance to use less harnesses than when using other heddles; with the result of making work easier for the fixer.

The flat heddle is less liable to rust than wire heddles; if proper care is exercised, it will remain smooth under all conditions.

On account of its shape of construction, the flat steel heddle keeps its position in the harness and does not bind with joining heddles, a feature common to other heddles.

The flat heddle presents during its entire life, a perfectly smooth eye, with no chances for warp threads to get caught, the eye being one solid piece of cast steel. On account of its long wearing qualities, the flat steel heddle, although possibly somewhat more expensive at the start, will in the end prove the cheapest heddle to the management of any mill.

On account of its smoothness, and being perfectly flat, the heddle offers as we might say, no friction to the warp threads while passing through the harness.

In connection with cotton fabrics, as high as 40 heddles per inch can be used per harness shaft, permitting as high as 55 heddles to be used in connection with silks.

Each flat steel heddle is stamped at one of its ends with a spring which, when the heddle is on the rod of its harness frame, always comes against the smooth portion of the joining heddle; all heddles in turn are thus evenly spread apart throughout the entire width of the warp in the harness.

An important feature in connection with any heddle in a weave room is the taking care of the heddles while not in use, and when in connection with the flat steel heddle, proper care must be exercised. Never take these heddles off the rods on which they are furnished to the mills, *i. e.*, do not take them off the rods and handle them loosely. The heddles are sent to you on rods and must remain on rods when not in use in the loom. The transferring of heddles from the supply rods to the harness rods, or vice versa, must be done by pushing the heddles directly from one rod onto the other.

As will be readily understood, there are different sizes of flat steel heddles, gauged by the class of work intended to be done by the mill, high textured fabrics requring a finer heddle than mills running on low textured goods. Flat steel heddles are graded by numbers, such numbers indicating the fineness of the wire used in its manufacture; numbers 6 to 21 are standard numbers, and when, for example, by number 12 is meant a heddle made of wire 0.012" thick.

The number of heddles per inch to use on a harness frame regulates the kind, size or style of heddle to order, also whether a flat or an open eye heddle is required, no matter whether it refers to silk, cotton or worsted fabrics, the character of the material used, not playing an important item. This will explain that a flat steel heddle, used for lower grades of silk work, will answer for better grades of cotton fabrics, and so on.

When a heddle breaks in the loom, using wire heddles, the weaver has, as a rule, to rig up a temporary twine heddle; whereas in connection with the flat steel heddle, a repair heddle is provided and which is quickly attached by the weaver to the harness rods, taking the place of the broken heddle.

The flat steel heddle is also used in connection with Jacquard work, a special construction of a lingo being provided to facilitate its attachment to the heddle.

HARRIS TWEEDS—SCOTCH HOMESPUNS.

The home of these fabrics are the Outer Hebrides, located off the northwest coast of Scotland. Here, says Consul Blake in a report to the Department of Commerce etc., the crofters, living in rude huts of unhewn stone laid without mortar, frequently with no escape for the smoke but the open door, are altogether ignorant of and unable to understand the changed conditions of modern textile manufacturing, and being too poor to initiate the costly experiment of mechanical weaving in their scattered community, they struggle on persistently and eke out a meager existence by the old methods of hand loom weaving.

Stornoway, the nucleus of the homespun trade in Lewis, is a fishing village numbering about 300 inhabitants, 36 miles from Harris, the parent island from which the cloth takes its name. In Harris, there are approximately 600 families engaged in weaving homespuns, each family weaving on an average three to four pieces per year, 35 yards to the piece, and receiving for the finished cloth about 73 cents per yard, a family realizing for their year's communal work from $150 to $200. The total annual output of Harris and vicinity varies from $340,000 to $390,000.

Homespuns are especially adapted for open-air life and sporting purposes, in moist climates; their suitability being especially due to an innate elasticity of the cloth.

The elasticity of Harris tweeds was formerly greater than at present, arising from the curious fact that the more than 60 inches of annual rainfall in Harris necessitated the farmers smearing the backs of their lambs with a preparation of tar and grease to prevent the rot. This treatment incidentally proved to be very beneficial to the wool, and was recognized by the trade as *smudged wool,* and commanded an enhanced price. The practice of smudging, however, has now been discontinued as a stronger breed of sheep, capable of resisting the climate, has gradually been produced. There is, nevertheless, a large amount of natural grease yet retained in the wool and left in the woven fabric, with the result that genuine homespuns are actually more nearly rainproof than some cloth artificially submitted to the so-called *rainproofing* processes, as the homespuns resist the penetration of moisture naturally. Homespuns are nonconductors of heat as well, but, as already remarked, are more suitable to damp climates, as the openness of the fabric is less adapted to resist cold, penetrating, or chilling winds.

Another important quality of the genuine homespuns is that the cloth is either undyed, or when dyes are used they are almost invariably vegetable dyes which are permanently fast, resisting the most trying exposures.

Of all the classes of homespuns, probably the most famous is the Harris tweed, made on the island of Harris, in the Outer Hebrides, off the west coast of Scotland, but some of the tweeds known as *Harris* are made on the Isle of Lewis and also in the North Uist. All of these tweeds are legitimately designated as Harris tweeds, as they are made by almost identical methods and it is practically impossible even for an expert to differentiate between tweeds made on these islands. These homespuns are heavy of weight, and the natives being proficient in the use of dyes, the cloth is uniformly of various soft colors, such as browns, greens, drabs, or rich and harmonious blendings of these colors. It is a curious fact that very few of these islanders possess the secret of dyeing black, and gray is likewise an uncommon color in a real Harris tweed. These tweeds have generally, but not invariably, a questionably pleasant odor, with which anyone who has ever worn a Harris tweed will be instantly familiar, and which to a considerable extent comes from peat smoke or *peat reek*, as it is called, peat being the fuel universally burned on these islands. The dyes also contribute to the odor as well, particularly a lichen called *crottle,* which is very redolent.

Shetland homespuns, made in the Shetlands—the most northerly of the British Isles—largely owe their excellence to a small brown sheep of those islands, possessing a particularly fine wool. This wool is extensively used in the islands for making underclothing and shawls, all of which are hand spun and hand knit, and it is also used for weaving tweeds. Its texture is luxuriously soft, but is of considerably lighter weight than the Harris tweed, being more suitable for summer wear.

The Shetland islanders seldom use any dye, and their homespuns are generally made in the plain drab color which is natural to the sheep, or in browns, with a variegated design of the herring-bone patterns on simply plain brown and white wools.

In contradistinction to this ignorance of the art of dyeing among the people of the Shetlands, the inhabitants of the contiguous Fair Island, although not famous for any quality of cloth comparable to that made in either Harris or the Shetlands, possess a secret of dyeing an indescribably rich crimson, recalling associations of the early Spanish dyers. It is historically known that one of the galleons of the Spanish Armada was wrecked on this island, and it is probably correct to assume that this crimson is the reminiscence of an art taught the islanders by the Spaniards. All that is known regarding the process is that the body of the dye is ox blood and its components, vegetable admixtures.

True homespuns are made from the wool clip of sheep reared in the same district. The first process in the manufacturing of the cloth is to tease the wool. After this preliminary treatment, it is usually dyed in an open kettle. The dyes used are generally vegetable, most of which are indigenous and can be obtained by the natives for the gathering. For instance, crottle, used to dye various shades of brown, is a rock moss or lichen. Roots of iris, heather tips, and various other plants are also utilized. These dyes are as fast as indigo, and although the process of dyeing in the large pot in the open air may appear primitive, the results obtained cannot be criticised, the colors being rich with a bloom which impregnates and endures.

After having been dyed, the wool is carded, after which it is ready to be spun on the old-fashioned spinning wheel. The process of carding and spinning by hand is exceedingly tedious. The women and children will spend weeks of their time in preparing enough wool to make one single piece of cloth. In the same way weaving is done by hand-looms, some of the cottagers possessing their own looms. Weaving in Harris is usually the work of women, but in Ireland and the Shetlands invariably that of men.

In most of the hand-loom districts, the cloth when finished, is simply cleaned and scoured and then left in a running stream, afterwards to be dried in the open air; but in Harris it is *waulked, i. e.,* fulled. Six or eight women, required for this process, assemble together, and spreading a piece of cloth between them on a prepared board surface, ribbed in shallow grooves, it is pulled from side to side, a few yards at a time, until the whole piece has been thoroughly *waulked* or plenteously wetted with soap and water. Handling the cloth in this way reduces it from about 32 inches in width to 28 inches. Finally it is left to soak clean in a running stream.

The cloth is now brought in from the scattered and remote places of production and disposed of to the various small provision dealers, and it is from these petty intermediaries that the traveling agents of the jobbers collect it for shipment to London and elsewhere.

Efforts are made of selling in the island machine-made and adulterated yarns in substitution for the durable hand-spun yarn, heretofore the really unique feature of the Harris tweed, with the result that the weaver, finding himself able to purchase this yarn—the same to all appearance as the hand-spun article with which he is familiar—at a considerably less cost than he is able to laboriously produce it by his old method, is often tempted to surreptitiously introduce this machine-made yarn for the filling of the fabric, as he is yet honest enough to realize that it does not possess sufficient strength for the warp for a sound cloth. When this substitution has been made in this way, it is utterly impossible of detection by any other means than the wear.

Fortunately, however, the remoteness of many of the weavers from the places where this machine yarn can be procured, as well as the restrictive cost of its distribution, coupled with the parochial disinclination of the crofter to bestir himself for its purchase, the strength of rural custom and suspicion of innovations have all partly helped to save the industry from any further corrupting influences, but unless something is soon done to educate the weaver against its use, or to prevent its sale among them, it is bound to be only a question of time until this adulterated yarn will become more generally used.

It is needless to revive the recent controversy as to whether or not a real Harris tweed may be accepted as satisfactory from a sanitary point of view, an objection to this cloth which the imitators have very sedulously employed. Undoubtedly a certain amount of primitive dirt is not unlikely to adhere to the yarn and does actually become woven in the cloth. That, however, is distinctive of the processes of all hand weaving. But the contention that anything of a contaminating nature results is dismissed as untenable by disinterested authority. The waulking, soaking, and open-air drying of the finished cloth, is apparently sufficient to thoroughly cleanse the cloth of all impurities it may have been exposed to during the different stages of its production.

It is worthy to remark before concluding that Ireland produces many fine homespuns, perhaps the most famous being the Donegal. These homespuns possess both individuality and style. The products of this industry, however, have been protected from wholesale imitation from the fact that a certain amount of colored yarn is used in weaving the cloth, which results in bright, irregular flecks of crimson, green, brown, blue, and other such colors, and though the body of the cloth is a plain drab or gray, or the natural color of the sheep, at least one-half of the wool is colored, producing an irregularity of effect which has so far defied mechanical imitation.

Other varieties of Irish homespuns are the Connemara, often characterized by bizarre stripes and solid or bright colors, and the Kenmare and Kerry tweeds, famous for fishing and mountaineering.

An Improvement To Latch Neddles.

The object of the improvement is to prevent the loosening of the rivet in latch neddles; the latch being hung for this purpose to the slotted shank of the neddle, thereby preventing the cutting or tearing of the knitting yarn by the projecting end or ends of the rivet.

The construction of the new neddle is readily seen by consulting the accompanying four illustrations, of which Fig. 1 is a vertical sectional view of the upper portion of the new latch neddle. Fig. 2 is a horizontal section on the line *a-a*, Fig. 1.

Figs. 3 and 4 are vertical sectional views, illustrating other embodiments of the improvement.

A description of the construction of the new latch neddle is best given by quoting numerals of reference accompanying our illustrations, and of which 1 represents the shank of the neddle; 2 is the ordinary latch which is free to swing in a central slot 3 formed in the neddle shank, the latch being pivoted to the neddle by means of a rivet 4 passing through openings in the walls of the slot and through an opening at the butt end of the latch, the ends of this rivet being swaged or expanded so that it serves not only as a pivot for the latch, but also, under normal working conditions, to retain in place the walls of the slot.

In the operation of the machine, however, lateral pressure is sometimes exerted upon the projecting portion of the latch, as by knots or enlargements upon the knitting yarn, which causes the walls of the slot to spread and thereby stretch or loosen the rivet, so that the latter projects, at one or both ends, beyond said walls when the latter assume their normal posi-

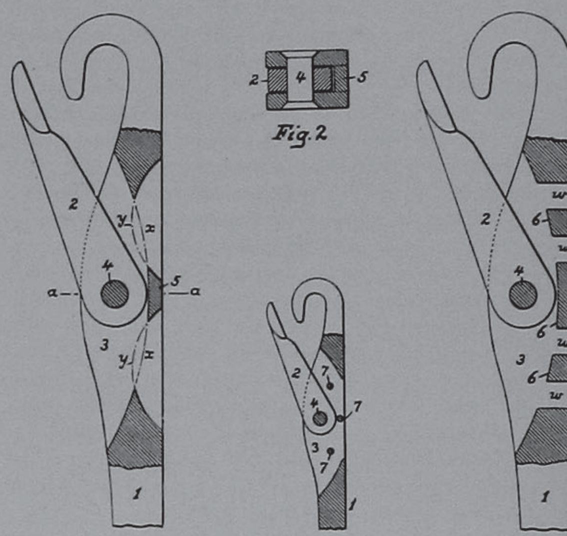


Fig. 1 Fig. 4 Fig. 3

tion. Such projecting portions of the rivet, as will be readily understood, have a cutting or tearing effect upon the knitting yarn.

The slot for the reception of the latch must extend completely through the shank of the neddle, to provide clearance for the particles of lint which enter the slot and which, in the absence of such clearance, would accumulate in the slot and in time interfere with the proper operation of the latch. Ordinarily, therefore, the slot is formed in the neddle shank by means of a saw or like cutting tool, forming a kerf extending completely through the shank.

In carrying out the improvement, a kerf is formed in the front of the shank, but which kerf does not extend completely through said shank as is indicated by the dotted lines *x-x* in Fig. 1. In order to provide the proper clearance, the kerfs are formed in the back of the shank, as indicated by the dotted lines *y-y* in Fig. 1, said kerfs being of such size and so located as to leave a body of metal 5 located in the slot at the back of the same, immediately behind the pivot end of the latch. This body of metal constitutes a bridge integral with the side walls of the slot, serving to prevent lateral deflection of said side walls by any pressure thereupon, such as may be caused by the strain exerted upon the outer projecting portion of the latch, the rivet being thereby relieved from any strain which would loosen the same or cause its ends to project beyond the sides of the neddle.

Instead of forming in the back of the slotted portion of the neddle shank, upper and lower saw kerfs, such as shown at *y-y* in Fig. 1, a series of openings may be formed through the body of metal at the back of the slot, as indicated at *w-w* in Fig. 3, so as to provide a plurality of bridges 6 connecting the side walls of the slot, said openings being so located that one of the bridges will be directly in the rear of the pivoted end of the latch.

Instead of providing a bridge or bridges integral with the side walls of the slot, said bridge or bridges may be separate from said side walls but secured in place between the same by soldering, brazing, welding, or riveting. Fig. 4 illustrates a needle having three of such bridges 7, one located directly in the rear of the pivot end of the latch, one above and one below the same. If desired, the bridges shown in Figs. 1 and 3 may be secured in like manner, although, as the constructions there shown lend themselves to the cheap and ready production of integral bridges, the latter are much to be preferred.

Lace Pattern Mechanism for Straight Knitting Machines.

The new mechanism is designed more particularly to be used in combination with a Jacquard apparatus for rapidly producing open work patterns in connection with the Jacquard Lace Hosiery Machines as built by Shubert & Salzer, the prominent builders of Full Fashioned Hosiery Machinery of Chemnitz, Germany, and of which concern Mr. Otto Walther is the American representative.

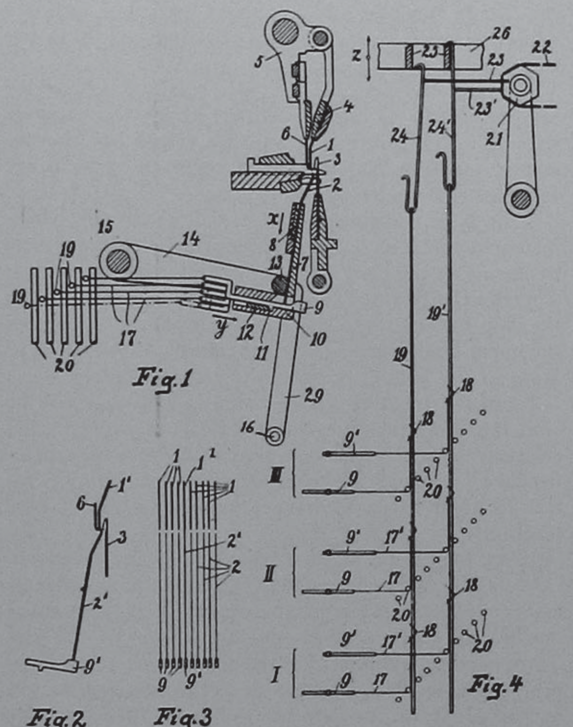
To clearly explain the construction and operation of the new mechanism, the accompanying four illustrations are given, of which Fig. 1 is a vertical section through those parts of the machine which come into consideration in the present case. Fig. 2 shows the needles at a different moment of the operation than represented by Fig. 1. Fig. 3 is a front view of Fig. 1. Fig. 4 is a view on an enlarged scale indicating single divisions of a straight bar knitting frame.

In Figs. 1 to 3 of the illustrations, 1 represents the point-shifting or lace needles, 2 the stop needles, 3 the frame needles, 4 the tickler, 5 the fashioning or narrowing attachment and 6 the narrowing needles; the latter are situated behind the lace needles 1 and do not contact with the frame needles 3 during the operation of the lace needles 1, but moreover move into operating position solely when a narrowing of the fabric is to take place.

Fig. 1 shows the movable stop needle 2 in the position in which it does not touch the lace needle 1.

The stop needles 2 are arranged in the needle bar 7 adapted to be moved singly. The bar 8, which is equal in length to the breadth of a division, is adapted to be moved up and down in the stop needle bar 7 and is forced downward in the direction of the arrow *x* by means of a spring (not shown in the illustration). Consequently if some or a great number of the stop needles 2 are moved upward, said bar 8 also is raised. However, when the force which lifted the needles 2 ceases to act, these needles are automatically returned by the bar 8.

The selecting jacks 9 are singly movable in the selecting jack bar 10 and are so arranged therein that the bottom end of each stop needle 2 touches the top edge of one jack 9. The stop needle bar 7 and the selecting jack bar 10 are integral with and arranged at right angles to each other. A projection 11 is provided on each jack 9, against which the restoring bar 12 abuts; the latter also is removed in the direction of the arrow *y* by means of springs, and serves to return the selecting jacks to their initial position.



The stop needle bar 7 is rigidly attached to the shaft 13, journaled in the ends of the levers 14. These levers 14 are pivoted to the fixed shaft 15 on which they oscillate. Also fixed to said stop needle bar 7 is a rod 29, to the lower end of which a pin 16 is fixed, adapted to be moved to and fro (by means not shown in the drawings). Consequently this arrangement enables the bar 7 to swing up and down about the shaft 15, and to and fro about the shaft 13.

Connected to the wires 19, at 18 in Fig. 4, are the selecting jacks 9, said wires 19 being movable between the guide-pins 20. I, II, III, etc., indicate the single divisions of a straight bar knitting frame, and in order to avoid confusion in the drawing and for the sake of better understanding, only two selecting jacks 9 with their accessories are shown. However, in reality, in each division there are as many selecting jacks as frame needles and they are arranged as close to one another as said frame needles.

In Fig. 4 is also shown the jacquard-card cylinder, adapted to be moved up and down for the purpose of shifting the perforated jacquard-card 22 controlling the jacquard-needles 23; the latter act upon the corresponding lifting wires 24 in the same manner as in the well known jacquard-machines.

The lifter-knives 25 of the jacquard-apparatus are fixed in the frame 26 and are adapted to be moved in the direction of the arrow *z*.

The wires 19 arranged between the guide-pins 20 are connected to the lifting wires 24.

In each division the knitting machine has so many lace needles 1, stop needles 2, jacks 9 and cords 17, as there are frame needles 3 in each division. However, the whole machine only contains so many primary actuating wires 19 as there are selecting jacks 9 in one division.

In each division I, II, III, etc., a jack 9 is provided and connected by means of part 18 to the common wire 19^1. Therefore if a knitting frame has, for instance, eighteen divisions, then eighteen jacks 9 are fastened to the wire 19^1.

Fig. 2, as a supplement to Fig. 1, shows the selecting jacks and needles at the moment when the jack 9 by means of the cord 17 is drawn into the position 9^1. Thereby the elevated head-end of the jack has shifted the stop needle 2 into the elevated position 2^1, so that the upper hook-shaped end of the needle 2^1 is located in front of the bottom point of the lace needle 1.

From the front view illustrated in Fig. 3 it will be seen that only this one stop needle 2^1 is lifted by the selecting jack 9^1 and has moved in front of the point needle 1^1, while all the other selecting jacks not operative by their cords 17 have remained in their initial position.

THE OPERATION IS AS FOLLOWS: If the jacquard-card 22, Fig. 4, is continually fed on by the cylinder 21 and moved against the jacquard-needles 23, then those needles 23 which meet or engage a hole of the jacquard-card 22 remain in their position of rest; however, those needles 23^1 which do not meet any hole, are carried along by the card 22, and with their opposite end force the lifting wire 24^1 against the knife 25. In consequence thereof the lifting wire 24^1 on the movement of the frame 26 is seized by the knife 25 and drawn into the position shown in Fig. 4. During this movement the wire 19^1 connected to 24^1 also is drawn along. This wire 19^1 pulls the selecting jacks 9^1, attached to it by means of the parts 18 and cords 17^1, backward; thereby the restoring bar 12 is moved rearwardly, and the stop needles 2^1 are lifted on the sloping part of the selecting jacks 9^1 also carrying the bar 8 along with them, Fig. 2. The single jacquard attachment 22, 23, 24, 25, 26 controls the selecting jacks and needles of all the divisions I, II, III, etc. Now when the stop needle bar 7 and the selecting jack bar 10, Fig. 1, receive the corresponding operating movements all those lace needles 1^1, Figs. 2 and 3, are kept back during the covering of the narrowing machine 5 which is situated above the stop needles 2^1 when elevated. The lace needles 1^1 kept back, cannot take up the loop from the corresponding frame needle 3, and only the lace needles 1 remaining free, are able to take up a loop.

An Ingenious Hosiery-Turner.

Turning stockings must be done with great rapidity and economy. This is accomplished in the new turner by reason of the fact that a free turning rod is always presented ready for the operator to insert another stocking thereon, also that the stockings are discharged automatically, the only manual work required to be done by the operator being that of merely inserting, and at the same time turning the stocking in the new hosiery-turner.

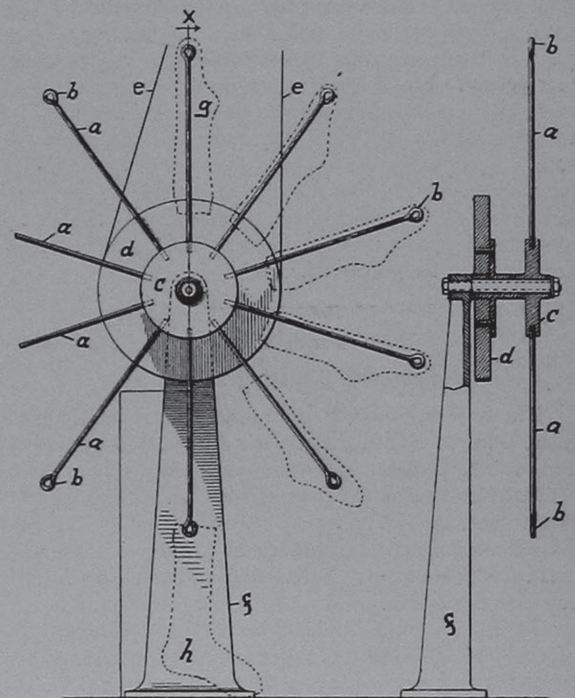


Fig. 1 Fig. 2

In the new hosiery-turner, a series of rotatable, radially arranged turning rods are provided for the insertion of the hosiery when the respective rod is in its upright position, the hosiery in turn dropping from the rods when the same approach their downward position.

Of the accompanying two illustrations, Fig. 1 is an elevation of this hosiery-turner, and Fig. 2 a section on the line *x-x* of Fig. 1.

Examining our illustration, we find ten radial rods *a* provided, the same being provided at their outer ends with eyes *b* to facilitate the turning operation. These rods are secured at the inner ends to a rotatable disk *c* which is driven by means of a pulley *d* to which the disk is connected, and which is driven by means of the belt *e*. Pulley and disk are rotatably mounted in the upper end of support *f*.

In operation, the operator stands in front of the machine, and after inserting the toe of the stocking *g* (see Fig. 1) through the loop of the uppermost turning rod, draws the stocking downwardly upon this rod and thereby turns the same. By the time this operation is completed, the next rod has reached, or is approaching, its uppermost position, whereupon another stocking is put through the same operation. This operation continues without interruption, inasmuch as the turning rods are successively presented, and the stockings automatically drop from the rods when the same reach or approach their downward position, Fig. 1 showing a stocking *h* discharged from the lowermost turning rod.

COTTON SPINNING.

The Ring Frame.

(Continued from page 119.)

THE McMULLAN SPINDLE is the spindle of the Saco & Pettee Machine Shops, and its distinguishing features are an extreme length between bearings and a locked step held loosely within the loose bolster, which is itself loose and locked in the outer case, and it drives the bobbin without a cup. The extra length of spindle below its main bearing serves to keep the spindle erect, without impairing the essential movements of bearings while running at a high speed. One of the best features of this spindle is its loose locked step, wholly inside the bearing tube, which is itself loose, and locked in the outer case. The benefit of this extra element is in the possibility of having the shank of the spindle blade made considerably longer than in any other form of modern spindle; this extra length of spindle below its main bearing serves to keep the spindle erect, without impairing the essential movements of the bearings while running at high speed.

In the construction, the upper bearing is made with a very slight taper, just enough to cause a tendency for the oil to remain on the bearing and not to rise to the top in sufficient quantities to be thrown off. The taper of the bearing is so slight that it is impossible for the band, however tight, to raise the spindle from its step, thus causing bad yarn. The conical shape of the sleeve above the whirl, which serves as a bobbin cup, is noteworthy. Because of this shape, the bobbin placed upon it has a tendency to be drawn down by centrifugal force as it revolves, in the same manner as a belt seeks the highest part of a pulley. The device insures the firm seating and retention in place of bobbins, hence less chance for breaking the yarn.

It will be noticed that there are no means provided, in any of these spindles explained, for emptying the oil when it becomes dirty and thick from use, without pumping it out. A feature of many English makes of spindles for this purpose is a cup attached below the spindle base, which contains the oil, and which is sprung or screwed to the base of the spindle. These cups can be removed, thus forming ready means for removing this deteriorated oil. Platt Brothers have improved the Whitin spindle by providing a sloping oil bath, so that the dirty oil can be pumped out immediately under the footstep bearing without removing the spindle.

As a matter of interest, a table of the weights of the standard sizes and types of spindles for cotton yarns is here given, compiled from manufacturers' data;

STANDARD WEIGHT OF MODERN HIGH SPEED SPINDLES.

Name of Spindle.	*Weight of Spindle, Complete.*	
Draper No. 4	22	oz.
Draper No. 3	22½	"
Draper No. 2	16¼	"
Draper No. 1	16¾	"
Rabbeth 49 D, short wind	16	"
Rabbeth 49 D, long wind	16¼	"
Whitin Gravity, standard	14¼	"
Whitin Gravity, medium	19	"
Whitin Gravity, large	25	"
McMullan	17½	"

Setting Spindles.—A large proportion of spindles are improperly set in erecting the spinning frame; the machine erectors sometimes may run the ring rail half way up and set the spindles in the centre. This is not

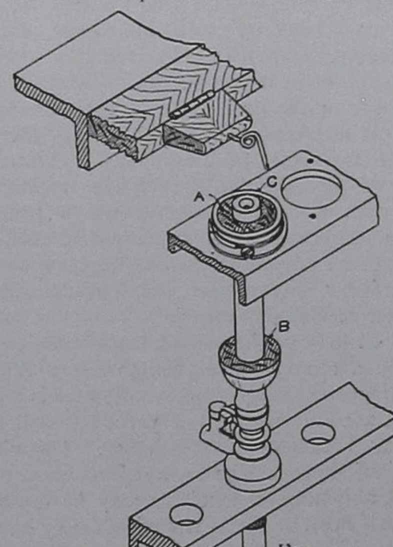


FIG. 274

the proper way. The spindles should first be set when the ring rail is near the bottom, the rail should then be run to the top, and if the spindle is then not in the centre of the ring, it is proof that it is not plumb, and it should be papered up. After this the rail should be again run down to see if the spindles are still in the centre, if not, they must be again adjusted. In some makes, the holes in the spindle rail are made $\frac{1}{16}$ inch larger than the stem of the base, allow a little room for adjusting spindles, so that it will not be necessary to depend on the ring holder altogether.

The spindles may be sometimes tipped too much, so as to bring them concentric with the centre of the ring. This is wrong, as it many times throws the spindles out of plumb. Adjustments as far as possible should be confined to the rings. Spindle whirls should be exact in diameter, distance from their centre to centre of cylinder shaft alike for every spindle, thus making it practicable to use bands that are marked, and assuring an even tension or pull on the band when knots are tied on the mark, thus avoiding undue wear and saving power.

Spindles should be reset as soon as they begin to show the effects of running. For testing the concen-