

Details of Manufacture of Spun Silk Yarns*

Preparation of Yarns for Weaving and Knitting Mills—Conditioning

By J. W. HOLLAS

SILK loses about 1½ per cent. from the spreading to the roving. The lap is taken from the relapping machine, previously described, and put up at the feeder of the gill sett frame. The tail end of the lap is put up first, for if this is not done the silk will be drawn twice the same way. In order to get an even sliver the silk should be drawn

side tight, the other side slack, causing a lot of snarls and variations in the weight of the sliver at the finishing head.

It is also highly essential that the machine be not overloaded. The writer prefers to run on the light side. With the double thread screws and patent disc cams that are made in the United



DRAWING SILK PREPARATORY TO SPINNING

States, and the machines properly set, they can be run at high speed, allowing a lighter sliver in the machine, also getting more weight through than with the single screw. Roving tubes or bobbins should be enameled so that the oil will not soak through, for if a single roving is run on a plain bobbin the silk will draw the oil out of the wood,

one way on one machine, and the other way on the next machine. If the silk is drafted the same way on two successive machines it is likely to be thick or thin, with too much draft. In joining one lap to another, care should be taken that the ends be kept straight so that all the material will go smoothly into the pins with none of the fiber riding on the pin tops as this tends to make nibs and loose short silk, which is difficult to get out. The lap fed into the sett frame is commonly given a draft of 12, and the material is delivered in the form of sliver.

DRAWING FRAMES

The slivers, which have been run into round sliver cans, are taken from the sett frames and 12 ends are put up at the back of the drawing head, where a 12½ draft may be given. It is advisable to give four drawing operations and then reduce the number of ends at the finishing head to get the proper weight of sliver for the roving frame.

The finishing head is usually a porcupine drawing head and may have four or eight deliveries according to the weight of sliver required for roving frames. The porcupine drawing head manipulates a large quantity of material, and the small draft roller will run well at 600 r.p.m. All the pins and surfaces the silk comes in contact with, should be polished and smooth so as to prevent the fiber from catching on rough places. If the silk has not had all the grease taken out during the early operations trouble will be caused during this process. The slivers, which should be straight, will come out raggy, one

causing stained yarn. The oil is generally on one side of the roving, and when the roving is spun into singles, then woven into a piece, it has a dark speckled appearance, full of brown dots.

Particular attention should be paid to have the top press rollers smooth and true, for if they contain hollow places the roving will be poor, or if there is a

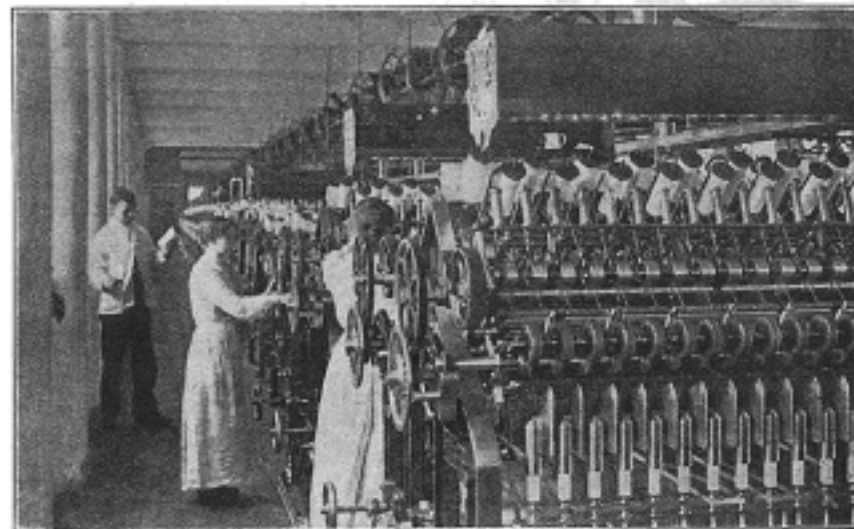
flat place on them there will be a lump on the roving every time the flat place in the roller comes on to the draft roller. If the roving is made too hard twist there will be a lot of bad rollers in the spinning. A large diameter bottom draft roller in the spinning will need more twist in the roving. A small diameter draft roller, about 1 or 1¼ inches, will need a very soft twist roving.

PARTICULARS OF SPINNING FRAME

A spinning frame with a small bottom draft roller will make a more evenly spun yarn than a frame with a large diameter draft roller. Yarn spun on a small diameter draft roller with a suitable draft will have a better feel and be more like a mule spun yarn, and when woven into a piece will make a fuller cloth. The most suitable drafts for spinning silk are from 10 to 15; if the draft exceeds 15 the yarn deteriorates in quality. By putting a finer hank roving in the spinning frame and running with a suitable draft, much more satisfactory results will be obtained.

Taken all round, a spinning frame with the spindles driven by tapes and with tension pulleys, is the more suitable equipment, preventing slack twist. The writer has found it better to increase the speed of the main shaft or motor than to run the main shaft at low speed and have large diameter cylinders, besides saving power. The thread guides should be directly over the top of the spindle, so that the thread will fly evenly, before lapping on the bobbin.

If the yarn is to be singles, it is wound on cops ready for the loom. If for two or three-ply yarn the spinning bobbins are taken to the winding frame where the ends are doubled. The thread from 8 to 12 spinning bobbins can be wound on one winding bobbin, and it will be found that this process saves a lot of waste, and more spindles can be kept running on the twisting frame than if twisting direct from the spinning bobbin. Care should be taken in tying the ends, using a weaver's knot with no long ends hanging which must be trimmed off when sorting. The twisting frame spindles run in the opposite direction to the spinning spindles, so if spinning to the left, the two-ply is twisted to the right.



SPINNING ON CAP SPINNING FRAMES

GASSING OR CLEARING

The yarn is taken from the twisting frame to the gassing or clearing frame. As stated previously, silk that is not clean enough for a single yarn can be made into a two-ply yarn so any nibs or ooziness in the thread will be taken off in the gassing. The package is put in the gassing frame creel, then

*Continued from issue of Sept. 2.

the thread lapped around the runners on the bar. The writer has had better success with porcelain runners, as steel runners get too dry and cause ends to break. The thread is then passed through the gas flame, which burns off the nibs. The friction caused by the thread running around the runners loosens the nibs and noils, and the gas flame burns all these loose particles from the yarn. After the yarn has been passed through the flame it is given a few more turns around the runners to polish it, and then wound on a bobbin. Usually a two-ply yarn requires about four passes on the gassing frame, but lower qualities require more.

A heavy count of yarn will stand more runners or friction than a fine count. The operator must be impressed with the importance of giving all the ends the same number of laps around the runners, otherwise the work will look nibby and dirty in some places, while in other places it will look clean.

It is a good plan to have the gassing bobbins painted different colors on the ends to determine the number of the pass or operation: for example, first pass, plain bobbins; second pass, blue ends; third pass, red ends; fourth pass, white ends. If any bobbin goes astray the color of the bobbin end determines which pass or lot it belongs to.

Yarn will lose from 4 to 8 per cent., in gassing, according to quality, so that a thicker count must be spun to allow for loss. Take a 2-60s composed of two ends of 120s twisted together. This yarn would be spun to 114s. Twisting two ends would give $114 \div 2 = 2-57s$ counts. This when gassed and washed would be about 2-60s. When gassing, the thread is stretched very tight, and when wrapping to take the size of yarn from a gassing bobbin, allow 5 per cent. for the stretch, for when the yarn is washed and conditioned again it will shrink 5 per cent.

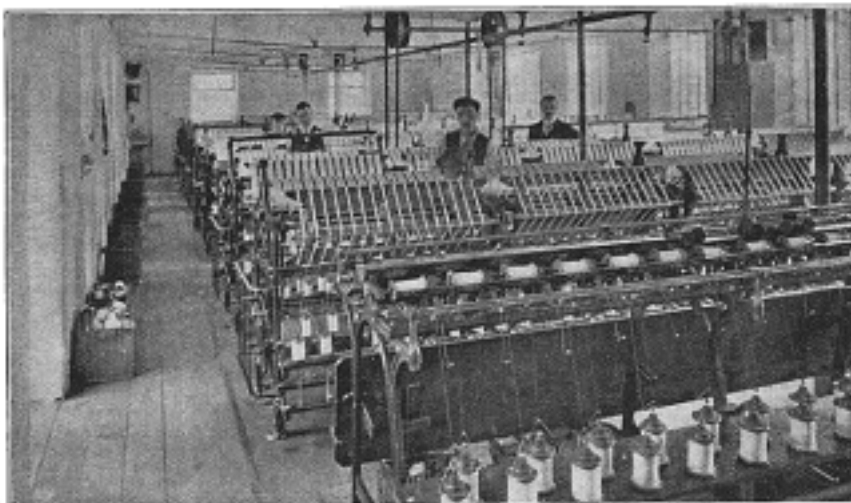
REELING THE YARN

The gassing bobbins are taken to the reel, which winds the thread into skeins or hanks. The reel has a catch arrangement, and when 840 yards have been wound it stops, so that in each skein

skeins are tied together to form a knot and ten of these knots weigh one pound. One hundred knots weigh ten pounds, making a bundle of yarn. In reeling 42s counts there would be 42 skeins of 840 yards to one pound. Three skeins would be tied together to make one knot, and 14 knots would equal one

deep, with ends made high enough to hold a square roller, and a notch at the top of the ends high enough so that when the yarn is put on the roller the silk just clears the water.

When the roller is full of yarn, lift it into a notch about 6 inches lower. This will let the silk hang in the water. Now



DOUBLING, TWISTING AND REELING SPUN SILK

pound; or 140 knots would make a bundle. If ten-pound bundles are arranged in this way for different counts, the counts can easily be determined by counting the knots in the bundle, and as a ticket is sometimes lost this is very useful.

The yarn from the reel is examined or sorted by operators, and all bad ends, irregular twist, corkscrew yarn, etc., picked out. If a mill has reliable and experienced help, there will be very little irregular yarn or bad ends, and if the drafts and other matters have received proper attention there will be little trouble. After sorting the yarn is ready for washing or dyeing.

WASHING YARN

When washing yarn the most common method is to fill a tank with water, adding soap, heating the water and then putting the yarn on wooden poles, working it back and forth, then taking

turn the handle forward a few times, and then backward a few times until the yarn has had a good wetting. Then lift the square roller into the top notch again, take the yarn off, place in a hydro-extractor, run a few minutes, then place in yarn drying machine or hang up in dry house. The yarn is then

taken to the shaking out pole. This is a pole with stout wooden arms extending and made very smooth. The yarn is placed on these arms, then one knot at a time is taken and shaken out by taking another short, round piece of roller about 14 inches long, putting it through the yarn and giving a few pulls and shakes. It is surprising the amount of dust this will shake out of the yarn, and this also serves to open up the twist leaving it nice and soft, ready for the conditioning room. Yarn shaken out, as described above, saves a lot of dust from accumulating in the equipment used in weaving and knitting.

CONDITIONING YARN

After the yarn is thoroughly dry it is put in the conditioning room and allowed to take up about 11 per cent. of moisture. Anything above 11 per cent. is excess moisture. If silk is allowed to take up natural moisture the appearance of the yarn is improved, giving a better lustre than if damped down.

If the yarn is to be sold in the hank or skein it is made into ten-pound bundles, as described above. The hanks are placed in a bundling press, then pressed very tightly, tied up with twine and made into neat bundles for shipment. If the yarn is to be used for warping it is taken to the hank winding machine and rewound on to warping bobbins. These bobbins are then placed in a creel, and the yarn run on a warping frame to make the necessary number of ends and length for the loom.



GASSING AND CLEARING SPUN SILK YARN

there are 840 yards. Whatever counts are being reeled there will be that number of skeins, each of 840 yards to the pound. For example, if 2-50s is being reeled, there will be 50 skeins of 840 yards each to one pound.

The operator, after 840 yards of 2-50s has been wound and the reel has knocked off, ties the ends so that they can easily be found again and then threads tie yarn through two other places in the skein. This keeps the thread in the skein straight, and it is easy to find the center of the skein. When the tie yarn has been put in five

off and putting in a hydro-extractor, and from there putting into a drying machine. This method often causes a lot of tangled yarn, which is hard to re-wind on bobbins. The writer has found the following method to give the best results: Have an iron tub in which to prepare the liquor, fill this tub nearly full of water, add one pound of good quality soap, also two pounds of good olive oil soap, as this is good for the silk at this stage. Boil the water by blowing steam into it, until all the soap is dissolved. Then run the water into a V-shaped trough, about 14 inches