1961

The Bobbin and Beaker Vol. 18 No. 2

Clemson University

Follow this and additional works at: https://tigerprints.clemson.edu/spec_bobbin

Materials in this collection may be protected by copyright law (Title 17, U.S. code). Use of these materials beyond the exceptions provided for in the Fair Use and Educational Use clauses of the U.S. Copyright Law may violate federal law.

For additional rights information, please contact Kirstin O'Keefe (kokeefe [at] clemson [dot] edu)

For additional information about the collections, please contact the Special Collections and Archives by phone at 864.656.3031 or via email at cuscl [at] clemson [dot] edu

Recommended Citation
University, Clemson, "The Bobbin and Beaker Vol. 18 No. 2" (1961). Bobbin and Beaker. 193.
https://tigerprints.clemson.edu/spec_bobbin/193

This Book is brought to you for free and open access by the Engineering, Computing and Applied Sciences, College of at TigerPrints. It has been accepted for inclusion in Bobbin and Beaker by an authorized administrator of TigerPrints. For more information, please contact kokeefe@clemson.edu.
An extensive survey of more than 25 installations proves that savings in steam and power costs alone permit a dye-house with a weekly production of 50,000 pounds or more to amortize the entire CAPITAL INVESTMENT of a Gaston County-Avesta static pressure, rapid dryer in less than 5 years.

Low labor costs, smaller yarn inventory, better yarn quality and better customer service are a few of the many additional advantages of this type of drying.

If "super-speed" drying is not required by your operation we build fast dryers without static pressure which will meet your requirements.

Our experienced sales engineers will be glad to discuss your drying problems with you at your convenience.
THE

Bobbin & Beaker

Official Student Publication
Clemson Textile School

VOL. 18 WINTER ISSUE 1961 NO. 2

The Staff

Editor
Tommy Ariail
Sevierville, Tenn.

Managing Editor
Robert Wall
Charleston Heights, S. C.

Business Manager
Harral Young
Sumter, S. C.

Advertising Manager
David Rodgers
Georgetown, S. C.

Circulation Manager
Lewis Kay
Ware Shoals, S. C.

Ass’t. Business Manager
Norman Guthrie
Charlotte, N. C.

Ass’t. Advertising Manager
Charlie Hagood
Easley, S. C.

Ass’t Circulation Manager
Crawford Love
Spartanburg, S. C.

Designer
Kemp Mooney
Columbia, S. C.

Faculty Advisor
D. P. Thomson
Associate Professor of Textiles
Gaston Gage
Dean

In This Issue

From the Editor ........... 5
Deering-Milliken Research Center ........... 6
Have You Changed Your Address Recently ..... 9
The Dean Say ........... 10
Outstanding Seniors ........... 11
The Draper Shuttleless Loom ........... 14
Maxbo Shuttleless Loom ........... 14
The Importance of Temperature Controls in Sizing ........... 16

THE BOBBIN & BEAKER. Organized in November, 1939, by Iota Chapter of Phi Psi Fraternity, and published and distributed without charge four times during the school year by students of the Clemson College School of Textiles. All rights reserved.

Address: The Bobbin and Beaker, School of Textiles, Clemson College, Clemson, South Carolina.

POLICY —
The views and opinions expressed in all guest articles are those of the writers themselves, and must not be construed to necessarily represent the views and opinions of the Editors of this magazine or of the Faculty of the Clemson College School of Textiles. No article in BOBBIN & BEAKER, or any part thereof shall be reproduced in any form without permission of the editor. Requests may be forwarded to Editor, THE BOBBIN & BEAKER, School of Textiles, Clemson, South Carolina.

THE BOBBIN & BEAKER is a non-profit magazine organized to serve Clemson students and the textile industry. We ask our readers to consider favorably our advertisers when buying.
There are many roads to success:

production

administration

research and development

sales

CONE MILLS offers you unlimited career opportunities in the field of your choice. If you have ability, imagination and initiative, we have an interest in you. We want you to share our enthusiasm for the future. For at CONE, the most important asset is people.

CONE MILLS CORPORATION

“Where fabrics of tomorrow are woven today.”

EXECUTIVE OFFICES: Greensboro, N. C.
SALES HEADQUARTERS: Cone Mills, Inc., 1440 Broadway, New York, N. Y
FINISHING DIVISION: Executive Offices, Greenville, S. C.
Continuing our theme of research in this issue, we feature the Deering-Milliken Research Center. Also of interest in the research and production field are the informative articles on the Maxbo and Draper Shutterless looms.

The article on Warp Sizing is also of special interest.
Deering Milliken Research Center

A century ago, the Industrial Revolution changed man's concepts of production and marketing for all time. Through the ages he had been creeping toward new economic and technological horizons, but, suddenly, he took a giant step forward—and his strides have continued to lengthen.

Today, what could be called the Research Revolution is taking place. The discovery and perfection of new ways to do new things with new products has been found to be the axis around which all progress revolves. New products, new processes, new markets in all fields are the key to both economic and physical survival in today's highly competitive business environment.

The textile industry, the first to take full advantage of the advent of the machine age, was slower in jumping onto the band wagon of research. An industry which had been undergoing dynamic change, textiles had been forced to devote its energies to adjusting to new concepts of marketing, production and pricing.

Today, however, the industry is making rapid strides in research and leading it is the Deering Milliken Research Corporation at Spartanburg, S. C., the largest and most comprehensive operation of its type in the industry.

Founded in 1945 as the Deering Milliken Research Trust, the research group's first home was a small brick bungalow on the banks of the Seneca River, just across from the Clemson College campus. Employing a half dozen persons, its administrative offices were in the living room, a machine shop in a bedroom and a spinning laboratory in the kitchen.

After a few months in these makeshift quarters, the research group moved to the basement of the textile school building on the Clemson College campus, where it remained another year and a half.

The next move was to Stamford, Conn., where the research activities were centered until 1950. In that year, it was moved back to South Carolina and located at Pendleton, four miles from Clemson, until its multi-million dollar building was erected on the outskirts of Spartanburg in December, 1958.

In 1955, the organization became known as the Deering Milliken Research Corporation. The stock of the corporation is owned by 28 mills representing practically every phase of textile production.

The research carried out by the corporation is geared to the development of new products, processes and machinery for all aspects of the textile industry. The corporation's staff includes chemists, physicists, mechanical engineers, electronic engineers, chemical engineers, patent lawyers and a number of technicians.

An example of the breakthroughs accomplished by Deering Milliken Research scientists and engineers is the development of BELFAST self-ironing fabrics—the first and only successful attempt to impart permanent wash and wear qualities to cotton by an actual chemical modification of the fiber itself.

This significant development is as great an improvement over previous wash-and-wear cottons as was the introduction of resin finishes to give drip dry properties to this fiber.

BELFAST cottons have a wet-crease recovery characteristic which makes them the first of the wash and wear cottons able to be spin dried in a home laundry without having wrinkles set into them.

Since the processing of these fabrics involves an actual chemical change of the basic fiber, these properties remain for the life of the fabric—BELFAST fabrics are not the result of a finish which can wash out after repeated launderings.

Add to this the facts that BELFAST fabrics are not chlorine-retentive so that any type of bleach may be used without fear of yellowing; are permanently shrinkage controlled; are odor free; release dirt and soil more easily than other fabrics during washing, and have excellent dry crease resistance, and the importance of their development will be obvious.

The key to the processing of BELFAST fabrics is the chemical cross-linking of the microfibrils within each individual cotton fiber. This essentially provides elastic bonds which enable the fibers to snap back to their original shape while wet.

Similar strides have been made in the development of man-made fibers by the scientists and engineers of Deering Milliken Research with the perfection of the process for the production of AGILON edge-crumped yarns.

These textured yarns, usually produced from nylon or polyester filament yarns but theoretically adaptable to any thermoplastic filament, have entered the commercial market in a number of end-products. Already AGILON yarns are found in 60 per cent of the women's seamless stretch hose mar-
SEVEN

marketed today. They also can be found in such products as lingerie, sweaters and men’s hose. Heavy-denier AGILON yarns have been used in carpets and upholstery fabrics.

The product of a strictly mechanical process, AGILON yarns are produced by heating the filament yarn and passing it over a blade to form a series of coils. The process is basically similar to that used to produce a decorative gift wrapping by passing a ribbon over a scissors blade.

In the finer deniers, this process primarily gives filament yarns additional stretch properties while in the medium and heavy deniers it mainly imparts bulk.

In the mechanical field, Deering Milliken Research engineers have developed the full-frame automatic doffer which drastically reduces the down-time of spinning frames from that required for manual doffing.

The full-frame doffer picks up empty bobbins at a central loading station, moves overhead to the frame, lifts full bobbins of yarn from the frame simultaneously and replaces them with empty bobbins in another single motion.

The doffer then returns to the loading station where it deposits the full bobbins and picks up another load of empty ones, which are fed automatical-

ly to the station. The actual doffing operation is accomplished by pneumatically controlled rubber-lined graspers.

But not all work at Deering Milliken Research is as close to actual product development as BELFAST fabrics, AGILON yarns and the full-frame doffer—many of the projects undertaken are in terms of the most basic research which may lead through many paths before it reaches the product stage.

Taking part in this research are many scientists whose backgrounds are in the pure chemistry and physics fields, rather than in applied textile sciences.

These men are working with the “whys” and the “what happens” of textiles processing. Instead of dealing with yards of fabric and gallons of finishes they are concerned with what happens to the individual fibers—even down to the molecules and crystals within them—when they undergo various processes.

To make their studies as thorough as possible, they have some of the most modern analytical equipment available. This includes infrared, ultraviolet and visible light spectrophotometers, X-ray diffraction and fluorescence equipment, and electron microscope and many more basic analytical tools.

One of the laboratories at the Spartanburg Research Center is devoted to the development of elec-

ATLANTIC

“QUALITY-CONTROLLED”

DYESTUFFS

NEUTRAZOICS—Stabilized azoics for printing suitable for flash-acid ageing.

ATLANTIC “PRINTING”—Stabilized azoics for printing with acid-ageing.

ATLANTIC RESIN FAST—Cotton and rayon direct dyestuffs. Fast to light and washing for resin finishing.

ATLANTIC DIRECT—Direct commercial dyes suitable for textiles, leather and paper industries.

ATLANTIC NAPHTHOLS, SALTS, BASES

ANTHRAVAT & THIOVAT—Vat dyestuffs of unsurpassed excellence.

ATLANTIC CHEMICAL CORPORATION

153 PROSPECT STREET

Passaic, New Jersey

WINTER ISSUE 1961  SEVEN
tronic equipment for textile processes. As the industry moves closer and closer to full automation, this branch of engineering is depended upon more and more for controls and instrumentation.

A complete fabric testing laboratory, capable of conducting standard tests for practically any physical quality of fibers, fabrics and yarns is an integral part of the research operation. Not only is this used to evaluate new developments of the research group, but it also is a key part of the DMRC quality control program. Under this program, licensees of the corporation's patented processes are constantly checked to assure that they maintain the high standards set for products bearing the trademarks owned by DMRC.

The operations at the Research Center do not stop with the birth of an idea however. Extensive development takes place before a new process is declared ready for use.

In a separate 20,000 square foot building at the Spartanburg site are three pilot plants, as well as a fully equipped machine shop for the construction of prototype models of new machinery developed by DMRC engineers.

Two of the pilot plants are devoted to filament yarns and are equipped with spinning, weaving and knitting machinery on which these yarns can be made in various constructions.

Naturally, much of the work in this area is concerned with the further development of AGILON yarns for use in a variety of end products.

The third pilot plant in this building is set up for the finishing of fabrics. The equipment in this area is the most modern and versatile obtainable since, as research is directed along different lines, it may be called on to handle practically any type of fabric or finishing process.

Since much of the work at DMRC today, is concerned with the development of new wash and wear finishes and particularly with the BELFAST self-ironing fabrics, this is one of the busiest spots of the entire research complex.

In addition to the filament yarn and finishing pilot plants, a chemical engineering pilot plant with which the DMRC staff will expand its development in the field of process chemical production is rapidly nearing completion—evidence that research is a constantly expanding process which embraces many fields.

An integral part of the research corporation's operation is its product development group. The staff of this department is primarily concerned with the furnishing of technical assistance to licensees of DMRC processes, aiding them in starting production in their own mills with their own equipment.

Another function of this group is the supervision of the quality control program to maintain the high standards required of products bearing DMRC trademarks.

In addition to the work carried on in the laboratories and pilot plants at the research center, there is another important aspect to any research program—the assembling of information from many sources. In the technical library at DMRC, a basic collection of books in all areas touched on by research projects carried on at the center is maintained. Technical periodicals from throughout the world are received regularly to keep the scientists and engineers aware of the latest developments in their fields.

It would, of course, be impossible to have on hand all of the material that might be needed so a major function of the Research Corporation's trained librarian is the securing of information for the research corporation staff from other sources. An extensive program is carried on with other libraries, involving the borrowing of materials and utilization of photostats and microfilm of desired articles, to avoid expensive duplication of materials.

Since the Deering Milliken Research Corporation does not manufacture any of its own developments but licenses them to manufacturers throughout the world, it must depend on the royalties from the use of its patented machines and processes for its support. To handle the worldwide patenting, licensing and trademark program of the Research Corporation, a staff of four patent lawyers is maintained.

Their important duties range from the policing of trademarks to the filling of patent applications and the licensing of manufacturers to use DMRC-developed machines and processes.

Research is a big word today and nowhere is it bigger than in the textile industry where research and development is not only necessary to meet competition but essential to survival.

Deering Milliken Research Corporation, which has set the pace for others to follow, is determined to keep its place by blazing new trails.

A successful invention or development is not an end in itself; it usually opens new avenues for exploration. As these new roads are opened, DMRC researchers constantly are expanding their efforts to develop new products to meet more successfully the needs and demands of the producers and consumers of textiles.
Have You Changed Your Address Lately?

By
Norman C. Guthrie
Junior Staff

If you have, we here at the “Bobbin & Beaker” would like to find out about it!

On the last several issues of the “Bobbin & Beaker” we have had anywhere from fifty to seventy-five issues returned. These issues came back from addresses that we have on file where the addressee has either moved or has in some way changed his mailing address.

Our mailing budget is run on a very tight schedule and we would more than appreciate any cooperation that you, our readers, would give us when you change your address.

We, the students of the “Bobbin & Beaker” staff, want everyone to receive a copy of our publication who is interested in Textiles, and Clemson. We, however, can not send you our magazine unless we have your correct address. So please help us out!

If you have recently changed your address, please send your correct address to “Bobbin & Beaker”, School of Textiles, Clemson College, Clemson, S. C.

Spartan Mills
Spartanburg, South Carolina

SPARTAN — BEAUMONT — STARTEX

Makers of Print Cloth, Corduroy, Industrial Fabrics, Twills, Drills, Broadcloth and Household Textiles

"A GOOD PLACE FOR A CAREER IN TEXTILES"
And speaking of visitors, we are constantly having large groups of visitors to tour our facilities. Last fall we had the South Carolina county agents. Before that we had about 70 county agents from Arkansas and Missouri. As this is written we are expecting about 90 people from a meeting of the National Cotton Council. These tours are usually in cooperation with the American Cotton Manufacturers Institute and are designed to acquaint various groups with the intricacies of the textile industry. Many people in the fringe areas, especially cotton production, know practically nothing about textile manufacturing.

For the fourth summer the School of Textiles is offering a short course program for those in the industry and related fields. Each course will last three weeks and will be a full time program. The lectures will be in the mornings and the afternoons will be occupied with laboratory work or with work in the library.

Two courses, Yarn Manufacturing and Fabric Development are especially recommended for college graduates, other than textile school graduates, who will be entering the industry in June. This program will serve well, regardless of what phase of the industry they enter. It will be ideal preparation for those entering a training program or for those going into the various staff jobs. High school graduates who have mill experience and have attracted the attention of management will benefit.

Other courses are Supervisor Development, Quality Control and Time and Motion study. The last two are for those people who find themselves in this phase of work with no formal training in the field. The Supervisor Development course is designed for the first line supervisors to acquaint them with the complex features of their job.

If interested in any of these, write to me for further information. The cost is $75.00 per course class fee, and room and lodging can be had in the college dormitory for $50.00 for three weeks.

We have many former students to drop in to see me and other faculty members. We are always glad to see you. Sometimes we can solve some small problems for our alumni.
David Harral is a Textile Management major from Sumter, South Carolina. He is 21 years old. Harral received honors during the first semester of his sophomore year and during the first semester of his junior year. In the textile industry, Harral has worked two summers with Santee Print Works, Sumter, South Carolina, and during the past summer, Harral worked with the Pacific Division of Burlington Industries in Lexington, North Carolina.

To aid with his college expense, Harral received the Carolina Yarn Assistance Scholarship during his junior year, and the Keever Starch Scholarship during his senior year.

Harral is Vice-President of N.T.M.S., Business Manager of the “Bobbin and Beaker”, Treasurer of PHI PSI, and he is the Hall Councilor of D-6.

ORREN F. HUNTER, SR.

Orren F. Hunter, Sr., age 26, is a married student from Bamberg, South Carolina. Frank is a Textile Science major. He received honors during both semesters of his sophomore year. In the textile industry, Frank has worked with Amerotron Woolen Plant, Barnwell, South Carolina, for one summer, and the Amerotron Plant, Williamston, South Carolina, for one summer.

Frank received the Textron Foundation Scholarship, which is a four year scholarship. During his senior year, he received the David Jenning’s ’02 Memorial Scholarship. Both of these financial aids have aided Frank in attending Clemson.

Frank is a member of PHI PSI of which he is Secretary. He is also a member of N.T.M.S. Frank has served 8 1/2 years in the South Carolina National Guard.
The Draper Shuttleless Loom

Draper Corporation has been continuously engaged in the manufacture of improved machinery for textile mills since 1816, and at this time, they are the world's largest builders of automatic looms. The development of the Draper Shuttleless Loom referred to as model DSL, marks a departure from conventional weaving for the North American textile industry that is so radical that it can only be compared to three previous loom inventions. The first was John Kay's fly shuttle development in 1733; the second was Cartwright's power loom dating from 1789; and the third was James Northup's automatic bobbin changing attachment patented in 1890. The last of these significant developments was made under the auspices of Draper Corporation; and the first so-called Northup looms were sold to the Queen City Cotton Mills, Burlington, Vermont in August, 1894. There were 792 looms in that order. Since that time Draper Corporation has built over 760,000 and have delivered them to mills all over the world.

The formal beginning on the development of a shuttleless weaving machine commenced in 1945, although considerable thought had been given to it prior to that date. As the first step the company investigated all of then-known shuttleless weaving principles (on which there are U. S. patents dated as early as 1866), and as a result of this, elected to attempt the breakthrough with a modification of the rapier principle. This means of inserting the filling yarn into an open shed appeared to the Draper Corporation to be the most practical approach to a machine for their traditional market—the area of mass produced single shuttle fabrics.

The Draper Corporation is now 15 years further down the road with research and development expense of more than six million dollars behind them. The first production unit of 45 looms was installed in a Southern mill in early 1957, weaving Class B Sheetling at 226 picks per minute. By the end of this year, they will have over 1700 DSL looms running on commercial production in thirteen different mills. The Draper Corporation is presently building these machines at the rate of 100 per month, and they are still in the process of developing and installing production tooling for higher rates.

The goals which the company has set for the shuttleless loom are as interesting as the machine itself. Their targets for the average weaves are:

- A 40% increase in speed
- A 40% increase in the weaver productivity
- A 100% increase in fixer productivity
- A 70% decrease in the cost of maintenance, repair and operating supplies
- Complete elimination of battery hands
- Other advantages will include:
  - A reduction in materials handling
  - A reduction in cost of filling preparation
  - A reduction in power consumption
  - A reduction in waste
  - A reduction in noise level

To date the loom has performed most satisfactorily on medium to coarse spun yarn fabrics. Installations now operating are weaving Class B Sheetling, Canton flannels, drills, muslins, percale sheeting and styles from print cloth yarn numbers. The Draper Corporation is actively experimenting with a wide range of fabrics from combed lawns to denims, including those made from continuous filament yarns, and are confident that the loom will ultimately handle a large percentage of all single shuttle weaves.

The cost of the machine is roughly $2800.00 compared to $1800.00 for a comparable fly shuttle loom. Their studies indicate that the economics favor fabrics in the medium to coarse range and a rough estimate the pay back in this area would be about five years, although many constructions will show a better return than this.

The Draper Shuttleless Loom shown in this article is of the flat or broad loom type, producing a single sheet of fabric in widths ranging from 36" to 64", at speed of approximately 220 picks per minute in the wider widths. Usable reed space is 5" greater than nominal size of loom.

The loom as you can see, is low in silhouette, without a handrail over the reed. This makes for easier weaver's operation. Its overall floor space requirement is somewhat less than a Draper X-2 Model of corresponding size but depth front to back is 7" less than a corresponding X-2 Model, depending on warp beam diameters.

The principal difference between this loom and the conventional fly shuttle loom is the method used in placing the filling in the shed.
Filling supply packages are in the form of cones, preferably of 8 to 9 pounds in weight, mounted at the right hand end of the machine so that two cones can be credled together to effect a continuous supply of yarn.

Filling insertion or “picking” is accomplished by two sets of mechanisms (1) the filling control mechanism and (2) Right hand and Left hand Filling Carriers.

The Filling Control Motion is located on the right side of the loom. By means of cams, this mechanism positions, then measures and cuts the yarn so that the correct length of filling can be drawn under tension into the warp shed by the filling carriers.

The Right and Left Hand Carriers which place the pick in the shed are mounted on the ends of flexible steel tapes, and work in and out of the shed from opposite sides of the loom in a modification of the old “Rapier” principle.

In the Draper loom, each carrier tape is fastened to an oscillating aluminum wheel. As the aluminum wheels turn the carriers enter the open shed (one from each side) and mate in the center. The Right Hand Carrier which has picked up the yarn from the filling supply, transfers it to the Left Hand Carrier near the center of the goods. As the tapes withdraw from the shed, the Left Hand Filling Carrier pulls across the shed the loose end of filling which has been correctly measured by the timing of the filling cams.

On the DSL the filling is laid in cycles of two picks. The two picks resemble a hairpin with the open end at the left hand side and the bend at the right hand side. This produces a fabric with a smooth or uniform selvage at the right hand side and an unfinished selvage at the left hand side.

Beat-up of the pick is by means of a cam operated, all metal reed mounted on a light metal lay beam which is supported by light metal swords. No crank shaft is used. Lay operating cams are designed with a dwell of nearly one-half the cycle to allow for the entry into and the withdrawal from the shed of the filling carriers.

The loom has a capacity of six cam operated harnesses. No dobbey or jacquard applications have been developed at this time. The harness motion features several departures from cam harness motions commonly used on fly shuttle looms.

As mentioned earlier, this loom produces a conventional selvage on the right hand side of the goods.

A very satisfactory left hand selvage is made possible by a selvage binder mechanism with separate selvage yarns. The binder ends, one on each spool mounted on a revolving disc, lock the free filling ends with a motion completely independent of the loom harness motion. For every revolution of the binder disc, the two ends of the binder yarn cross each other twice. This produces a binder cord of the outside wrap ends—in effect, a full turn leno—and can be set to bind every filling pick or every two picks. The edge left by the filling ends projecting beyond the binder cord can be sheared or trimmed in a number of ways to produce a relatively smooth edge. These ends can be held to 3/8” in the loom, and the waste resulting is no greater than the waste from feller bunches on bobbins.

---

GREENWOOD

NINETY-SIX

MATHEWS

PLANTS

GREENWOOD

MILLS

Weavers of quality fabrics since 1907
Maxbo
Shuttleless
Loom

Production is the most important feature of the Maxbo Shuttleless Loom, but not at the cost of quality. This revolutionary loom has picking speeds of between 320 to 400 per minute as compared to an average of 185 per minute on the conventional loom. This is accomplished through a unique way of inserting the filling, a shorter stroke of the lay, and less stress on the warp threads.

In the Maxbo Loom, the shuttle is replaced by an air nozzle from which a concentrated jet of air is ejected to blow the filling through the shed. The filling is inserted from one direction only—from left to right. Filling yarn is provided by a magazine of two large capacity cheeses. The thread is drawn from the cheese onto a measuring drum which is preset to draw off the amount of filling for the width of cloth to be woven. The air blast is very short but powerful enough to blow the filling through the shed. A suction nozzle is located on the opposite side of the shed to receive the thread. A clamp catches and holds the outgoing pick so that the thread remains stretched. A simple but effective pick detector at the feed end ensures that the thread is blown through the shed.

After the pick has been laid the beat-up must follow. This is another advantage of the Maxbo. Since there is no shuttle to pass through the shed, the movement of the lay is considerably shorter. It is now approximately 5 1/4 inches. This shortens the beating-up cycle which is one of the changes from the conventional loom that attributes to the Maxbo's high speed. As there are no shuttles to rub against the reed of the Maxbo Loom, the reed dents are consequently made thinner than normal and with an increased lateral resilience. Reed marks are made less noticeable in the cloth.

Many parts of the shedding motion have been eliminated to allow the harnesses to move at this extremely high speed. The harnesses are slanted forward at an inclined plane in a harness rack. The movement comes from steel lifting rods fastened to the bottom of the harness frame and connected to treadle arms. The lifting rods are operated by two sets of synchronized cams that are enclosed in an oil filled case. The high speed of the harnesses would cause excessive end breakage on the conventional loom; but Maxbo has increased the distance from the fell of the cloth to the tip of the warp beam from approximately 2 1/2 feet to nearly 3 1/2 feet. This increase in distance allows a far more elongation of the warp beam. This increased elongation decreases the tension on the warp yarn thereby decreasing the end breakage due to weak or thin places in the warp. This increase in distance also helps the weaver. Because of the increased speed of the harnesses a constant warp tension is necessary. The warp beam regulator operates entirely automatically and does not require setting. It is actuated by the tension beam and retains a constant warp tension from the loaded to the emptied beam. The warp tension is set by means of tension springs.

The selvage on the cloth produced by the Maxbo is fringed. This is due to the filling being inserted from left to right only. The pick is held by a filling holder on the right hand side of the loom while shears cut the filling on both sides of the loom. The approximate 1/2" of waste filling, which occurs after the cutting of each pick, is drawn off to a central collection point by a vacuum tube. This vacuum tube also holds the filling in place and retains the twist in the yarn until the filling holder comes in contact with the filling. The selvage could be tucked in but this causes a build-up on the roll which gives trouble both in finishing and cutting operations. On the tucked selvage there are twice as many picks per inch in the selvage as there are in the body of the cloth.
Production is not the only facet of this revolutionary loom. The Maxbo Loom has a lower operating cost than the conventional loom. This is obtained by elimination of many parts. The new revolutionary method of inserting the filling eliminates the cam shaft, picking cams, pick balls and levers, rocker shaft, picker sticks, pickers, benders, parallel feet, box fronts, hold-up straps, lug blocks, leather, check straps, bumbus, lay-plates, shuttles, batteries, and filling quills. The elimination of these parts greatly reduce the work of the loom fixer, and the cost of replacing worn out parts.

The protector motion, an expensive maintenance item, is no longer needed. It is impossible for the Maxbo Loom to produce a smash because there is no shuttle. Smashed or torn up reeds are also eliminated for the same reason.

The elimination of the picking motion greatly reduces the vibration of the loom. A coin can actually be balanced on its edge while the loom runs at its high speed. The lay of the Maxbo Loom is dynamically balanced—thus aiding in a greater reduction of vibration.

The new lubrication system results in a cleaner cloth being woven. No outside oil can be blown onto the warp or cloth. There is an oil reservoir in the bottom part of the left hand loom side. Submerged in this reservoir is an oil filter with a line running to an oil pump. This pump lubricates all the moving parts of both ends of the loom. There are seven (7) other grease fittings that need additional attention only once a year.

The Maxbo Loom can run up to eight harnesses with full selectivity of the harness cams. Yarn as fine as 40/1's and as coarse as 5.50/1's has been sufficiently tested at the same high speed on four, six, and eight harnesses.

The approximate floor space required is 4 ft. 7 inches x 7 ft. The loom weighs 3100 pounds and is driven by a 2 1/2 H.P. motor.

The manufacturer of this loom expects the following results from its operation:

1. Increased production.
2. Fewer stops.
3. Reduced maintenance.
4. Quieter running.
5. No lubrication or attendance, and less risk of accidents.
6. Higher construction can be woven without pick packers.
7. No fringe shearing required after weaving before finishing.

The Maxbo Loom was invented in Sweden by an Esthonian engineer. Edda International Corporation is the selling agent.
The Importance of Temperature Controls in Sizing

For efficient weaving, cotton warps of single yarns, yarns must undergo the process known as sizing, dressing, or slashing. The three terms are used exchangeably to designate the application of a protective reinforcing film to the warp yarns which will enable it to withstand the abrasive and chafing action of weaving. The sizing process consists in impregnating the yarn with a film—forming compound of various ingredients in a machine called a slasher.

The fundamental purpose of sizing any warp is to provide one or more of the following requirements:

A—Weavability, B—Weight, C—A given finish or blend. However, the primary purpose of warp sizing is to produce weavability. No matter what other properties slashing may give to the yarns, as hand, stiffness, tensile strength, or weight, if these are done at the expense of weavability, the sizing has not served its purpose. The ideal size should leave the desired weight on the cloth, give it the proper hand or feel, and at the same time eliminate warp breaks during weaving.

Percy Been, the English Textile expert, said a quarter of a century ago, "Sizing is the most important preparatory process to which cotton yarns are subjected previous to their being woven into cloth."

The objects to be obtained in the sizing of warp yarn where application of size is only for the purpose of enabling a warp to be woven satisfactorily are:

A. To cause the sizing solution to penetrate the structure of the yarn to an appreciable extent in order to increase the cohesion of the individual fibers of the yarn and thus increase its strength.

B. To coat and smooth the outer surface of the warp yarn and thus enable the warp to resist the chafing and abrasion that are inevitable during the weaving process.

Good slashing depends, to a marked degree, on the maintenance of a uniform level of the size in the size box of the slasher, a uniform temperature of the size, a correct and uniform temperature of the drying cylinders, and the constant use of the same size formula and size-cooking procedure. Of these, we are most interested in temperatures and their effect upon sizing.

Sizing is the process of applying to yarns or threads a film or coating of an adhesive material which, when dry, forms a smooth, hard, but pliable surface that encases the yarns and tends to bind the projecting fibers of the yarn close to the yarn surface. Sizing is generally composed of materials that will impart to the size mixture the ability to adhere to the yarn firmly and form a smooth surface, or film, around it.

The materials composing a size mixture may vary slightly but essentially they come under the same classifications. Practically all size mixtures are composed basically of an adhesive, a softening agent, and a gum. Miscellaneous materials, such as antiseptics, preservatives, anti-foaming agents, chemical, etc., are sometime added.

A size mixture is prepared by first running an accurately measured amount of cold water in the cooking kettle. To this is added a measured weight of starch. The mixture is then stirred thoroughly in the cold water for about ten minutes to break up lumps and wet out the granules. Steam is then turned on and the temperature of the solution begins to rise. The compound and other ingredients should not be added until the heated starch solution has reached a temperature of 180° F. The reason for this is that the fats generally used melt at a temperature lower than the gelatinizing temperature of starch, and some insulation of the starch granules may result. The solution is then brought to a boil, cooked for one to one and one-half hours, then pumped to a storage kettle where it is kept at a temperature of 190° to 206° by steam coils. It is desirable to keep the temperature as near the boiling point as possible but violent boiling should be avoided as it robs the size viscosity. The mixture remains in the storage kettles until called for by the size level control of the slasher size box. A temperature ranging from 204° to 206° is maintained in the size box by live steam coils.

Starch, the basic ingredient of sizing material, is composed of granules. These granules differ from those of other chemical substances, such as salt and
sugar, in that they are not uniform throughout. Each starch granule differs. The outer wall is more condensed than the inner wall and behaves differently.

Starch granules are built in layers, some of which are easily soluble while others are soluble with great difficulty. The outer layer, known as alpha amylose, is difficult to get in solution; the inner layer, known as beta amylose, is easily soluble. The beta amylose is soluble in cold water but the alpha amylose is not.

As the temperature of the size solution is raised to approximately 140°F, the hot water begins to soak into alpha amylose. As the temperature increases, the penetration of water through the alpha amylose and into the beta amylose also increases. As hot water soaks in, it dissolves the beta amylose and the granules to swell. The membrane of alpha amylose is very elastic and allows the granule to expand to many times its original size. As the quantity of water within the granule increases, it swells and finally bursts. The temperature at which the granule burst is known as the gelatinizing temperature and no two starches have exactly the same gelatinizing temperature. Temperatures for the common starches used in sizing are as follows:

<table>
<thead>
<tr>
<th>Types of Starches</th>
<th>Gelatizing Temperatures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potato</td>
<td>148°-155°F</td>
</tr>
<tr>
<td>Tapioca</td>
<td>160°-165°F</td>
</tr>
<tr>
<td>Sago</td>
<td>162°-165°F</td>
</tr>
<tr>
<td>Corn</td>
<td>167°-170°F</td>
</tr>
<tr>
<td>Rice</td>
<td>175°-182°F</td>
</tr>
<tr>
<td>Wheat</td>
<td>176°-180°F</td>
</tr>
</tbody>
</table>

During the swelling period, the viscosity of the mixture increases because of the increased size of the granule. As the granules begin to break, the viscosity decreases. Mechanical agitation also helps to break these swollen granules. The starch granules do not all break at the same time. Therefore, a cooked starch contains unbroken particles which continue their swelling and breaking under the influence of heat and agitation during use. The viscosity continues to drop. The usefulness of a starch paste depends in part on the amount of broken granules present. Because of their size, unbroken granules do not penetrate the yarn as well as do the broken granules.

Heat and agitation are continued until the desired viscosity is reached. Viscosity may be defined as the reluctance to flow. Viscosity is the reciprocal of fluidity, which is a measure of freeness of flow of the size mixture through pipes. This determines to a large degree whether the starch solution will penetrate the yarn or be merely pasted on the surface.

Temperature in the storage kettle is also accurately controlled by closed coils. The size mixture should be stored at temperature above 204°F, or as near the temperature of the size box as possible. The kettle is equipped with agitators to keep the mixture in constant agitation.

Size is applied to the sheet of yarn in a size box equipped with steam coils which have small holes to allow live steam to enter. The live steam keeps size solution at a temperature ranging from 204°F to 210°F, and also thoroughly agitates the mixtures. Control of temperature is important because the rate of congealing of a starch paste on cooling will affect its properties in sizing. Any size which congeals too quickly will not penetrate sufficiently, resulting in excessive shedding in the weaving process.

After the yarn has passed through the size box, where it is sized and excess size is squeezed out by the squeeze rolls, it goes to the dry cans where the temperature is very closely controlled. If the yarn is baked by too much heat it will become brittle and tend to flake or shed off. This lost flexibility of a baked yarn can never be regained. A starch film which has been dried too much also has a disadvantage of very slow moisture pick-up in the weave room.

Warp yarn insufficiently dried will cause trouble in the weave room for if too much moisture is left a sticky warp will result. Mildew of yarn may also result from improperly dried warp yarn.

In order to assure accurately controlled conditions of sizing, mills have installed expensive automatic controls which controls time and temperature in cooking, storage, size box, and dry cans.

Temperature controls the making of the size mixture, the application of the mixture on the yarn, and the drying of the yarn. No other factor affects the sizing process more than temperature. The majority of defects caused in slashing may be traced, either directly or indirectly, to improper temperature control. The time and temperature of the cooking operation generally control the degree of gelatinization, which in turn governs the viscosity of the size. Size viscosity, in turn, influences the penetration of the size into the structure of the warp yarns during slashing. Only slight changes in heat application are necessary to bring about a change in size characteristics; therefore, the exacting control of the size temperature and the period of size cooking will influence greatly the degree of success with which the warp is sized.
# Index to Advertisers

<table>
<thead>
<tr>
<th>Company</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atlantic Chemical Corporation</td>
<td>7</td>
</tr>
<tr>
<td>Cone Mills Corporation</td>
<td>4</td>
</tr>
<tr>
<td>Gaston County Dyeing Machine Co.</td>
<td>2</td>
</tr>
<tr>
<td>Greenwood Mills</td>
<td>13</td>
</tr>
<tr>
<td>Royce Chemical Company</td>
<td>19</td>
</tr>
<tr>
<td>Southern Loom Reed Manufacturing Company</td>
<td>15</td>
</tr>
<tr>
<td>Spartan Mills</td>
<td>9</td>
</tr>
<tr>
<td>Steel Heddle Manufacturing Co.</td>
<td>20</td>
</tr>
</tbody>
</table>
VATROLITE® - Use this powerful concentrated reducing agent for brighter vat dyed colors on cotton, linen and rayon ... for faster, cleaner stripping results on silk, cotton and rayon.

DISCOLITE® - A concentrated reducing agent, highly stable at high temperatures, outstanding for discharge and vat color printing. Employed successfully wherever the reducing agent must dry into the fabric and retain its reducing power.

PAROLITE® - A dust-free white crystalline reducing agent. Soluble, colorless, excellent for stripping wool piece goods and rags, shoddy, acetate or nylon fabric.

NEOZYME® - Concentrated low temperature desizing enzyme. Removes starch and gelatine. Excellent for eliminating thickeners from printed goods at low temperatures.

NEOZYME® HT - Concentrated high temperature desizing enzyme. Removes both starch and gelatine. Suitable for continuous pad-stream method. Remarkable stability at very high temperatures.

NEOZYME® L & NEOZYME Special - Liquid desizing enzymes in two degrees of concentration. Remarkable stability at very high temperatures.

VELVORAY® - A blend of sulphonated vegetable oils and selected fats for a superior, non-foaming finishing oil. High in combined SO₃ and stability. Excellent for compressive shrinking, will not smoke off at high temperatures.

DISPERSALL - Effective retarder for dyeing vat colors, dispersing and leveling qualities, for dyeing napthol and vat colors, useful in wool and acetate dyeing. Valuable auxiliary in stripping vat colors, naphthals.

NEOWET - Permits effective wetting at all temperatures - particularly useful with enzymatic desizing agents. No reaction to soft or hard water. Not affected by dilute acids or alkalies. Non-ionic. Not suitable for use in peroxide baths.

NEOWET X - Effective wetting agent at all temperatures from cold to boiling. Does not inhibit enzyme action in desizing bath. Good for use with resin finishes, and hydrogen peroxide bleaching liquors. Good rewetting properties. Anionic.

CASTROLITE® - A highly sulphonated castor oil used as a staple penetrant for dyeing or kier boiling in leading textile mills. Still used extensively in finishing.

VELVORAY® - Economical creamy white paste softener derived from highly sulphonated tallow. Gives softness and body without stiffness or affecting whites.

F.S. - A central, strategically placed warehouses ...and Royce's own fleet of trucks ...mean fast, dependable delivery—always!
Return Postage Guaranteed

Stehedco and Southern

The World's Most Complete Line
TEXTILE and WEAVING SUPPLIES

Flat Steel Heddles • Loom Harness Frames • Loom Reeds (Pitch Band and All Metal, Regular and Stainless Steel Wire) • Loom Harness Accessories • Automatic and Hand Threaded Southern Shuttles (Tempered Dogwood, Persimmon and Fibre Covered) • Warp Preparation Equipment • Electrode Rods (Fibre and Plastic Insulation) • Drop Wires • Creel Stop Motors • Pigtail Thread Guides • Tension Washers • Light Metal Stampings • Hard Chrome Plated Parts • Wire Rolling.

A complete staff of field engineers to solve your problems.

Other Plants and Offices: Granby, Quebec, Canada — Lawrence, Mass. — Greensboro, N.C. — Atlanta, Ga. — Textile Supply Co., Dallas, Texas — Albert R. Breen, Chicago, Ill.