



# FOR WOOL AND SHODDY

Always  
Uniform  
and  
Reliable  
\*  
Once Used,  
Always Used



Unequaled  
Scouring Agents  
and Fibre  
Lubricators  
\*  
Non-Gumming,  
Penetrating

SAMPLES GLADLY SENT ON REQUEST

WRITE US ABOUT YOUR NEEDS.

**BRADFORD OIL COMPANY, INC.**

**Lynn, Mass.**



## TOLHURST EXTRACTORS

*Self-Balancing—Center-Slung—Suspended—Solid Curb*  
have established new records for service, rapid operation and economy.

Remarkably adaptable to a variety of industries, they are especially serviceable and useful in the textile field, because they eliminate the many difficulties usually encountered in other types of extractors, and are unsurpassed for the separation and extraction of excess moisture.

The finished product of 66 years of exacting experience and test, the TOLHURST EXTRACTOR is *running all over the nation*, because it has become recognized as the standard of its kind.

## TOLHURST MACHINE WORKS

Established 1852 TROY, N. Y.  
New York Office, 111 Broadway  
Southern Rep. Western Rep.  
Fred H. White John S. Gage  
Realty Bldg. Hartford Bldg.  
Charlotte, N. C. Chicago, Ill.  
Canadian Rep.  
W. J. Westaway Co., Main & McNab Sts., Hamilton, Ont.; 400 McGill Bldg., Montreal

## H. BRINTON COMPANY

Circular Knitting Machinery

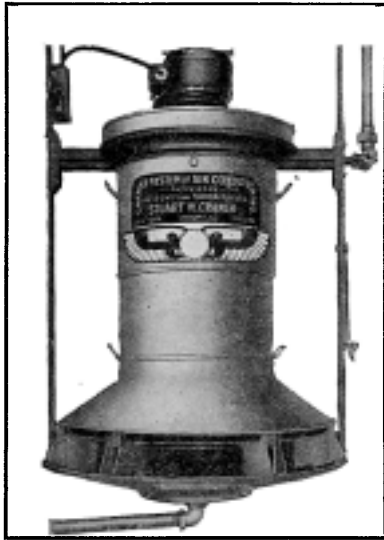
# RIBBERS KNITTERS BODY MACHINES

Each style the latest, with all modern improvements. Simple in construction, well built of the best materials.

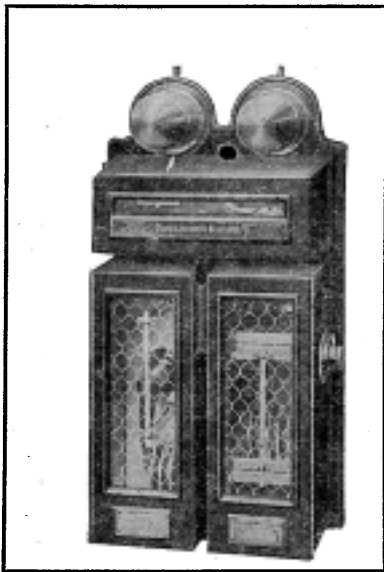
*Catalog and samples mailed on request*

213-217 Race St., PHILADELPHIA, PA.

# Every Pound of Cotton You Use One Cent Less



Parks-Cramer High Duty Humidifier  
Most evaporated value per dollar of  
investment.



The Parks-Cramer Humidity and  
Temperature Regulator. Makes  
for uniform conditions.

Take the back of an old envelope and even a dull pencil—and it wouldn't take very long to figure out what one cent saved on every pound of cotton you manufacture would mean to you, would it?

Try it.

And underneath the figures make this memorandum.

“My humidifying apparatus is so many years old. I don't even recall just why I put it in. Never thought much about the subject since. Seemed so simple. And yet seems as if I recall my friend Flanders saying something about big savings with Parks-Cramer stuff. Said he saved the equivalent of better'n a cent on every pound of cotton that came into his mill. And come to think of it, his old apparatus was put in the same year as mine. I wonder how they do it. Wonder if it wouldn't be well to ask some of 'em to come and see me. Chances are that wouldn't cost anything. Think I'll write them to-day.”

## Parks-Cramer Company

*Engineers & Contractors  
Industrial Piping and Air Conditioning*

**Fitchburg**

**Boston**

**Charlotte**

ESTABLISHED 1815

# ARNOLD, HOFFMAN & CO.

---

INCORPORATED

---

PROVIDENCE, R. I.

NEW YORK, N. Y.

BOSTON, MASS.

PHILADELPHIA, PA.

CHARLOTTE, N. C.

*Importers and Manufacturers of*

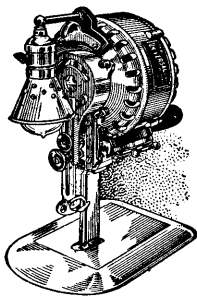
## Starches, Gums, Dextrine Alizarine Assistant, Soluble Oil, Soap

And Every Known Material from every part of the world for Starching,  
Softening, Weighting and Finishing Yarn, Thread or any Fabric.

Special attention given by practical men to specialties for Sizing, Softening, Finishing and Weighting  
Cotton, Woolen and Worsted Fabrics; combining the latest European and American methods.

**We Believe There is No Problem in *SIZING OR FINISHING* That We Cannot Solve.**

*Formulas for the Best Method of obtaining any DESIRED FINISH  
on any fabric cheerfully given.*



EVERY TIME-SAVING AND CON-  
VENIENT DEVICE IS PROVIDED ON

## UNIVERSAL CUTTERS

ASK FOR A TRIAL. NO OBLIGATIONS

**UNIVERSAL CUTTER CO.**

NEW YORK  
245 Seventh Avenue  
BOSTON

CHICAGO  
506 S. 5th Avenue  
BALTIMORE

PHILADELPHIA  
605 Arch Street  
MINNEAPOLIS

**St. Louis, Mo.**  
CLEVELAND  
1220 W. 52nd Street  
SAN FRANCISCO



Our factory at Southbridge, which is the  
largest shuttle factory in the world

Established 1843

## LITCHFIELD SHUTTLE CO.

SOUTHBRIDGE, MASS., U. S. A.

Manufacturers of

**SHUTTLES, SHUTTLE IRONS  
and  
HEDDLES**

**SHUTTLES FOR ALL KINDS OF LOOMS**

## ANNOUNCEMENT

# SWAN AND FINCH COMPANY

begs to announce that it has  
acquired the interests of the

## CATARACT REFINING & MFG. CO.

The combined business will hereafter  
be conducted under the name of  
SWAN & FINCH COMPANY

**T**HE increased facilities for distribution made possible through this change will be of great advantage to the consumer, for all of the products of both companies will now be available at the many points where warehouse stocks will be kept.

The reputation of these products is an enviable one. It is needless to say that the high quality of all will be carefully maintained.

Orders for any of the products of CATARACT REFINING & MFG. CO. and SWAN & FINCH COMPANY will receive prompt attention if directed to:



Quality Oil and Grease Products Since 1853

165 Broadway, New York  
Marine Trust Bldg., Buffalo

532 Hart Avenue, Detroit,  
327 So. La Salle St., Chicago

United Cotton Bldg., New Orleans

CATARACT REFINING CO., of California  
Monadnock Building, San Francisco

CATARACT REFINING CO., Limited  
20-23 Holborn, London, E. C. 1., England  
Royal Bank Building, Toronto, Ontario, Canada

*New York*  
*November 15, 1919*

# 24 Hours of Daylight in Your Factory

## High Efficiency **GM** Tungsten Lamps

G M daylight lamps reproduce daylight conditions throughout your plant. Not the dazzling white light that results in eye strain and possibly permanent injury, but a clear, diffused light that simulates true daylight exactly. Government authorities find that daylight lighting conditions have the following average effect:

- 10% increased output**
- 20% less spoilage (particularly in color work)**
- 24% fewer accidents**
- 25% better workmanship**

The daylight effect of the G M lamp is produced by a tinted glass bulb that eliminates glare and adds the blue element essential to natural daylight. Clear, even illumination is assured.

G M High-Efficiency Tungsten Lamps are made in all sizes and in all types. The G M 60 watt daylight lamp is the only vacuum daylight lamp made, the only daylight lamp suitable for local lighting. We have named it the Isaver. The larger gas-filled G M daylight lamps are particularly adapted to general mill lighting.

To supplement our G M lamp service we are sales agents for the Ivanhoe-Regent\* and Amco\* industrial lighting fixtures. In fact, we are prepared to take care of your lighting requirements in every detail. Complete lighting recommendations and layouts are given on request.

**G M lamps are low in cost. Discount schedule will be sent at your request.**

## Lord Manufacturing Company

105 West 40th Street, New York, N. Y.

BOSTON

PROVIDENCE

BALTIMORE

NEWARK



**G M Isaver**  
60 watt vacuum lamp  
for daylight lighting

\*CATALOG ON REQUEST

# TEXTILES

A MONTHLY TECHNICAL JOURNAL OF THE  
TEXTILE TRADE

Published by

## THE TEXTILES COMPANY

Post Office Square Building : : 79 Milk Street, Boston, Mass.

Telephone Main 19

EDWIN B. PILLSBURY, Business Manager

SAMUEL S. DALE, Editor

Cable Address, "Textiles, Boston"

J. CARLISLE LORD, New York Manager

### SUBSCRIPTION

In the United States . . . . .	\$1.00 per Year
To Canada and Foreign Countries . . . . .	\$1.50 per Year
Single Copies . . . . .	15 Cents

REMIT TO "TEXTILES" BY EXPRESS OR POSTAL MONEY ORDER, CHECK OR BY ENCLOSING CURRENCY WITH ORDER AT OUR RISK. ADVERTISING RATES SENT ON APPLICATION

Entered as second-class matter January 14, 1916, at the post office at Boston, Massachusetts, under the Act of March 3, 1879, (Copyright, 1919, by Samuel S. Dale.)

# ALLEN BLEACHING KIERS

ALLEN KIERS are either of the Allen Patent Injector Type or "Allen Worcester" Kiers, equipped with Motor driven pump and especially constructed Heater.

The "Allen Worcester" Kier, which is wonderfully popular, is mechanically correct and can be depended upon to do exceptionally good work. The motor driven pump gives positive and even circulation and the strength of the liquor is maintained throughout the Boil. Tendered goods are impossible. Let us show you these Kiers in operation.

Allen Heating Boilers, Horizontal, Tubular, Upright and Locomotive Type, have been on the market for many years. We also manufacture the Allen Improved Logwood Extractor.

## WORCESTER STEAM BOILER WORKS

WM. ALLEN SONS CO., Proprietors

GREEN, PLYMOUTH AND WASHINGTON STS. : WORCESTER, MASS.

# "BRETON" MINEROL "F"

## For Cotton Piece Goods

*"We are pleased to say that adding the Breton  
Minerol 'F' in our boil has given us a softer finish."*

### BORNE, SCRYMSER COMPANY

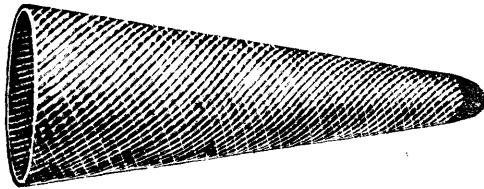
80 South Street, New York

BOSTON

Works: Elizabethport, N. J.

PHILADELPHIA

## The Perfect PATENT KNIT-ALL Cone



The smooth round polished point allows the yarn  
to knit off without catching and breaking



SEE THE POINT

All Sizes

All Colors

All Kinds of Paper Tubes

Made by

### THE PAIRPOINT CORPORATION

Paper Mill and Tube Factory, New Bedford, Mass.

ANDREW G. PIERCE, Jr., Pres.

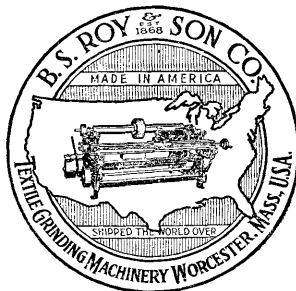
THOMAS A. TRIPP, Vice-Pres.

FREDERICK R. FISH, Gen. Mgr.

WILLIAM A. CLARK, Treas.

## B. S. ROY & SON CO.

WORCESTER, MASS.



## Textile Grinding Machinery

of all kinds

ESTABLISHED 1868

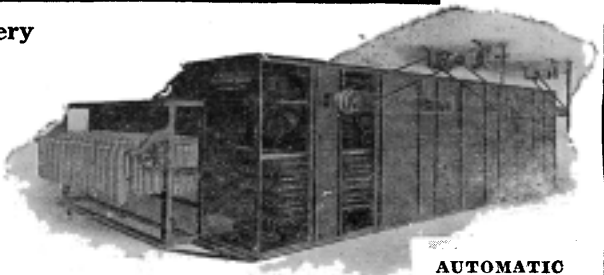


# CONTENTS FOR DECEMBER

Home and Foreign Markets.....	11
World Trade Club Chronology Continued .....	12
French Worsted Drawing .....	13
“Straight Line” Textile Calculations .....	14
The Mechanics of Textile Processes .....	15
The Construction of Weaves .....	16
Identification of Textile Fibers .....	17
Power Transmission of Textile Mills .....	18
Purification of Water from Boiling Off and Dyeing Silk .....	19
Wool Scouring .....	20
How the “Flapper” Works .....	21
Influence of the Atmosphere on Wool .....	22
System for the Spinning Mill .....	23
<b>QUESTIONS AND ANSWERS .....</b>	<b>24</b>
Silk Grass—Yarn Calculations—Loss in Bleaching Worsted—Reducing a Set of Jacquard Fabric—Needle for Dissecting Cloth.	
<b>KNITTING DEPARTMENT .....</b>	<b>25-26</b>
The Manufacture of Knit Goods	
<b>DYEING, BLEACHING AND FINISHING .....</b>	<b>27-28</b>
Vigoureux Printing of Worsted	

## “HURRICANE” DYEING, DRYING AND FINISHING MACHINERY, PRESSES, ETC.

### The “HURRICANE” Line of Drying Machinery Includes

- |   |   |
|---|---|
| <p><b>Automatic Loop Dryers</b><br/>For Underwear, Toweling, Piece Goods, Silks, Plushes, etc.</p> <p><b>Automatic Raw Stock Dryers</b><br/>Single and Multiple Apron Types for Wool, Cotton, Linters, Hair, Flax, etc.</p> <p><b>Continuous Piece Carbonizing Machines</b></p> <p><b>Automatic Raw Stock Carbonizing Machines.</b></p> <p><b>Automatic Yarn Dryers</b><br/>For Cotton, Worsted, Jute, Silk and Artificial Silk Yarns.</p> <p><b>Automatic Yarn Drying and Conditioning Machines</b><br/>for all kinds of yarn.</p> <p><b>Truck Dryers for Yarn, Tape, Braid, etc.</b></p> <p><b>Truck Dryers for Yarn Dyed on Cones.</b></p> |  <p style="text-align: center;"><b>AUTOMATIC<br/>YARN<br/>DRYER</b></p> |
|---|---|

**THE PHILADELPHIA DRYING MACHINERY CO.**  
MAIN OFFICE AND WORKS: STOKLEY ST. ABOVE WESTMORELAND PHILADELPHIA, PA.

## DU PONT AMERICAN INDUSTRIES



**A** SELF-CONTAINED American dyestuff industry means, first of all, *protection* to America and American industries.

*Protection* to the nation in time of war in that it furnishes the plants, the technique and the intermediate products for the manufacture of high explosives and poisonous gases.

*Protection* to our one source of supply for the synthetic medicinals that are the chief reliance of medical science in relieving pain and in fighting disease.

*Protection* to the textile, leather, paper, printing ink, paint and other dyestuff consuming industries producing over two and a half billion dollars of manufactured goods a year, employing over one million people and representing upwards of two and one-half billion dollars in invested capital.

*Protection* to industries indirectly dependent on an uninterrupted supply of dyestuffs for their maintenance producing over three billion dollars of manufactured goods a year, employing over a million people and representing nearly two billion dollars in invested capital.

In developing and safeguarding, with every means at our disposal, a self-contained American dyestuff industry, American manufacturers are therefore laying and preserving the very keystone of our national and industrial independence.

E. I. du Pont de Nemours & Co.  
Dyestuffs Sales Dept.  
Wilmington                      Delaware

Branch Offices  
New York                      Boston                      Providence  
Philadelphia                      Chicago  
Charlotte, N. C.



# TEXTILES

VOL. XV

DECEMBER, 1919

NO. 6

## PROTECTION OR FREE TRADE.

Now that the sovereignty and independence of the United States have been protected by the rejection of the German treaty with the league of nations, it is fortunate that the President in his message to Congress has drawn the lines sharply on the other great issue of free trade or protection to American industry. After stating the well known facts as to the huge debts that Europe owes to the United States, the great excess of our exports over imports, the inability of Europe to ship gold in payment, and the danger of increasing the present stock of gold in this country, the President advocates free trade in these words:

"The time has nearly passed for international governmental loans and it will take time to develop in this country a market for foreign securities.

"The productivity of the country greatly stimulated by the war must find an outlet by exports to foreign countries and any measures taken to prevent imports will inevitably curtail exports, force curtailment of production, load the banking machinery of the country with credits to carry unsold products and produce industrial stagnation and unemployment. If we want to sell, we must be prepared to buy. Anything, therefore, which would tend to prevent foreign countries from settling for our exports by shipments of goods into this country could only have the effect of preventing them from paying for our exports and therefore of preventing the exports from being made."

This proposal to change the settled policy of the United States from protection to free trade, like that of abandoning the policy of Washington for a league of nations, must be judged, not by the temporary and extraordinary conditions created by the World War, but by the conditions that will exist when the world is restored to a normal basis.

Under the present abnormal conditions, not only is Europe unable to pay her debts with gold, but the greater part of Europe has been deprived temporarily of the ability to produce goods with which to pay these debts. In some sections this loss of productive power is due to devastation; in other sections, to the lack of raw material. But in all sections of the continent the disability is temporary and the return to normal production but a question of a few years under the skilful management for which Europeans are so well fitted.

When the present prostration has passed and European mills and workshops are again in operation, any attempt to pay the huge debts to America with manufactured goods would disorganize American industries and cause widespread unemployment.

It was the fear of demoralized industry that led the Peace Council at Paris to reject the idea of allowing Germany to pay her indemnity with manufactured goods. As one of the Entente representatives put it: "The very government that proposes this plan would be the first to revolt against it if put into effect." And yet with that fact so clearly demonstrated at Paris, the President now proposes that Europe's gigantic debt to America shall be paid with European goods.

The remedy for the present extraordinary situation in international trade is not to be found by opening the gates for a devastating flood of manufactured goods into the United States. It is to be found in the regulation of both exports and imports on the principle that the citizens, not only of the United States, but of every country on earth, have the first right to the consumption of what they produce and to the production of what they consume.

Instead of admitting foreign goods free of duties, the mad struggle for export trade should be abandoned. The true

American policy is to provide for the needs of the American people with American goods so far as nature makes that possible, letting foreign countries adopt the same policy of industrial independence for themselves. That principle, not the league of nations, is the secure foundation for world peace. Under the extraordinary conditions now existing the United States by the power of mere example can do much to secure its general adoption by the nations of the earth.

The President not only advocates free trade for the United States, but in the extract from his message quoted above views with approval the policy of granting ultimately great loans to Europe for financing our export trade. By indorsing it the President has fallen a victim to the money madness that has taken possession of so many influential men, and who are obsessed with the idea that the welfare of the American people depends on shipping as great a quantity of goods as possible to foreign countries. Among the exponents of this policy we find former Secretary Redfield seriously proposing that the American people lend \$8,000,000,000 to foreigners that the foreigners may use the money to buy American goods. In this way we are to pay ourselves for the goods we sell. The same scheme is advocated by E. A. Filene, of Boston, who urges a great popular loan of \$4,000,000,000 as a starter, "with securities issued in denominations as low as \$5 so they will be within the reach of everybody."

Anyone with ordinary horse sense knows that the Redfield-Filene scheme would mean no payment at all, but merely a transfer of the credit from the American exporter, middleman and banker to the American public; and furthermore that such loans mean a huge interest charge, which at 6 per cent. on Mr. Redfield's loan would amount to \$480,000,000 a year, or \$4,800,000,000 every ten years, against countries that cannot now pay what they owe.

But the most serious result of this scheme would be its effect on the cost of living. The only real remedy for the social unrest and the labor troubles in the United States is a reduction of the cost of living. The Redfield-Filene scheme would bring with it an immediate increase by aggravating the scarcity of all the necessities of life. This would be brought about at a time when, as a result of the war conditions and the demands of labor for shorter hours with reduced output, production not only has been overtaken by consumption, but is now far short of the necessities of American consumers. Under this scheme anyone with five dollars in his pocket can increase the cost of living by lending his money to foreign creditors in countries that are bankrupt or on the verge.

The foreign borrower will use American money to buy the necessities of life in the United States, taking them away from the American consumer.

The foreigners will have the goods. The exporter, middleman and banker will have the money and the profits. The American investor will have a finely engraved piece of paper on which someone somewhere promises to pay something sometime. The American producer and consumer will have the privilege of paying higher prices for the necessities of life and the materials that make up the cost of production. With the rising prices will continue the hopeless and demoralizing struggle to raise wages to the level of the cost of living, with the certain result of increasing social unrest and the strain on the social order.

(Continued on following page.)

# World Trade Club Chronology Continued

Since the first edition of this statement appeared, on Sept. 27, the World Trade Club of San Francisco has continued its pro-metric propaganda.

**Sept. 7.** A booklet entitled "An Evening at the World Trade Club" is distributed purporting to give an account of a Wednesday night "meeting" of the "Club." As usual, the name of Mr. Z does not appear, but the booklet refers to "some of the notable men who have written or wired, or aided the World Trade Club in advocacy of the metric units," among whom are the following: Henry Ford, John Hays Hammond, James Speyer, Otto H. Kahn, and George W. Perkins.

San Francisco correspondent No. 3 makes the following report of this "meeting":

"I am enclosing a pamphlet recently issued entitled "An Evening at the World Trade Club." The meeting referred to in this pamphlet is a meeting of the Foreign Trade Club of San Francisco, of which Mr. W. H. Hammer is President. It is evident that the transposition of names has been made with the tacit consent of the officers of the Foreign Trade Club. At least we have not heard of any objection being urged."

Here the World Trade Club is seen appropriating temporarily the membership of what is apparently a real organization. After what has been discovered, even this fake is not surprising. But what is to be thought of the organization that allows its members to be used in this way for the purpose of deceiving the American people?

The World Trade Club report the "meeting" begins with this:

"At 6.15 o'clock on the evening of 18 June, 1919, there met in the banqueting hall of Hotel St. Francis a company representing the leading 500 manufacturing merchants of San Francisco. It was a gathering such as takes place every Wednesday—a meeting of members of the World Trade Club. The banquet room furnished an appropriate setting for this occasion. It is a room 27 meters long, 15 meters wide, 8 meters high."

And ends with this:

"The meeting closed. As these leading merchant-manufacturers were leaving they were still talking among themselves on the interesting subject of meter-liter-gram. In groups they passed into the balmy atmosphere of a perfect San Francisco night. As they made their way homeward, the stars shone out, gleaming with incandescent brightness in a setting of richest ethereal azure—a beautiful California evening sky."

And to think that such humbug is possible under such a canopy.

---

## HOME OR FOREIGN MARKETS.

(Continued from previous page.)

There is to be no regulation of exports. The American products taken from American consumers will be used, not only to supply the real necessities of suffering peoples in distant countries, but to gratify the vanity and feed the extravagance of foreigners who are not suffering, while foreign governments, relieved of the burden of providing for the needs of their nationals, will be able to turn their resources to the support of armies and navies for world conquest and dominion, directed perchance against the United States itself. This plan is not only in the minds of schemers, it is so far advanced that the Edge bill authorizing United States charters to banking corporations for financing it, has already been passed by both House and Senate and may be a law before these words are printed.

This banking scheme to lend American money to foreigners should be cast with free trade and the league of nations into the everlasting discard.

## The Propaganda and the Bureau of Standards.

**Oct. 25.** The World Trade Club issues a leaflet giving the results of a canvass of 58,226 "meter-liter-gram petitions received by the United States Government up to September 15, of which all but 434 were in favor of the metric system. Here is an extract from the introductory note:

"The results (of the petitions) were referred to the Department of Commerce at Washington. *Without cost to the United States Department of Commerce and at the expense of World Trade Club of San Francisco*, these petitions were classified and carefully counted under the direct supervision of W. Mortimer Crocker, 156 5th Ave., New York."

After noting the collaboration between the United States Department of Commerce and the World Trade Club of San Francisco, let the reader direct his attention to the following additional evidence of this connection between the United States Government and organizations of individuals carrying on a propaganda to compel the use of the metric system and forbid the use of English weights and measures under penalty of fine and imprisonment:

## The "Club" Canvasses the Petitions.

**Oct. 29.** The World Trade Club sends to the press a "release-immediately-please-insert-current-date news item," announcing the result of its own canvass of the petitions it has instigated:

"Out of 58,226 petitions relating to exclusive use of metric weights and measures in U. S. America, now in keeping of the Bureau of Standards, Department of Commerce, 57,800 petitions or 99.27 per cent. favor this progress, and only 426, or less than 1 per cent. oppose it. This unqualified endorsement of metric standards for U. S. America is brought out in the analysis just completed at Washington by representatives of World Trade Club of petitions sent to President Wilson and America's national legislators. The petitions have come as a result of the efforts of World Trade Club of San Francisco and the Metric Association of New York in explaining the great advantages of world-wide standardization of weights and measures. The petitions were referred to the U. S. Department of Commerce, and without cost to the United States Government, World Trade Club had them carefully counted and classified."

**Oct. 29.** The World Trade Club sends to editors throughout the country "a suggested editorial" on the canvass of the petitions, from which this extract is taken:

## "Common Sense Wins.

"A great victory has been won by common sense over prejudice.

"Gumption has triumphed over ultra conservation and inertia.

"World Trade Club of San Francisco and the Metric Association of New York have just received a classification of the petitions mailed within the past few months to President Wilson and national American legislators, and by them referred to the Bureau of Standards, Department of Commerce."

**Nov. 3.** The World Trade Club supplies additional evidence of the close connection between its propaganda and the Bureau of Standards by enclosing a blank petition addressed to President Wilson and also an envelope addressed "Bureau of Standards, Department of Commerce, Washington, D. C." Under this arrangement the President of the United States is not to have the privilege of receiving and considering the petitions which his countrymen address to him. These petitions are to be framed by Mr. Z. in San Francisco to favor the metric propaganda, the citizens having no idea they are the work of one man, misled by the name "World Trade Club" into thinking that the movement is backed by a real trade organization, are to sign them on the dotted lines; they are then to be sent to that metric hothouse, the Bureau of

(Continued on page 32.)

# French Worsted Drawing

By Leon Faux

(A Series of Articles on French Worsted Spinning)

## Driving the Winding Rolls.

The rollers of the winding motion have a horizontally vibrating motion as well as a rotary movement and are driven ordinarily in two ways. In the winding devices of carding machines and single or double-roll winders on gill boxes for combed sliver, the roller *Bo* slides on shaft *a*, Fig. 118. This shaft imparts the rotary movement to the roller *Bo*, whatever may be its lateral position, by means of a key *o* in the shaft, as shown, or in the bore of the roller *Bo*; in the latter case there is a key-seat in the shaft *a* in which the key *o* slides.

In the winding devices of drawing frames the rotary movement of *Bo* is obtained by the toothed drum *D*, Fig. 121, keyed on an extension of the drawing-roll, Fig. 121, and meshing with a pinion gear *P* keyed on the shaft of the rollers *Bo*.

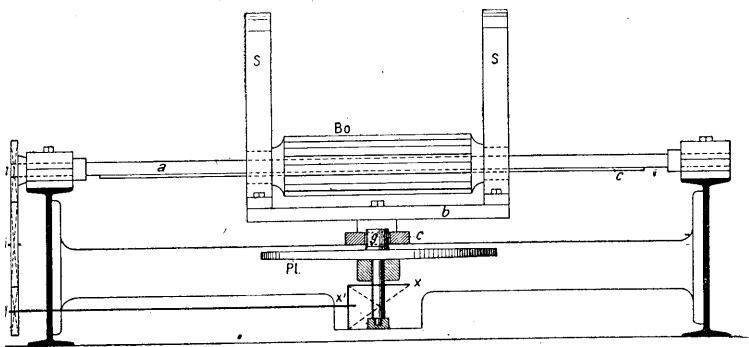


Fig. 118. Winder for Card.

The horizontally vibrating motion of the winding roller is obtained in different ways. On cards and on certain gill-boxes it is obtained by a driving plate. On a cross piece *b* fastened to the supports *S*, Fig. 118, there is bolted a guide in which a stud *g* fastened to the plate *Pl* revolves. The plate *Pl* is driven by bevel gears *x x'* and the chain gears *y, i, z*. This arrangement, shown in Fig. 104, has a vibrating motion which is uniformly accelerated and retarded. The elliptical 68-tooth gear keyed on *Pl*, meshes with the 34-tooth eccentric gear, which is driven at a uniform speed. The speed ratio being 2 to 1 and the guide *C* being perpendicular

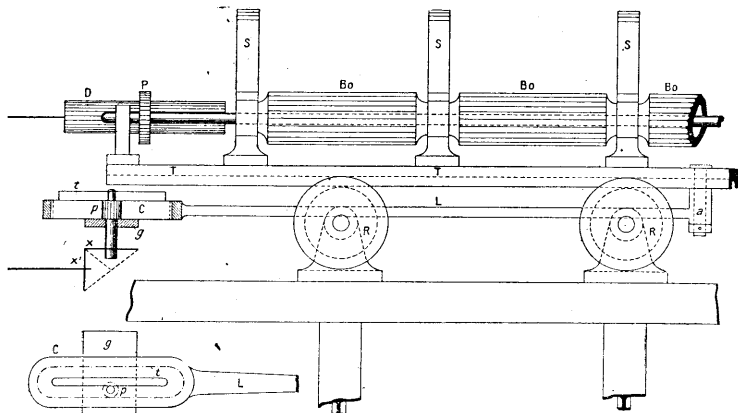


Fig. 121. Winder for Drawing Frame.

to the greatest diameter of the 68-tooth elliptical gear when it coincides with the center of the *Pl*, it follows that the stud *g* is driven with a planetary motion that is uniformly accelerated and retarded at each half revolution *Pl*, with the result that *Bo* vibrates with a uniform movement.

Fig. 137 illustrates the application of the same principle by a crank in place of *Pl*. This crank is driven by two ec-

centric bevel gears. One with 48 teeth is keyed on the crank shaft, and the other with 24 teeth is keyed on a shaft driven by two 36-tooth gears. This drive gives the crank a uniformly accelerated and retarded movement at each half-revolution, whence results the uniformity of the vibrating motion of the carriage *T* and then of *Bo*.

In the porcupine drawing-frames the drive for the vibrating the winding devices consists of an endless gear rack *C*, Fig. 121, with interior teeth. Fixed on the carriage *T* of the winder is a casting *a* to which is attached the rod *L* carrying the gear rack *C* which rests on a fixed slide *g*. The pinion gear *p* set in a stationary bearing is driven by the gears *z, i, y, x', x*, and meshes with the teeth of the gear rack *C*, being guided by the fixed plate *t* fastened to the gear rack. This drive gives a uniformly vibrating movement to the carriage *T* of the winder. The curves of the gear rack *C* being of small diameter there is a very brief dwell when the direction of the movement is changed, so that the movement to the right and left can be considered as uniformly continuous, whence results the winding of the sliver into the form of a cylinder.

Because of the sudden change of direction of the gear rack *C*, the casting *a* is sometimes movably attached on a shaft parallel with *T*. The position of *a* on this supplementary shaft is determined by the tension of two spiral springs wound around the shaft, which exert pressure on each side of *a*. The springs thus absorb the shock resulting from the sudden reversal of the movement of *T* causing a slight lateral displacement of *a*, which immediately resumes its original position by the reaction of the springs.

The gear rack is also arranged in other ways. Instead of being horizontal it may be vertical; the gear rack, in place of being movable, remains stationary in a fixed position and the

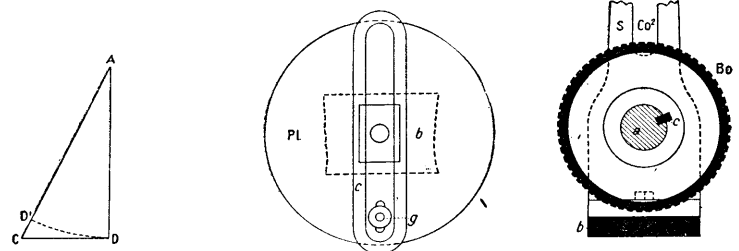


Fig. 122.

Fig. 119.

Fig. 120.

pinion gear *p* oscillates by pivoting on a point corresponding with the center of the conical gear *x'*. In the latter case the gear *C* is adjusted to the desired oscillation of *p*.

## Tension of the Sliver.

The rotary movement of the winding roller being constant, the vibration of the sliver causes a variation in the tension on the sliver. If we represent the width of the vibration of *Bo* by *CD*, Fig. 122, and the rotary movement of *Bo* by *AD* during the same period, the length wound on the ball will be equal to the hypotenuse *AC* of the right-angle triangle *ACD*. The length of the sliver delivered is equal to *AD*. Placing *AD* on *AC* we find the tension of the sliver to be equal to *CD*<sup>2</sup>.

This excess of tension does not have any influence on the section of the sliver and roving because of the natural elasticity of the material, which permits a certain momentary stretching, which is corrected when the sliver is unwound. It is, however, necessary that the vibrating motion of the winder be uniform, in order that the stretch may not exceed certain limits and cause an irregularity in the sliver.

# "Straight Line" Textile Calculations

By Samuel S. Dale

It follows that the cotton No. is found by dividing the constant (1000) by the grains per 120 yards.  $1000 \div 25 = 40$ , cotton No.  $1000 \text{ (grains)} \div 40 \text{ (cotton No.)} = 25$  grains per 120 yards.

Below will be found the formulas for reducing yarn numbers from one basis to another:

## Runs. (1600-Yard Lengths per Pound).

Used for carded woolen yarn. As the runs indicate the number of 100-yard lengths per ounce, the run system is practically identical with the yard per ounce system used in England for silk.

- Runs  $\times 1.905 =$  Cotton No.
- Runs  $\times 2 \frac{6}{7} =$  Worsted No.
- Runs  $\times 5 =$  West of England No.
- Runs  $\times 5 \frac{1}{3} =$  Linen No.
- Runs  $\times 6 \frac{1}{4} =$  Yorkshire No.
- Runs  $\times 1600 =$  Yards per pound.
- Runs  $\times 3.22 =$  Metric No.
- $2790 \div$  Runs  $=$  Denier No.
- $160 \div$  Runs  $=$  Dram No.
- $525 \div$  Runs  $=$  Grains per 120 yds.
- $437 \frac{1}{2} \div$  Runs  $=$  Grains per 100 yds.
- $218 \frac{3}{4} \div$  Runs  $=$  Grains per 50 yds.
- $109 \frac{3}{8} \div$  Runs  $=$  Grains per 25 yds.
- $87 \frac{1}{2} \div$  Runs  $=$  Grains per 20 yds.
- $9 \div$  Runs  $=$  Jute No.

## Cotton Count. (840-Yard Lengths per Pound).

The world's standard for cotton yarn. Also used for spun silk.

- Cotton No.  $\times .525 =$  Runs.
- Cotton No.  $\times 1.5 =$  Worsted No.
- Cotton No.  $\times 2 \frac{3}{4} =$  West of Eng. No.
- Cotton No.  $\times 2.8 =$  Linen No.
- Cotton No.  $\times 3.28 =$  Yorkshire No.
- Cotton No.  $\times 840 =$  Yards per pound.
- Cotton No.  $\times 1.693 =$  Metric No.
- $5315 \div$  Cotton No.  $=$  Denier No.
- $305 \div$  Cotton No.  $=$  Dram No.
- $1000 \div$  Cotton No.  $=$  Grains per 120 yds.
- $833 \frac{1}{3} \div$  Cotton No.  $=$  Grains per 100 yds.
- $416 \frac{2}{3} \div$  Cotton No.  $=$  Grains per 50 yds.
- $208 \frac{1}{3} \div$  Cotton No.  $=$  Grains per 25 yds.
- $166 \frac{2}{3} \div$  Cotton No.  $=$  Grains per 20 yds.
- $17 \frac{1}{7} \div$  Cotton No.  $=$  Jute No.

## Worsted Count. (560-Yard Lengths per Pound).

Used for worsted yarn.

- Worsted No.  $\times .35 =$  Runs.
- Worsted No.  $\times \frac{2}{3} =$  Cotton No.
- Worsted No.  $\times 1 \frac{3}{4} =$  West of Eng. No.
- Worsted No.  $\times 1.8 \frac{2}{3} =$  Linen No.
- Worsted No.  $\times 2 \frac{3}{16} =$  Yorkshire No.
- Worsted No.  $\times 560 =$  Yards per lb.
- Worsted No.  $\times 1.129 =$  Metric No.
- $7972 \div$  Worsted No.  $=$  Denier No.
- $457 \div$  Worsted No.  $=$  Dram No.
- $1500 \div$  Worsted No.  $=$  Grains per 120 yds.
- $1250 \div$  Worsted No.  $=$  Grains per 100 yds.
- $625 \div$  Worsted No.  $=$  Grains per 50 yds.
- $312 \frac{1}{2} \div$  Worsted No.  $=$  Grains per 25 yds.
- $250 \div$  Worsted No.  $=$  Grains per 20 yds.
- $25 \frac{5}{7} \div$  Worsted No.  $=$  Jute No.

## West of England Count. (320-Yard Lengths per Pound).

Used for carded woolen yarn in the west of England.

- West of Eng. No.  $\div 5 =$  Runs.
- West of Eng. No.  $\times .20 =$  Runs.
- West of Eng. No.  $\times .381 =$  Cotton No.
- West of Eng. No.  $\times .571 =$  Worsted No.
- West of Eng. No.  $\times 1.07 =$  Linen No.
- West of Eng. No.  $\times 1.25 =$  Yorkshire No.
- West of Eng. No.  $\times 320 =$  Yards per lb.
- West of Eng. No.  $\times .645 =$  Metric No.
- $13,951 \div$  West of Eng. No.  $=$  Denier No.
- $800 \div$  West of Eng. No.  $=$  Dram No.

- $2,565 \div$  West of Eng. No.  $=$  Grains per 120 yds.
- $2,187 \div$  West of Eng. No.  $=$  Grains per 100 yds.
- $1,094 \div$  West of Eng. No.  $=$  Grains per 50 yds.
- $547 \div$  West of Eng. No.  $=$  Grains per 25 yds.
- $437 \frac{1}{2} \div$  West of Eng. No.  $=$  Grains per 20 yds.
- $45 \div$  West of Eng. No.  $=$  Jute No.

## Linen Count. (300-Yard Lengths per Pound).

The world's standard for linen and hemp yarn. Used in the Philadelphia district for woolen yarn and there called the "cut" system.

- Linen No.  $\times .19 =$  Runs.
- Linen No.  $\div 5 \frac{1}{3} =$  Runs.
- Linen No.  $\times .357 =$  Cotton No.
- Linen No.  $\div 2.8 =$  Cotton No.
- Linen No.  $\times .534 =$  Worsted No.
- Linen No.  $\times \frac{15}{16} =$  West of Eng. No.
- Linen No.  $\times 1.17 =$  Yorkshire No.
- Linen No.  $\times 300 =$  Yards per lb.
- Linen No.  $\times .605 =$  Metric No.
- $14,882 \div$  Linen No.  $=$  Denier No.
- $853 \div$  Linen No.  $=$  Dram No.
- $2,800 \div$  Linen No.  $=$  Grains per 120 yds.
- $2,333 \div$  Linen No.  $=$  Grains per 100 yds.
- $1,167 \div$  Linen No.  $=$  Grains per 50 yds.
- $583 \div$  Linen No.  $=$  Grains per 25 yds.
- $467 \div$  Linen No.  $=$  Grains per 20 yds.
- $48 \div$  Linen No.  $=$  Jute No.

## Yorkshire Count. (256-Yard Lengths per Pound).

Used in England for carded woolen yarn.

- Yorkshire No.  $\times .16 =$  Runs.
- Yorkshire No.  $\times .305 =$  Cotton No.
- Yorkshire No.  $\times .457 =$  Worsted No.
- Yorkshire No.  $\times .8 =$  West of Eng. No.
- Yorkshire No.  $\times .853 =$  Linen No.
- Yorkshire No.  $\times 256 =$  Yards per lb.
- Yorkshire No.  $\times .516 =$  Metric No.
- $17,440 \div$  Yorkshire No.  $=$  Denier No.
- $1,000 \div$  Yorkshire No.  $=$  Dram No.
- $3,281 \div$  Yorkshire No.  $=$  Grains per 120 yds.
- $2,734 \div$  Yorkshire No.  $=$  Grains per 100 yds.
- $1,367 \div$  Yorkshire No.  $=$  Grains per 50 yds.
- $684 \div$  Yorkshire No.  $=$  Grains per 25 yds.
- $547 \div$  Yorkshire No.  $=$  Grains per 20 yds.
- $56 \div$  Yorkshire No.  $=$  Jute No.

## Yards per Pound.

The size of yarn is sometimes indicated by the number of yards per pound.

- Yards per lb.  $\div 1600 =$  Runs.
- Yards per lb.  $\div 840 =$  Cotton No.
- Yards per lb.  $\div 560 =$  Worsted No.
- Yards per lb.  $\div 320 =$  West of Eng. No.
- Yards per lb.  $\div 300 =$  Linen No.
- Yards per lb.  $\div 256 =$  Yorkshire No.
- Yards per lb.  $\div 496 =$  Metric No.
- $4,464,528 \div$  Yards per lb.  $=$  Denier No.
- $256,000 \div$  Yards per lb.  $=$  Dram No.
- $840,000 \div$  Yards per lb.  $=$  Grains per 120 yds.
- $700,000 \div$  Yards per lb.  $=$  Grains per 100 yds.
- $350,000 \div$  Yards per lb.  $=$  Grains per 50 yds.
- $175,000 \div$  Yards per lb.  $=$  Grains per 25 yds.
- $140,000 \div$  Yards per lb.  $=$  Grains per 20 yds.
- $14,400 \div$  Yards per lb.  $=$  Jute No.

## Metric Yarn Number (496 Yards per Pound).

This system of numbering (1000-meter lengths per kilogram) is used on the Continent of Europe, principally for carded woolen and worsted yarn.

In France cotton yarn is numbered to indicate the number of 1000-meter lengths per half-kilogram (992 yards per pound, making the French No. equal to one-half of the metric).

- Metric No.  $\times .31 =$  Runs.
- Metric No.  $\times .59 =$  Cotton No.
- Metric No.  $\times .886 =$  Worsted No.
- Metric No.  $\times 1.55 =$  West of Eng. No.
- Metric No.  $\times 1.65 =$  Linen No.

(Continued on following page)

# The Mechanics of Textile Processes

By W. Scott Taggart, M. I. Mech. Eng.

In the case of irregular bodies or bodies that are not homogeneous in structure, the center of gravity is found by balancing the body on a knife-edge support or other test, and in many cases by calculation of graphics.

Pulleys and other revolving bodies, no matter how carefully they are made, may have their center of gravity out of the center of the pulley. They are said to be out of truth or out of balance and when running are liable to cause serious trouble. All such bodies are carefully balanced by adding

Fig. 151.

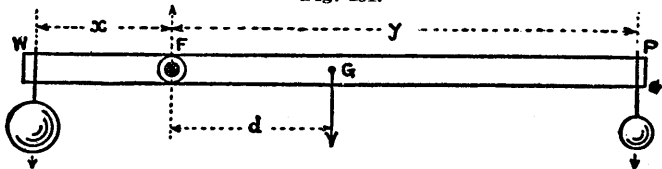


Fig. 152.

or removing portions of the material until they remain at rest in any position when supported on their geometrical center.

If a uniform lever is supported on its center, its weight will act directly over the support and will not affect the balance; but if such a lever is fulcrumed on one side of the center of gravity, the weight of the lever must be taken into account.

Ex. A uniform lever 18 in. long is pivoted at a point 3 in. from one end. From the short arm hangs 36 lbs. How many pounds must be hung from the long arm to obtain equilibrium? The weight of the lever is 6 lbs., Fig. 151.

Fig. 153.

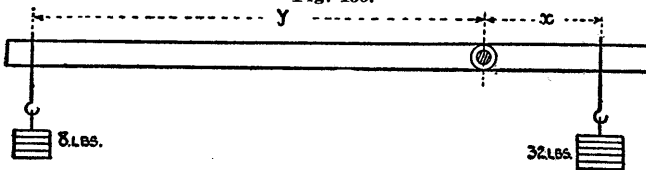


Fig. 154.

The center of gravity is in the center of the lever, so the weight of the lever will act 6 in. from the fulcrum.

Moment of W round F is  $Wx$

Moment of P round F is  $Py$   
Moment of G round F is  $Gd$

The moments on either side of the fulcrum must be equal.

$$Py + Gd = Wx$$

$$P15 + (6 \times 6) = 36 \times 3$$

$$P15 + 36 = 108$$

$$P = (72 \div 15) = 4.8 \text{ lbs.}$$

Ex. A safety-valve is  $2\frac{1}{2}$  in. dia. A lever 22 in. long is pivoted  $4\frac{1}{2}$  in. from the center of the valve and a weight of 60 lbs. is hung 18 in. from the fulcrum. What is the total pressure on the valve, and the pressure per sq. in.? The weight of the lever is 6 lbs. and the center of gravity acts at 12 in. from the fulcrum, Fig. 152.

The pressure P is the unknown quantity.

$$P \times FP = W \times WF + G \times GF$$

$$P \times 4\frac{1}{2} = (60 \times 18) + (6 \times 12) = 1152$$

$$P = 1152 \div 4\frac{1}{2} = 256 \text{ lbs., total pressure on valve.}$$

$$\text{Area of valve} = 4.9 \text{ sq. in.}$$

$$256 \div 4.9 = 52.24 \text{ lbs. per sq. in.}$$

## MECHANICAL ADVANTAGE

In a previous article the velocity ratio was defined as follows: The movement of the first driver  $\div$  the movement of the last driver.

This statement may assume a variety of forms all meaning the same thing: the first movement in a given time  $\div$  the last movement in the same time, or space moved over at driving end  $\div$  space moved over at finishing end.

It is thus seen that in any given arrangement of driving mechanism it is a simple matter to find how much faster or how much slower the resulting speed or movement is than the starting speed: starting movement  $\div$  resulting movements = velocity ratio.

This method of comparing movements is applicable to practically all kinds of mechanism and is very often the basis of methods for calculating any advantage we obtain by the use of mechanism. If by the use of some appliance a force of 10 lbs. will enable a person to lift 50 lbs., there is clearly a gain of four-fold, which means that the appliance has enabled the person to move something against a resistance, to lift a load or to exert a force equal to five times the amount of the force applied. This would be termed the *mechanical advantage* of the appliance: force at the terminal end  $\div$  force at the starting end = mechanical advantage, or load lifted  $\div$  load applied = mechanical advantage.

This may be illustrated in the case of a simple lever, Fig. 153. If the load applied is 8 lbs. and a weight of 32 lbs. is required to balance it on the other arm in the position shown, then: load lifted  $\div$  load applied = 4, mechanical advantage.

If instead of a weight being used we applied other forms of force, such as a driving effort, there would be exerted also at the other end a resultant effort or load, so that the effect can be expressed in this form: load  $\div$  driving effort = 4, mechanical advantage.

Suppose that the lever moves round its fulcrum as in Fig. 154. When the lever has moved from position AB to CD the end A has traversed a portion of a circle AC and the end B has moved in the circular path BD, so that  $AC \div BD$  = the velocity ratio.

It is easy to show that since AF is four times longer than FB, the arc AC is four times longer than the arc BD, and that therefore the velocity ratio is four, but the usual method is to prove it by drawing CH and DE at right angles to AB and then from the similar triangles show that:

$$HC \div CF = DE \div DF. \text{ Then:}$$

$$HC \div DE = CF \div DF = 4$$

As HC and DE represent the respective arcs AC and BD, we have

$$HC \div DE = 4, \text{ velocity ratio.}$$

## "STRAIGHT LINE" TEXTILE CALCULATIONS.

(Continued from previous page)

Metric No.  $\times 1.94$  = Yorkshire No.

Metric No.  $\times 496$  = Yards per lb.

**9,000  $\div$  Metric No. = Denier No.**

516  $\div$  Metric No. = Dram No.

1,693  $\div$  Metric No. = Grains per 120 yds.

**1,411  $\div$  Metric No. = Grains per 100 yds.**

706  $\div$  Metric No. = Grains per 50 yds.

353  $\div$  Metric No. = Grains per 25 yds.

282  $\div$  Metric No. = Grains per 20 yds.

29  $\div$  Metric No. = Jute No.



# The Construction of Weaves

By E. Bittner

## Color Effects on Satin and Other Weaves.

A great variety of attractive effects can be obtained by arranging the colored warp and filling threads on satin and other weaves.

Sharply defined stripes are produced with a warp satin weave by arranging two or more colors in the warp and weav-

picks. The pattern is shown at top and right of draft; the weave in lower left-hand corner.

Fig. 552. A wider cross-stripe on the same 5-leaf satin.

Fig. 553. Ling stripe on a 5-leaf warp satin. Dark warp is down when dark pick is woven; light warp is down when light pick is woven.

Fig. 554. Long stripe on a 7-leaf satin.

Fig. 555. Cross stripe on an 8-leaf filling satin.

Fig. 551.

Fig. 552.

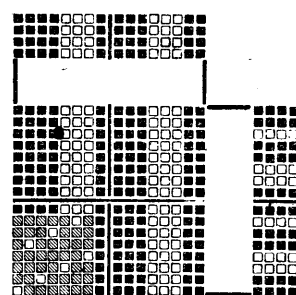
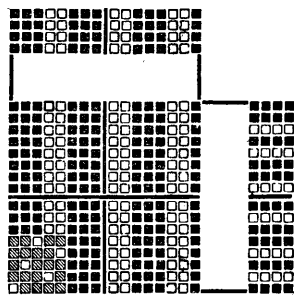
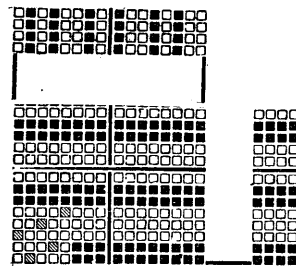
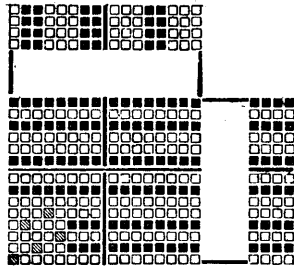


Fig. 553.

Fig. 554.

ing with closely set and solid color filling, as the filling shows very little or not at all on the face.

Warp stripes only are woven with a corkscrew weave, but

Fig. 555.

Fig. 556.

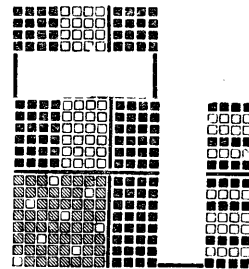
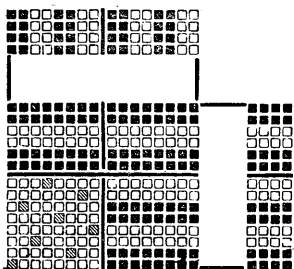


Fig. 557.

Fig. 558.

checks are produced with crepe weaves by introducing multiple colors in both warp and filling.

Various patterns are shown at Figs. 551 to 567.

Fig. 551. A cross stripe with a 5-leaf satin. Warp, 2 dark 3 light. Filling, 1 dark, 1 light, 1 dark, 2 light. Light warp is raised over the light picks; the dark warp over the dark

Fig. 560.

Fig. 563.

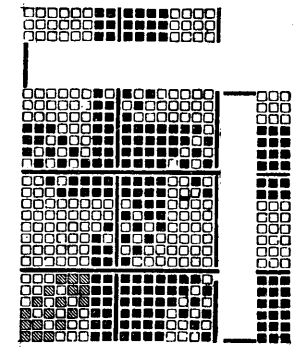
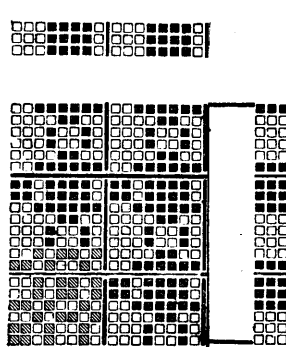
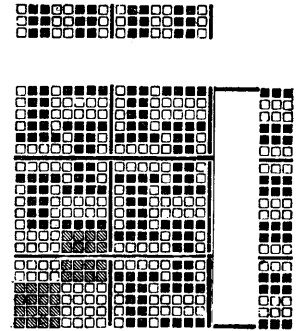
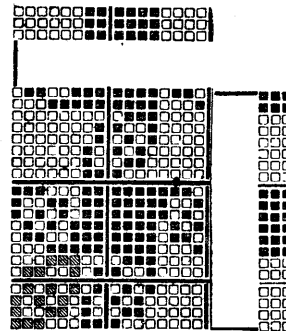


Fig. 564.

Fig. 565.

Fig. 556. Long stripe on an 8-leaf warp satin.

Fig. 557. Cross stripe on a 10-leaf filling satin.

Fig. 558. Long stripe on a 10-leaf warp satin.

Fig. 559.

Fig. 567.

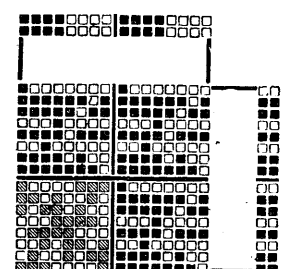
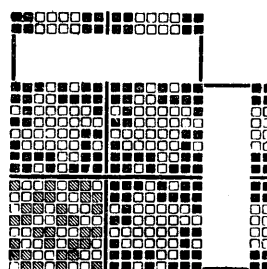
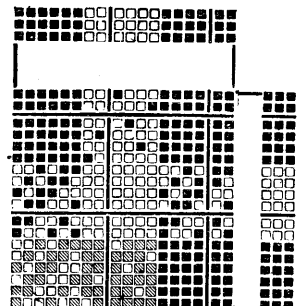
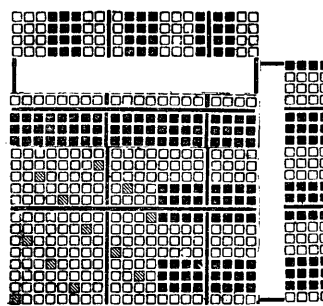


Fig. 561.

Fig. 562.

(Continued on following page)



# The Identification of Textile Fibers

By Dr. Louis J. Matos

In examining undyed wool fibers of any grade under the microscope, attention should be given to some fibers that appear distinctly white; also in dyed wool some fibers appear to be but slightly stained. These fibers are known as *kemps* and are generally devoid of the characteristic markings that

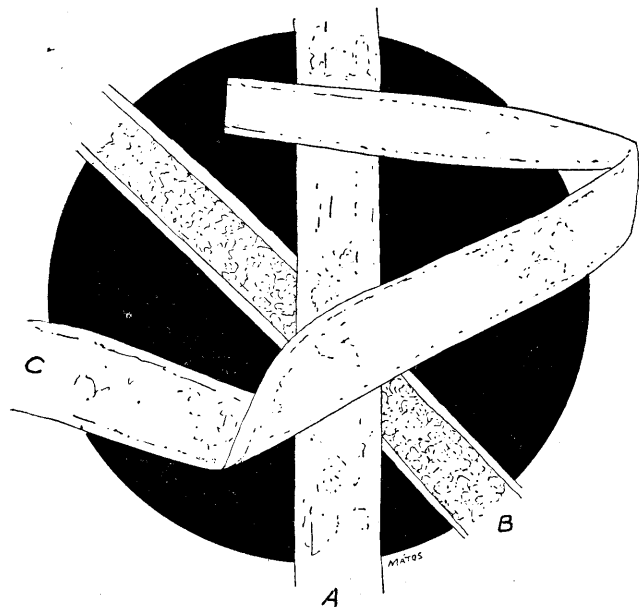


Fig. 25. *Kemps*. A and B. Roundish *kemps*, usual form. C-Flat kemp. Scarce.

distinguish the normal wool fibre. *Kemps* are somewhat horny in texture, appear flat, and are essentially dead fibers. They occur in almost all wools, some wools being distinctly "kempy," while in others such fibers seldom occur. They may be mistaken for vegetable fibers, but the alkali solubility test will confirm the identity, Fig. 25.

A very important chemical test to distinguish vegetable fibers from animal fibers, including natural silk, is to char a small portion of the sample in a dry test tube over a bunsen flame. In the mouth of the test tube place a small slip of red and blue litmus paper, and note the reaction of the fumes on

the color of the paper. If the red paper changes to blue, the fibers are of animal origin, while if the blue paper changes to red, the fibers are vegetable. Animal fibers contain nitrogen, which during the heating is liberated in the form of ammonia, an alkali, which changes the red paper to blue. Vegetable fibers when treated as above give off acetic acid which changes the blue paper to red.

Natural silk is classed as an animal fibre, although it is a product of the silkworm. There are two commercially important silks, the ordinary natural silk, and the tussah, or wild silk. The chemical reactions of both of these are practically the same, but the microscopic characteristics are widely different and require notice.

Natural silk, in the raw state, always appears as a double filament. Each fiber is cemented to the other with the natural sericin or gum that is secreted by the worm during spinning, Fig. 26. Boiled-off silk appears as a single filament, quite clean and free from any gum. The filament in cross-section is round.

Tussah silk, on the other hand, though double, is distinctly flattish in the raw state, and besides shows under a moder-

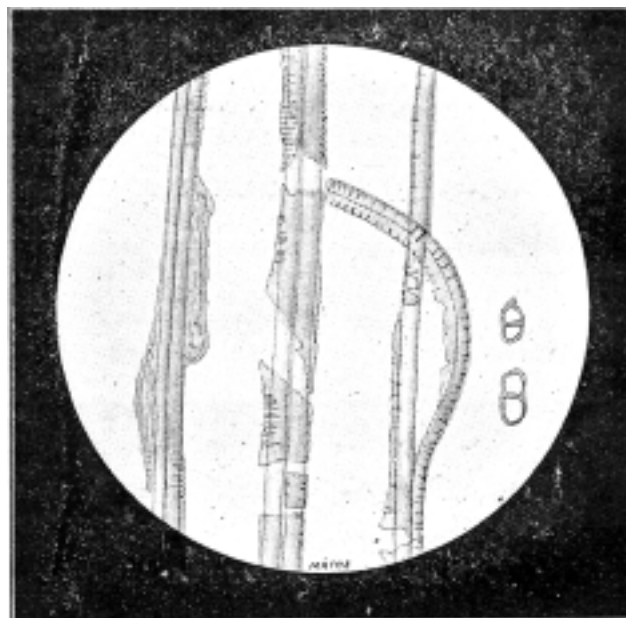


Fig. 26. Raw silk fibres. Here is seen the natural silk gum or "glue" known properly as sericin, binding the double filaments together.

ately high power microscope striæ running lengthwise, Fig. 27. The size of the filaments of this kind of silk is relatively larger than that of the natural silk.

Chemically, the wild silks are not as readily acted upon by reagents as the true silk, and the microscope affords the best means of identification. The parallel chemical reactions of wool and silk are as follows:

Reagents	Wool	Silk
Schweitzer's reagent.	Insoluble	Dissolves.
	after ½ hour immersion.	
30% solution of caustic potash.	Dissolves.	Dissolves.
	On adding a few drops of a 10% solution of nitro-prusside turns violet.	On adding a few drops of a 10% solution of sodium: No change in color.
Saturated solution of carbonate of soda, without heating.	Wool dissolves, but is precipitated upon adding water.	Silk is not attacked.

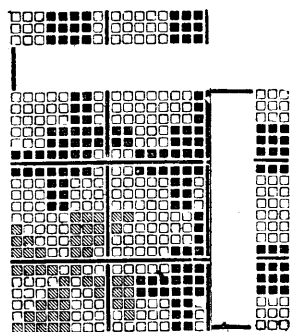
(Continued on following page)

## THE CONSTRUCTION OF WEAVES.

(Continued from previous page)

- Fig. 559. Cross stripe on a 12-leaf filling satin.
- Fig. 560. Check on a 6-leaf thousand-square weave.
- Fig. 561. Check on 8-leaf radiating twill.
- Fig. 562. Check on 8-leaf crepe.
- Fig. 563. Check on 8-leaf basket.
- Fig. 564. Check on 8-leaf modified basket.

Fig. 566.



- Fig. 565. Check on a 6-leaf thousand-square weave.
- Fig. 566. Check on a 10-shaft thousand-square weave.
- Fig. 567. Check on a 12-shaft combination weave.

# Power Transmission in Textile Mills

By Charles L. Hubbard

## Bearing Proportions.

The relation between the diameter of the shaft and length of the bearing depends upon the maximum pressure of the shaft against the bearing, expressed in pounds per square inch of "projected area," the latter being obtained by multiplying the diameter of shaft by length of bearing in inches. If, for example, a journal 3 inches in diameter by 10 inches in length carries a total weight of 3,000 pounds, the pressure per square inch will be  $3,000 \div (3 \times 10) = 100$  pounds.

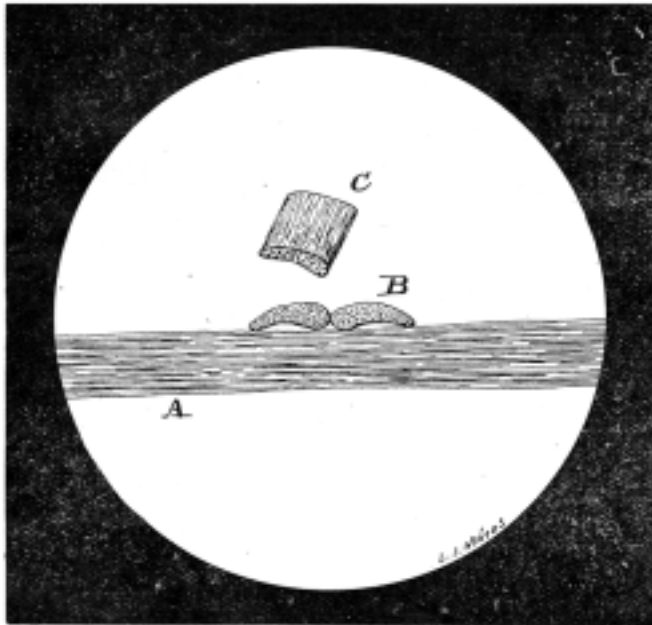
The allowable pressure depends upon the speed of rotation, the material and finish of the bearing surfaces to some extent, and largely upon the quality of the oil used and the thoroughness with which it is applied to all parts of the bearing. For the conditions of general transmission work tests show safe bearing pressures ranging all the way from 100 to 600 pounds per square inch, depending upon the speed and method of lubrication.

As the exact pressure to be provided for is not known under ordinary conditions, and furthermore as the length of bearing cannot well be changed for each piece of work, it is customary to assume a relation between diameter and length of journal which shall be safe for a given class of work. Thus for line-shafting and general power transmission a ratio of 2.75 may be taken for speeds below 100 r. p. m., while for speeds of 100 to 350 r. p. m., the ratio should be at least 3 to 1. The catalogs of a number of manufacturers of bearings show

## IDENTIFICATION OF TEXTILE FIBRES.

(Continued from previous page)

Plumbate of soda. Wool turns brown. No coloration. In making microscopic mounts of wool fibers for factory or mill work, permanence of the slides is not necessary, consequently distilled water will serve all purposes, but when permanence is required, the use of a gum-arabic-glycerine-water



White cow hair when viewed under the microscope, appears gray.  
Fig. 27. Tussah Silk. A—is a longitudinal view of a single fibre showing striae. B is a cross-section of the double filament. C—is a perspective view of a short section.

mixture, known as Farrant's Medium, will prove useful. It may be bought of most dealers in microscopic supplies, and a few ounces will make several hundred slides.

the standard length to be four times the diameter, while short-length bearings for lighter work have a ratio varying from 2.5 to 3, according to the make. Extra-short length bearings for special conditions are also made, with a ratio of about 1.6. For head and line shafts and general transmission work, the standard length of bearing should always be used as the bearing then runs cooler and requires less attention.

## Linings.

Bearings are lined with a softer metal than the shaft for two principal reasons. If the bearing were of a material approaching in hardness that of the shaft, abrasion or scoring

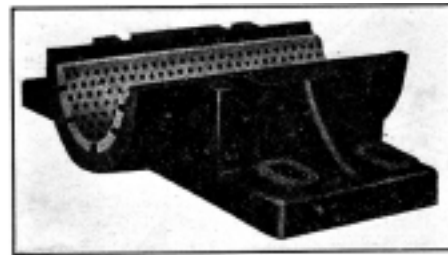


Fig. 40. Anti-Friction Bearing.

would take place should the oil fail to flow properly or the bearing become dry for any other reason. With the bearing lined with some softer metal, abrasion is confined to the lining, which is easily renewed without damage to the shaft.

Even though the frictional heat is sufficient to melt the lining, the shaft will not usually be injured, although it may require some care to remove the pieces of lining material which adhere to it. It is of course impossible to fit the bearing surfaces of new work exactly. If the lining is of a comparatively soft metal it will flow sufficiently to conform to any slight irregularities of the shaft after a short period of use.

The metals usually used for this purpose are alloys of tin, antimony, lead, copper, and zinc in varying proportions and commonly sold under the name of "babbitt."

Babbitt metal is easily melted in a ladle and is poured into the iron box or casing around a mandrel of the same size as

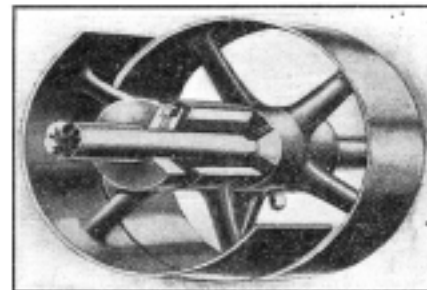


Fig. 41. Oilless Loose Pulley.

the shaft. To get the best results both the box and mandrel should be heated, otherwise the molten metal will not flow freely and the result will be an imperfect casting. A cold mandrel also produces a thin chill or hard film on the face of a bearing which is likely to be torn from the softer metal back of it by the grinding action of the shaft. Heating burns off any grease which may happen to be present on the box or mandrel. This prevents the formation of gas and resulting blowholes. It is the most economical in the end to use the best grades of babbitt made up of pure metals and free from

(Continued on following page)

# Purification of Water for Boiling Off and Dyeing Silk

By J. L. Girard, Chemical Engineer

## Precipitation Process.

*Theory.* Calcareous water contains lime salts and to simplify the theoretical explanation we would refer to the salts of magnesia which are subject to identical reactions. Lime is found in water in two forms:

(a) Bicarbonate of calcium formed by the dissolving of carbonates by the action of free carbonic acid which is present.

(b) Sulphate of lime soluble in cold water in very appreciable proportions.

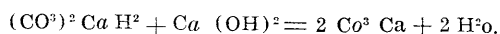
When the water is boiled the bicarbonate of lime is decomposed, releasing carbonic acid and depositing insoluble and neutral carbonate.

The sulphate of lime on the contrary remains in solution and causes the permanent hardness of the water which resists boiling. The two products combined constitute the total hardness of the water.

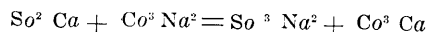
The total or permanent hardness of the water is indicated in France by the hydrometric degree, corresponding to one centigram of carbonate of lime per liter (1 part by weight per 100,000 parts of water). I will leave the hydrometric analysis of water for a special article as it does not come within the practical limits of the subject.

The precipitation process is based on the two following reactions:

(a) The bicarbonate of calcium is treated with lime which absorbs a portion of the carbonic acid and is converted into an insoluble carbonate in accordance with the following equation:



(b) The sulphate of calcium is treated with carbonate of soda which by double decomposition gives sulphate of soda and carbonate of lime as follows:



The lime is finally precipitated in the form of insoluble carbonate which is removed by decanting and filtering.

In practice the reaction is not as simple as would appear from the preceding explanation. The salts are not completely transformed, owing to opposing reactions. Furthermore the carbonate of lime is not absolutely insoluble. When this process gives water testing 5° to 6° with a slight alkaline reaction, the result can be considered satisfactory.

*Practice.* The precipitation process is carried out in two ways:

- (1) By intermittent action with purification tanks.
- (2) By continuous action with various purifying systems.

The intermittent installation gives a small production and requires more labor than the continuous method, but uniform results are more easily obtained with it. The intermittent plant consists simply of a tank in which the water to be purified is mixed in suitable proportions with the lime and carbonate of soda. The water is decanted to dispose of the precipitate and the clear water is thus obtained. A very convenient installation for a small production is arranged as follows: Two tanks are operated alternately, one decanting while the other is being emptied. The tanks are rather shallow with two draw-off valves, one in the bottom for cleaning out the tank, and the other about four inches above the bottom to draw off the clear water. Near the water supply pipe there are placed two small tanks in which the purifying materials, carbonate of soda and lime, are dissolved.

The water and the purifying solution are run together into a pipe at a point as far as possible from the settling tank in order to obtain a thorough mixture. It is a good plan if at this time the water is thoroughly agitated, preferably by an injector blowing air or steam. The action of the chemicals and the deposit of the precipitate are hastened by heating the water.

## POWER TRANSMISSION IN TEXTILE MILLS.

(Continued from previous page)

the impurities that add to the frictional resistance of the bearing.

Experience has shown that bearings lined with high grade metals will usually run from ten to twenty times as long as those in which the ordinary grades have been used, thus greatly reducing the cost of labor and lessening the chances of shutdowns for repairs.

### Anti-friction Bearings.

There are a number of bearings upon the market constructed of such material as to require a minimum of lubrication, while others dispense with oil entirely. The first type, Fig. 40, has small graphite cylinders embedded in the babbit lining. This, it is claimed, adds greatly to the life of the bearing and at the same time reduces the consumption of oil to a minimum.

Another device, specially adapted for countershafts, loose pulleys and light machine bearings of various kinds, consists of a bushing or lining of wood chemically treated, which requires no lubrication whatever. Bearings of this type are well adapted to textile machinery where the dropping of oil upon the product may cause serious loss, also to loose pulleys, which are always difficult to lubricate because the oil will not stay at the center of the bearing, having a tendency to work out and be thrown upon belts and surrounding objects. A bushing of this type, applied to a loose pulley, is shown in Fig. 41. These bearings have in some cases been in continuous use for this purpose for nine or ten years and are still giving good results. As a rule they are best adapted to pulleys carrying belts not over 6 inches in width, not too tight nor too long.

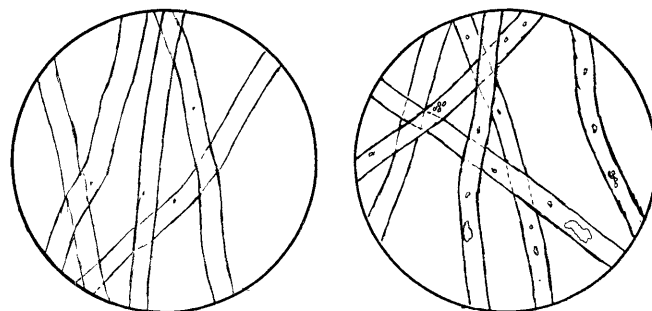


Fig. 4.  
Silk boiled in distilled water.

Fig. 5.  
Silk boiled in calcareous water.

It is naturally much better to prepare the water in the evening in order to let it settle during the night. It is also advisable not to clean out the tank oftener than once a week, as the presence of the precipitate helps to purify the water. The tank is cleaned simply by opening the draw-off valve in the bottom and clearing out the sediment with a broom and a stream of water. An excellent arrangement is obtained in a very small space by placing two rectangular tanks end to end or side by side with the water supply apparatus between the two.

# The Scouring of Wool

By Prof. Everett Hinckley, New Bedford Textile School

## Importance of Controlled Temperatures.

It is my intention in this article to illustrate the absolute necessity of a properly controlled temperature in wool scouring. It is a well recognized fact that excessive temperatures in this process set the dirt, discolor the wool, make the fiber hard and destroy its luster.

Experience over a number of years has taught us that the temperature of the scouring liquors should at no time ex-

ceed 150° F. In the case of the more lustrous fibers, this limit may be dropped as low as 100° F. Practice varies somewhat, but the majority of the scouring is done between 120° and 130° F. Hence the need for a reliable automatic device to control the temperature of the wool scouring liquor, is apparent. Such devices as mercurial thermostats have been used many years in chemical laboratories with considerable success, but constructed as they were of glass, they were fragile and liable to damage. For this reason they were not suitable in wool scouring.

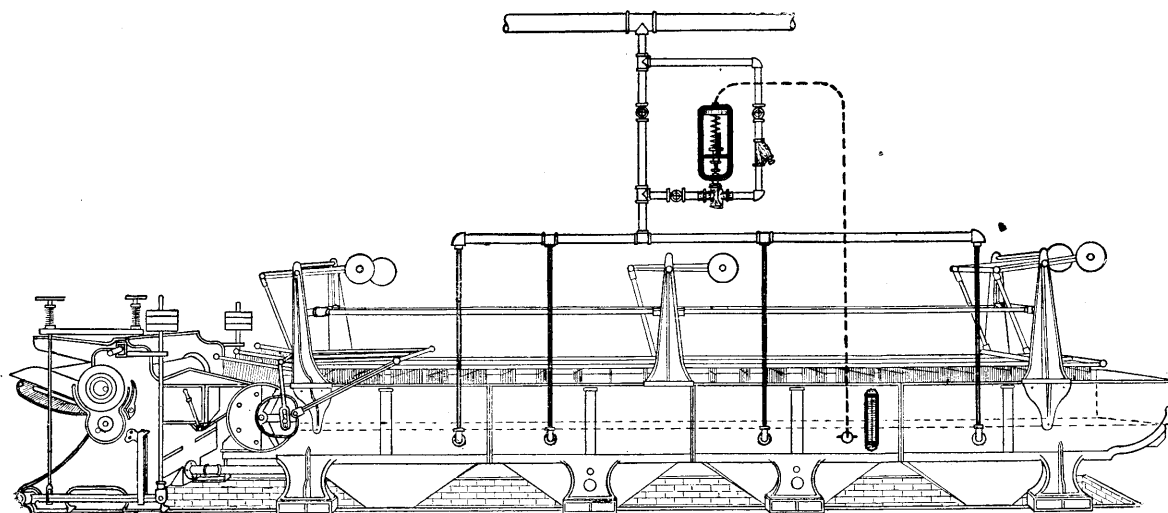


Fig. 1. Typical application of a Self-Operating Temperature Controller applied to a Sargent Wool Scouring bowl, showing method of installation.

ceed 150° F. In the case of the more lustrous fibers, this limit may be dropped as low as 100° F. Practice varies somewhat, but the majority of the scouring is done between 120° and 130° F.

The methods used are based on a particular kind of wool, certain types of scouring material and the personal equation of the operator. The control of these first two points are easily within the management of the plant, but the control of the operator is at all times a difficult point. Aside from neglect, the question of judgment arises, which, with the

Within recent years, however, metal thermostats have been developed, which act upon the same general principle as the familiar laboratory apparatus. These regulators are simple in operation, durable in construction, and, compared with labor, very inexpensive. When the temperature in the scouring bowl reaches the point for which the controller has been set, the steam valve is closed automatically. On the other hand, when the temperature falls below this pre-determined setting point, the controller automatically opens the steam valve.

In actual applications, these fluctuating demands occur constantly, and the rise and fall of the temperature is kept within very narrow limits. Fig. 1 shows a typical application of a self-operating temperature controller. Many mills, recognizing the value of such a device, have had them installed and are now obtaining results that are highly satisfactory to the practical man.

To determine exactly what the actual performance of such a device is after being in service over a period of time, several tests were made. These tests indicated that heat conditions in the several mills were similar, and the following data was selected as typical.

On one range, the temperature was regulated by an ordinary steam valve on the handle of which a weight was hung to prevent it from turning. On the other range, the temperature was controlled by a "Tagliabue" self-operating temperature controller. Fig. 2 is a photographic reproduction of the actual installation used.

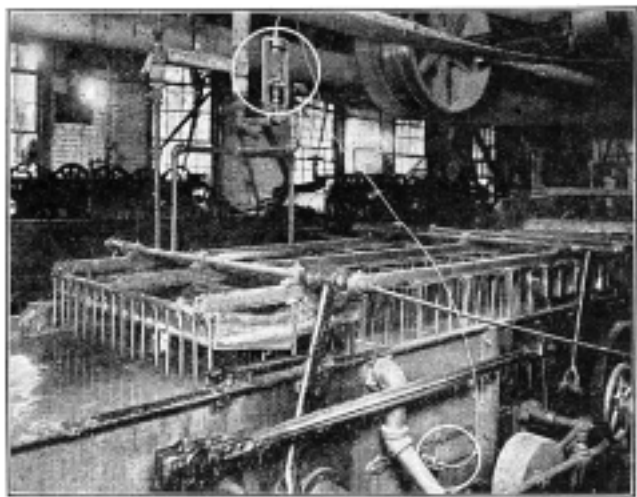


Fig. 2. Photographic reproduction of the wool scouring bowl equipped with a self-operating temperature controller taken at the mill in which the test under discussion was conducted.

best of intentions, may result in temperature conditions that are unfavorable to efficient scouring.

Of course, with constant vigilance the operator can keep the temperature of a scouring bowl fairly constant, but,

The steam for each train was obtained from the same main, and the quality of wool handled was the same, so that conditions were identical. By means of recording thermometers installed on the first bowl of each range, charts were obtained showing the actual temperatures of operation. These charts are shown in Fig. 3 and 4 respectively, the records on which need little explanation.

The chart obtained on a hand control, Fig. 3, shows a fre-

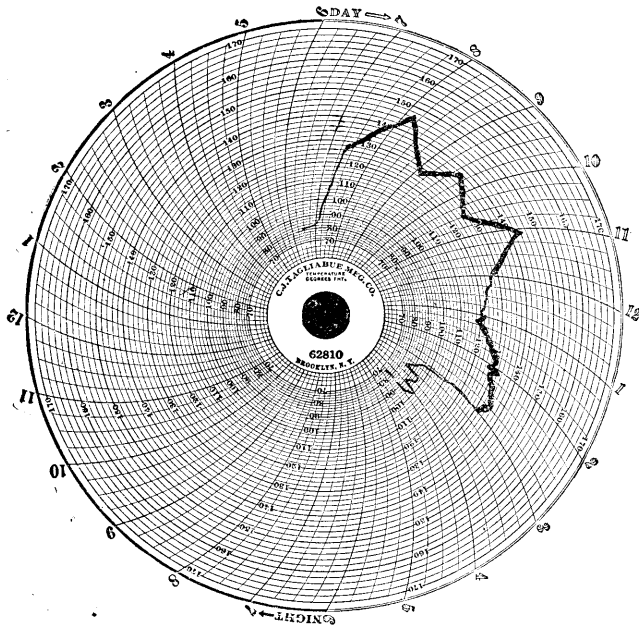


Fig. 3. Reduced reproduction of chart used to record the actual temperature conditions of the scouring liquor when the steam supply was regulated by hand. Note the wide fluctuations.

quent rise and fall of the temperature, twice reaching as high as 146° F., once 144° F., and 137° F., and also running as low as 118° in the course of a day, the actual variation amounted to 28° F.

On the other hand the chart from the bowl fitted with the

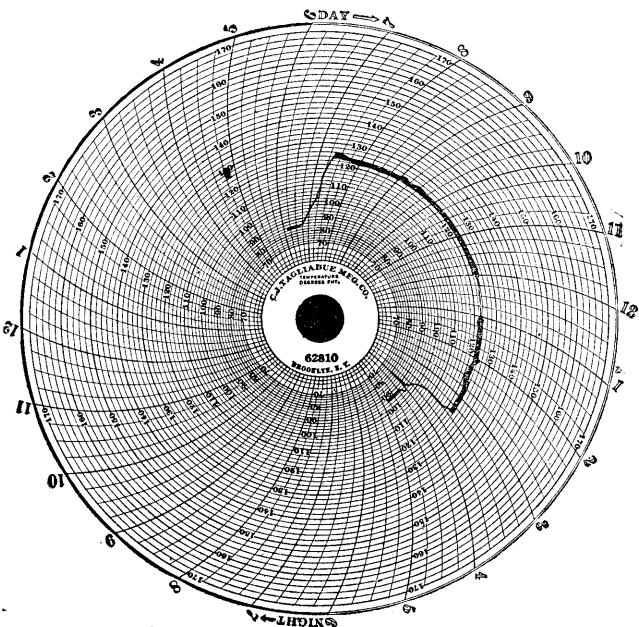


Fig. 4. Reduced reproduction of chart used to record the actual temperature conditions of the scouring liquor, when the steam supply was regulated with a self-operating temperature controller. Note the practical uniformity of control.

self-operating controller, Fig. 4, shows that the temperature was maintained practically at 123° F.

By hand regulation an actual temperature variation of 28° F. is shown, while the controller kept it within 1° of the point desired.

The self-operating controller automatically maintained the scouring liquor at 123° under most difficult conditions. It is evident, therefore, that hand control is unreliable, and results in fluctuations in temperature that produce dirty, discolored and unevenly scoured wool. There can be no doubt but that these conditions are being duplicated in other mills to a greater or less extent.

This conclusion is certain: By the use of a self-operating temperature regulator of the type named, the temperature in the scouring bowl is maintained automatically within limits so narrow that absolutely no danger of overheating of scouring liquor can occur, and all necessity for close attention on the part of the operator is avoided. The fact that the self-operating regulator used in these tests has been in operation day after day under usual mill conditions over an extended period of time proves conclusively that the instrument is absolutely reliable and practical.

The above tests demonstrate that in the self-operating controller a practical solution of control of temperature in wool scouring has been reached; that the danger of overheating wool scouring liquors is avoidable, and, therefore, that the damage done to the wool fiber by high temperature is wholly inexcusable.

### HOW THE "FLAPPER" WORKS.

In England they apply the expressive name of "flappers" to the superfluous employees who draw their breath and their pay in the Government departments. The species, however, is not confined to the British Government. When the armistice was signed it was confidently expected that the army of employees on the Government payroll in Washington would be reduced one-half without delay. Eight months later the host in the departments was actually on the increase. How the American "flapper" manages to put in his time was recently told by Senator Jones of Washington in a Senate discussion of a resolution calling for information as to the duplication of work by Government bureaus in the promotion of foreign commerce:

On yesterday morning two employees from the Adjutant General's office came to my office. It seems, from their statement, that the Secretary of War has issued an order requiring the clerks there to work half an hour overtime, the ostensible reason given being that the necessities of the Adjutant General's office and the different bureaus require the clerks to give this extra time. Those clerks told me very positively that they did not do more than an hour or at the outside more than two hours of real genuine work a day, and that frequently their chiefs would come around and tell them to make a showing of being busy. They further stated that they were satisfied that this order requiring extra time, and so forth, has really been issued for the purpose of impressing Congress with the necessity of extra appropriations. I have not any doubt that these persons were telling the truth. It discloses a condition of things that we ought to try to get at if we can possibly do so.

Mr. Smoot. The Senator from Washington is a member of the Appropriations Committee, and he knows that no matter how much money Congress appropriates for any department of this Government—perhaps with a single, solitary exception—all of it is spent, and the heads of the departments will see that it is spent. If they cannot spend it legitimately, they will employ people enough to require the expenditure of every dollar of the appropriation. One reason for that is that they think if they should happen to turn any unexpected balance back into the treasury at the end of the fiscal year the Congress of the United States would take that as an indication that the money they had asked for was unnecessary. The departments of our Government have now gotten into a position where they not only ask for the amounts they know they have to have, but they ask for all they think they can get, with the idea that Congress is going to cut some of it out anyhow, and they will be on the safe side. That practice must be stopped."

A strong man is needed, strong mentally, morally and physically, to take charge of affairs at Washington, get rid of the "flappers" and establish the Government service on a basis of economy and efficiency.

# Influence of the Atmosphere on Wool

By A. Kertesz

(Read before the Association of German Chemists in 1916 and suppressed by the German Government during the War.)

It has surprised many intelligent observers that the appearance of the clothing worn by many of the soldiers on leave had very much altered, in that the surface of the cloth had completely disappeared, laying bare the threads of the cloth so that the uniforms looked like badly-worn cotton material.

According to the present state of our knowledge, the following could be possible causes of this:

1. That the raw material was of low quality.
2. That the wool had been deteriorated in the dyeing or in course of manufacture.
3. That the uniforms had been affected by conditions prevailing on active service, for example, poison gases, or gaseous products from high explosives.
4. That the faults had been caused by too severe or too alkaline steaming during the disinfecting process.

The last named suggestion was considered very probable, because the dirt and earth present in the uniforms might easily react alkaline when steamed and thus cause the damage.

The examination of hundreds of garments taken from the different hospitals proved, however, that the above suggestions as possible causes of the extraordinary deterioration of the uniforms were wide of the mark, because clothing which did not come within the scope of the above possible causes was equally badly affected.

Further experiments showed without any possibility of doubt that the effect on the cloth was due in the first place to the action of atmospheric influences on the wool, and that the observed differences in the uniforms were due to the degree and length of exposure to which they had been subjected. The hitherto accepted idea that the appearance of the cloth was an indication of the exertions and fatigue through which the wearer had passed was proved to be incorrect in its general form. The change in the cloth was rather an exact measure of the length of time the wearer had been in the open.

These faults had not shown themselves hitherto on this scale, because uniforms had never previously to this war been submitted to so long, continuous, and severe exposure to atmospheric influences, so that these faults had now developed after months instead of after years, when they were attributed in the latter case to general wear.

It was noticed by A. Rechberg in Hersfeld that atmospheric influences had a strong action on the wool fiber. This firm found in 1913 on making long exposures of German blue-gray uniform cloth, made respectively from two blends of colored wool in which white wool and chromed wool were used for blending purposes, that the white wool in the mixture became tender while the chromed wool did not.

The experiments carried out by me on this basis completely confirmed the supposition of Rechberg, and showed that wool on exposure to the atmosphere became tender and finally completely destroyed. The destruction was most pronounced if the wool was in its natural state. The destruction is most pronounced on white scoured wool, less pronounced on dyed wool, and still less pronounced on chromed wool. Acid salts, alum, or iron salts delay the destructive effect on the wool, but not to the same extent as chrome salts. The effect is the strongest in the summer months with most sunshine.

The action is most easily seen if a cloth made from a mixture of dark dyed wool and white wool is exposed to the atmospheric influences and carefully examined from time to

time. The cloth begins to grow darker and darker after 3 to 4 months' exposure, due to the fact that the white wool falls out and the cloth becomes quite dark and tender after a few more months.

On examination of uniforms which had been worn on active service it was estimated that the markedly changed appearance of the cloth could also be attributed to the action of the sun and weather. This was confirmed by fastening blue-gray uniforms on to a board and exposing them for 8 months. At the end of this period the cloth had completely lost its wool character, and after the dirt and dust had been removed possessed exactly the same bare appearance that had been noticed in the case of many uniforms returned from active service.

Experiments were now made by exposing for 8 months undyed cloth which had been previously treated as follows:

1. Undyed gray cloth.
2. The above boiled  $1\frac{1}{4}$  hours with 4 per cent. sulphuric acid.
3. The above boiled  $1\frac{1}{4}$  hours with 4 per cent. formic acid.
4. The above boiled  $1\frac{1}{2}$  hours with 3 per cent. bichrome,  $2\frac{1}{2}$  per cent. tartar.
5. The above boiled  $\frac{3}{4}$  hour with 3 per cent. potassium bichromate, 6 per cent. lactic acid, 1 per cent. sulphuric acid.
6. The above boiled 1 hour with 2 per cent. sulphuric acid and then 2 per cent. bichrome added and boiled  $\frac{3}{4}$  hour later.
7. The above boiled 1 hour with 2 per cent. formic acid and then 2 per cent. bichrome added and boiled  $\frac{3}{4}$  hour longer.
8. The above washed  $\frac{3}{4}$  hour at 122° F. with 2 gr. ammonia,  $\frac{1}{2}$  gr. hydrosulphite,  $\frac{1}{2}$  gr. universal oil per liter.

	BEFORE EXPOSURE.							
	1	2	3	4	5	6	7	8
Strength .....	35	35	33.4	34	33.2	35.4	35	33.2
Elasticity .....	78	75	76	72	79	76	72	76
	AFTER EXPOSURE.							
	1	2	3	4	5	6	7	8
Strength .....	23	27.4	28	28	29	28.2	27.6	26
Elasticity .....	53	62	65	64	64	67	65	60

Test on the rubbing machine after preliminary extraction with ether.

	LOSS AFTER EXPOSURE.							
	1	2	3	4	5	6	7	8
65 p. c.	48 p. c.	40 p. c.	50 p. c.	31 p. c.	49 p. c.	40 p. c.	61 p. c.	

The experiments also showed that the softer the cloth handled the severer was the effect of exposure; for instance, cloths treated with lanolin on the anticipation that the lanolin would protect the cloth were more affected than cloths not treated with lanolin.

The physical properties of the cloth play a part in that cloths with a soft handle are more sensitive to atmospheric influences than cloths with a hard handle. An examination of the above results shows that No. 5 gave the best result, that the most effective protection is oxide of chrome, and the cloth that contained the most oxide of chrome was the best, thus No. 5 is better than No. 4, owing to the lactic acid producing more oxide of chrome than tartar. Nos. 2 and 3 behave like Nos. 6 and 7, while No. 8 behaves similar to No. 1 which suffered the most.

The further experiments were directed to find out which of the atmospheric influences had the greatest effect. There comes into consideration besides moisture the oxygen or ozone of the air and the light rays.

Woolen yarn and cloth were submitted for several weeks to the action of ozone. A bleaching action was soon observed, and after 8 weeks' exposure the fiber had deteriorated 35 to 40 per cent. in strength. The alteration in the wool caused by the action of the ozone was quite different from that caused by atmospheric influences. Ozone does not cause



the fabric to lose its soft woolen character, whereas on exposure to the atmosphere the wool loses its woolen character and grows increasingly hard. Also on exposure to ozone there was no difference between chromed and unchromed wool.

The experiments in which different wool samples were exposed to the illumination of a mercury vapor lamp, which is known to be very rich in ultra-violet rays, were much more decisive. In a very few days it was manifest that exactly the same results were obtained as by exposure to the atmosphere. The employment of this lamp offered the additional advantage that absolutely comparative tests could be carried out in the laboratory without taking the weather into consideration. That the reaction of the lamp was similar was shown by the fact that the differently exposed wools behaved almost the same and that the tendered wool in both cases showed the same characteristic reactions.

The surface of the exposed wool showed the surprising property of being much more readily attacked by alkali than non-exposed wool, in that weak soda or ammonia solutions had a solvent action on the same at moderate temperatures. If solutions obtained by this method are submitted to the Biuret reaction for albuminous bodies. (Becke, *Farber Zeitung*, 1912, p. 45; 1919, p. 101) experience has shown that the reaction is very useful for determining to what degree the wool has deteriorated.

**Method of Examination.**

Samples of cloth 4-5 cm. long by 2-3 cm. wide were allowed to stand for 1 hour at 60-65 deg. C in a test glass containing 10 c.c. soda ash solution (1 per cent.) after being well wetted out, during which process rubbing must be avoided. The soda solution was then poured off and 10 c.c. normal caustic soda and 2 c.c. copper sulphate solution (1:20) added. After some time the affected wool shows a violet coloration, which is compared with a prepared scale. It may be inferred from the sensitiveness to alkalies that the breakdown of the albumen molecule is caused by the light rays assisted by the moisture and oxygen of the atmosphere. This inference is supported by the fact that pure unweighted silk suffers the same deterioration and that the degree of the deterioration may be estimated by the Biuret reaction.

Only one difference shows between wool and silk in that tender wool shows a marked acid reaction, because the sulphur in wool oxidizes to sulphuric acid when it breaks up, while there is no acid formed in the case of the silk because the silk molecule contains no sulphur. The fact that raw unweighted silk is sensitive to light rays has already been proved earlier by Ristenpart (*Zeitschr. f. angew. Chemie*, 1909, §18).

Moisture alone does not play an important part, because the same reaction is obtained with the mercury vapor lamp whether the cloth is wet or dry. Further experiments will be necessary before it can be determined whether individual colors increase or decrease the absorption of the light rays. Experiments as far as they have been completed show that dark shades deteriorate less rapidly than pale shades.

The degree of deterioration of the wool may also be determined by dyeing with Methylene Blue in an acetic acid bath at 122° F. The deteriorated wool dyes much heavier than the non-exposed wool.

Before practical conclusions may be drawn from the above results further study and many experiments will be required.

For the moment I may recall my earlier publication (*Farber Zeitung*, 1908, No. 13) that wool treated with acids and mordants increased in strength. It may now be accepted that this increase in strength is coincident with its increased resistance to atmospheric influences.

One may rightly assume that a closer study of wool will enable a better wearing cloth to be manufactured than hitherto. The above experiments also show that wool does not

possess the highest wearing properties, and that these may be improved.

Later experiments have confirmed all the results given above.

The cloths most resistant to atmospheric influences are those which contain 1 per cent. oxide of chrome calculated on the weight of dry wool. The difference may easily be seen by exposing side by side for a few months untreated woolen cloth and cloth treated with chromium acetate 3°-5° Bé. Moreover, it may also be stated that sulphuric acid used in dyeing wool is detrimental to the resistance of the wool to atmospheric influences, while organic acids are much less detrimental.

The substitution of mineral by organic acids is strongly recommended, at least for fabrics for which the best wearing properties are required.

For the testing of deteriorated wool the Biuret reaction may be strongly recommended. With a little practice reasonably accurate determinations may be made of the degree of deterioration.

**SYSTEM FOR THE SPINNING MILL.**

The accompanying form is used for reporting to the manager's office the weekly production, waste and supplies in the spinning department of a cotton mill. The report is so

**SPINNING**

PRODUCTION AND AVERAGES

HOURS RUN 55  
HANDS EMPLOYED 175 WEEK ENDING May 17 19   

KIND	STANDARD NUMBER	AVERAGE NUMBER	SPINDLES RUN	POUNDS SPUN	PER SPINDLE PER DAY
<i>Worfr</i>	13	13.24	19,936	69,827	9.340g.
"	15	15.10	6,048	19,763	8.68 "
"	21	21.50	7,480	14,875	5.30 "
<i>Filling</i>	14	13.75	11,500	42,128	9.76 "
"	18	17.87	3,450	10,783	8.33 "
"	20	20.38	6,210	18,304	7.86 "
"	22	21.83	4,836	13,785	7.61 "

WASTE REPORT  
CLEARER 85lbs.  
ROLLER 168 "  
ROVING 1,263 "  
SWEEPINGS 1,075 "  
TOTAL 2,591 "  
WORKED OVER 1431.

OILS USED 53 GALLONS  
SUPPLIES \$ 243.35

clear that no detailed explanation is necessary. It gives the required and actual counts, spindles run, total pounds spun and daily production per spindle for each kind of yarn; also the waste made and worked over, gallons of oil and value of supplies delivered to the spinning department.

**TEXTILE SCHOOL GRADUATES.**

Lieut. W. A. Kennedy, who was with the 317th Field Artillery in France, has been appointed Southern representative of the Electro Bleaching Gas Company of New York. Lieut. Kennedy is a graduate of the North Carolina Textile School, West Raleigh. Another graduate of this textile school, M. Stough, is in the dyeing laboratory of the Du Pont Company of Charlotte.

**ATLANTIC DYESTUFF CO.**

T. James Brown of Everett, Mass., has taken a position in the main office of the Atlantic Dyestuff Company in Boston. Prior to going into the service, Mr. Brown was for many years with one of the leading dyestuff houses of Boston in a technical capacity, and is therefore well fitted for both technical and sales duties in his present position.

## QUESTIONS AND ANSWERS

We invite subscribers to submit any questions they desire answered regarding the manufacture or sale of textile products. Any question sent to us will be answered at once if the information is in our possession. If it is not, we will submit the question to experts and their replies will be published promptly. In urgent cases we will, if practicable, send the inquirer an advance copy of the reply. Inquirers are requested to state their questions as clearly, concisely and fully as possible. This will save time and misunderstanding. The names of inquirers are held in confidence.

### SILK GRASS.

Editor of TEXTILES:

We receive from time to time inquiries regarding the vegetable silk fiber extracted from the Central American and South American "Pita Floja" or so called "Silk-Grass" or "Silk Fiber Plant." These inquiries are generally if there is a market, where it can be found and at what price per lb. They also ask whether it is sold on spools. Please let me know where I could get the above information.

FIBRO (218).

A description of this fiber is given on page 169 under the head "Furcraea gigantea" (Giant Lily), in Chas. Richards Dodge's excellent work, "Useful Fibre Plant of the World," which was published by the United States Department of Agriculture some years ago.

Mr. Dodge quotes a number of fiber experts regarding the commercial value of this material, who go into the subject in considerable detail.

In addition to Dodge's work, which "Fibro" will undoubtedly find in the Department of Agriculture, we suggest that he consult the officials of that department, and also the Bureau of Insular Affairs. We have had occasion to consult both of these departments regarding the value of tropical fibers, and found them both interested and well informed.

MAIN 19.

### YARN CALCULATIONS.

Editor of "Textiles":

1. What is the count of the single yarn composing a 2-ply yarn that is equal in weight to a single 16s and is composed of single yarns of the same size?

2. A copy of 120s cotton filling yarn weighs one ounce net. How many yards does it contain?

ROVIGO (210).

1. If two threads of equal size are doubled the resulting 2-ply is double the size of the single yarn. Thus two threads of the material? If so, by what processes? Or is it due to 40s make a 2-ply equal to 20s, the count of the single yarn being double that of the resulting 2-ply. It follows that a 2-ply equal to 16s would result from doubling two threads of single 32s.

2. The cotton count indicates the number of 840-yard lengths per pound, or the number of 52½-yard lengths per ounce. Following are two methods of calculating the length of 1 ounce of 120s cotton:

- (a)  $120 \times 52\frac{1}{2} = 6,300$  yds. per ounce.  
 (b)  $120 \times 840 = 100,800$  yds. per pound.  
 $100,800 \div 16 = 6,300$  yds. per ounce.

Still another method for finding the yards per ounce consists in the use of the "straight line" comparative yarn table, which shows the equivalent of 120s cotton to be 63 runs, equal to 6300 yards per ounce.

### LOSS IN BLEACHING WORSTED.

Editor of TEXTILES:

We buy considerable 2/40s half-blood worsted yarn in the oil and have it double bleached. Can you give me an estimate on what percentage of loss in weight there is through the bleaching process?

CRESCENT (213).

The shrinkage of worsted yarn in the oil by double bleaching would vary considerably with the amount of oil that the spinner leaves in the yarn and which must be removed before

the yarn can be properly bleached. In addition to this loss there will be a small additional loss of weight due to the bleaching process itself, this probably amounting to not over 3 to 5 per cent.

We would suggest that "Crescent" have the yarn tested for oil before bleaching, in order to determine whether the spinner is leaving an excessive amount of oil in the yarn. It is not unusual to find worsted yarn losing as much as 12 per cent. in scouring.

MAIN 19.

### REDUCING SET OF A JACQUARD FABRIC.

Editor of "Textiles":

A jacquard machine is tied up on 1,224 hooks and is weaving a warp of 3,672 ends and set 51 inches wide in the reed. It is desired to weave a warp in this loom reeded 66 ends per inch. How many hooks must be cast out?

HURON (212).

"Huron" is weaving a cloth reeded 72 ends per inch and wishes to reduce to 66 ends per inch. A 1200-hook machine carries from 1224 to 1248 hooks. All over 1200 are in the broken row and are not included in the body of the machine. These extra hooks are used for selvages, box-motions and pressure harness. On a 1200-hook machine there are 12 hooks in the short row. As an entire row must be cast out "Huron" will have to cast out 12 hooks every 2 inches.

JOHN REYNOLDS.

### NEEDLE FOR DISSECTING CLOTH.

Editor of Textiles:

Where can I obtain a needle for dissecting cloth? I want one in which the point can be reversed and the instrument carried in the pocket. Am inclined to think you gave an illustration of such a needle in one of your interesting articles of last year, on "How to Duplicate Finished Fabrics."

CARLETON (214).

The best instrument needle for dissecting cloth that we have found is the ordinary machinist's scriber, shown in the

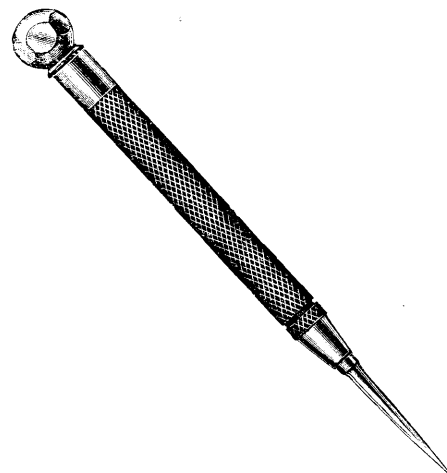


illustration. The point can be reversed and the instrument carried in the pocket. This was described in the issue of May, 1918.

MAIN 19.



# Knitting Department

## THE MANUFACTURE OF KNIT GOODS.

BY JOHN CHAMBERLAIN.

### Gauge of Seamless Hose Machines.

The gauge of seamless hosiery machines is given in England in terms of needles per diameter. Thus a machine possessing the gauge marking 200—3¼ has 200 cylinder tricks in a diameter of 3¼ in. This system of gauging does not enable comparisons to be made at a glance, and should be replaced by giving needles per circumferential inch and diameter. To obtain the number of needles per inch from the present system of gauging it is necessary to divide the total number of needles by the circumference. Hence—

Needles per inch = Total needles ÷ inches in circumference which in the illustration given would be—

$$\text{Needles per inch} = 200 \div (3.75 \times 3.1466) = 17.$$

Machines are built in varying diameters from 2¾ in. to 5 in., the former making the smallest sock sizes for children, and the latter men's outsizes. Machines are built increasing ¼ in. in diameter for two sizes. Thus 00's and 0's may be made on 2¾ in. or 2⅞ in. machines, 1's and 2's on 3 in.

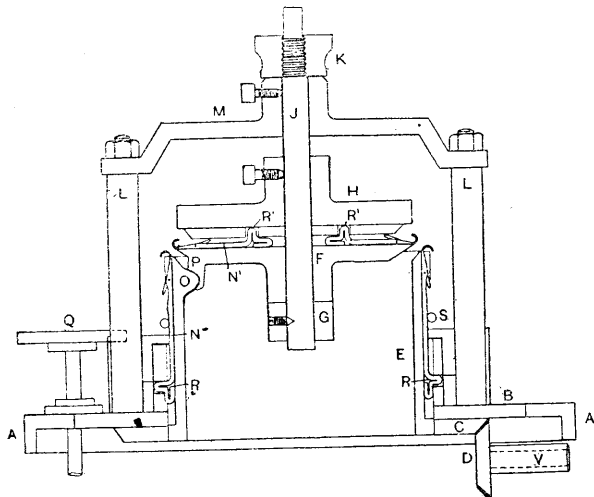


Fig. 20.

or 3½ in., 3's and 4's on 3¼ in., 5's and 6's on 3½ in., and 7's and small women's on 3¼ in. machines. Full women's or outsizes are usually made on 3¾ in. or 4 in. machines, but there is no standard, and by using a coarser yarn per gauge and a correspondingly longer loop, the width of the hose may be increased.

### Yarn Count per Machine Gauge.

Plain seamless hose machines may knit from a wide scope of yarn counts, but taking average counts used on the various gauges and plotting as shown in connection with the gauge of wrought hosiery machines, it will be found that

$$\text{Gauge} = 4.2 \times \text{square root of cotton count.}$$

Hence, when the yarn count is known, the gauge required can be calculated. Thus the gauge (needles per inch) required for 14s single cotton is:  $4.2 \times \text{square root } 14 = 16$ . Hence, 14s single cotton could be worked on a 3½ in. machine containing 176 needles, or on a 4 in. machine having 200 needles.

### Rib-Top Machines for Half-Hose Tops.

The manufacture of half-hose, even of the plain variety, necessitates the use of a knitting machine capable of making ribbed loops. Plain half-hose have the upper part or top

knitted from ribbed fabric, and can be produced either on a single machine which will automatically change the stitch from rib to plain, or on a set of two machines, one of which makes the ribbed portions in string formation, and the other a plain automatic knitting machine such as has been previously described. The two-machine method is more preferable, because, although the transferring of the ribbed tops to the

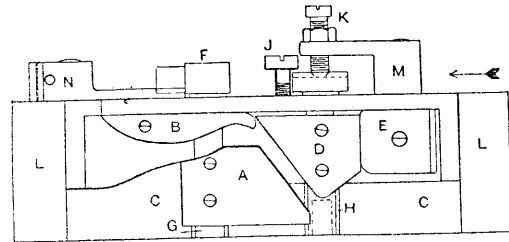


Fig. 21.

plain machine is a comparatively slow and tedious operation, the complicated form of looping mechanism employed on the stitch-changing machines renders it impossible to drive these machines at more than 130 r. p. m., whereas the ribbed tops may be produced at a speed of 180 r. p. m.; or if a change-gear is used, the main part of the knitting may take place at 200-220 r. p. m., while the automatic knitting machine, as previously stated, will rotate at 270-300 r. p. m. Moreover, the stitch-changing machines cannot be constructed in the finer gauges.

A machine specially designed to produce the plain half-hose automatically was introduced into this country some years ago, but although a few machines are still working, its success with regard to the reduction of the gross cost of production was not sufficient to warrant an extensive employment. Some manufacturers use fine machines of the XL type—the type upon which the military ribbed half-hose are made,—but these are used chiefly because they are also capable of making ribbed legs, and not definitely for the single purpose of making plain half-hose. Rib-tops are therefore usually produced on a separate machine in string formation, and one rib machine will make enough tops to keep from four to six automatic knitting machines in constant employment.

A rib-top consists of: (1) Welt; (2) plain 1 × 1 rib; (3) slack course for transferring; (4) locking courses; (5) separating courses. Some manufacturers prefer to omit the locking

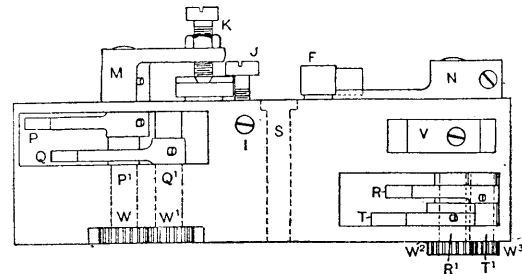


Fig. 22.

and separating courses on the ground that more tops are spoiled through the needle latches failing to open after the cylinder stitches are cast off, than through the carelessness of the rib-top cutter in cutting too near the slack course or in cutting the welt.

The welt is made first by causing the rib needles to cease knitting for four or six courses while still retaining their

loops. This forms a roll which will not unrove, although the row of stitches previous to the welt is cut. To strengthen the welt it is fairly common practice to let the rib needles tuck—that is, receive the yarn but not cast off—for the first course of the welt.  $1 \times 1$  rib is made to the required length, usually from 4 in. to  $4\frac{1}{2}$  in. for men's half-hose tops, and a slightly longer course of loops is made so that the operator can clearly discern this row, and thus run the loops on to the transfer points with greater facility. Two or three courses are knit, and tuck and welt courses are made to form a locking zone beyond which the stitches will not run down. Two or three courses are subsequently knit, and the loops are cast off the cylinder needles. This causes the rib loops to become elongated, and makes a gauzy part which the cutter can readily discern. After the separating courses are made, the latches are opened by means of a brush, and knitting is begun for the welt of the next top.

The fundamental parts of a modern-rib-top machine are shown in Figs. 20, 21, and 22. Fig. 20 shows the general arrangement of the knitting head. A is the fixed base of the machine carried on supports at a height of 3 ft. from the floor. Usually the needle cylinder E and the needle dial F are fixed, and the cam-ring B bearing the bevel-wheel C is rotated by means of a horizontal shaft V through the agency of the wheel D. The shaft may be driven from fast and loose pulleys, or by means of a clutch. The machines may possess one or two feeds, but for half-hose tops usually the former. The cylinder needles N having projections or butts R slide in tricks, and are actuated by cams in a manner hereafter described.

The cam cylinder is made in two sections, which are screwed to the cam ring B, and the latter carries vertical posts which support the ribber arm M. The spindle J is suspended from the ribber arm, and rotates with it, being attached to it by set-screws. This spindle carries loosely the ribber needle dial F, in which the rib needles N<sup>1</sup> having butts R<sup>1</sup> slide. The dial rests on the stop G, and can be adjusted longitudinally by means of the knurled nut K. The dial is loose on the spindle J, and is positioned by means of the lug P coming into contact with the projection O on the needle cylinder.

The fabric passes between O and P, and when the fabric is being pricked on to the needles after it has accidentally been pressed off, care must be taken to introduce the fabric between the "dogs," as they are called, before putting any loops on to the needles. This contact between the needle cylinder and dial, especially when the former is the driving agency, is troublesome, and on large machines for making ribbed fabric alternative methods of keeping the cylinder and dial needles in relative position are adopted. On the small rib-top heads this method of positioning the two sets of needles so that they will work between each other is generally adopted.

The camplate H, to which are attached the cams for controlling the movements of the rib needles, is secured by set-screws to the spindle J, and the knitting movements of the rib needles may be timed with those of the cylinder needles by the circumferential setting of the camplate on the spindle J. An elastic spring S keeps the cylinder needles in their tricks. The roller Q is operated by a stud-carrying wheel, and assumes the number of positions requisite for the timing of the automatic changes.

Fig. 21 shows the internal view of one-half of the cam cylinder, the direction of the rotation of the cams being denoted by the arrow. A is the clearing cam, which is carried on the spindle G. This cam can be automatically made to assume a tucking position by the lowering of the spindle G through the agency of the projection at F and the lever N. D is the stitch cam which decides the length of the plain loops. This is also carried on a spindle H, which is recessed at its lower end to receive a spiral spring, so that it always

rises to the setting of the set-screw J, except when held down by the slack course lever M carrying the set-screw K. The part C is formed on the cam-ring itself, and is not removed with the cam cylinder section. The cams B and E are guard cams necessary to keep the needle butts in the proper track.

Fig. 22 gives a view of the outside of the cam cylinder section, and shows how the movements are given to the internally placed cams. The slack course lever M is pegged to the spindle P<sup>1</sup> which carries the control lever P. When the slack course is required, the roller Q, Fig. 20, is raised to the level of the lever P, so that the stitch cam is lowered and the loops are slackened. To cause the stitch cam to assume its normal position, a second spindle Q<sup>1</sup> carrying the reverse lever Q is fitted. This spindle carries the toothed-wheel W<sup>1</sup> which gears with the wheel W attached to the lower end of the spindle P<sup>1</sup>.

Before the cam cylinder has made a complete revolution the roller Q is repositioned to come in line with the lever Q. Thus the spindle Q<sup>1</sup> is oscillated, and by the gearing causes the oscillation of the spindle P<sup>1</sup> to take place in the reverse direction, so that the slack course lever M is released from the stitch cam, and the latter is again raised to the height determined by the set-screw J which is locked by the screw I.

In like manner the levers R and T on the spindles R<sup>1</sup> and T<sup>1</sup> carrying the wheels W<sup>2</sup> and W<sup>3</sup> decide the position of the clearing cam. In some cases a friction pad V is placed over the spindles in order that the movement may be increased by the force of the action, and so place the levers out of the easy control of the wheel. The cam cylinder section is screwed to its base by a single screw at S, but it is steadied by each end making contact with the upright spindles L (Figs. 20 and 21).

## RECENTLY BROUGHT OUT.

**Buckley Opener.** Taylor, Lang & Co., Stalybridge, Eng. An improved model of the Buckley type of opener and cleaner for cotton. The dropping chamber and cleaning area have been enlarged, the cylinder remodeled and the number of blades increased, making it possible to avoid running the machine at an excessive speed.

**Hand-Threading Shuttle.** Preston Mill Finishing Co., Fishergate, Preston, Eng. An improved shuttle for threading by hand to obviate shuttle "kissing" against which there is an active agitation in England.

**Friction Linings.** Herbert Frood Co., Chapel-en-le-Frith Derbyshire, Eng. A patented ply-fabric for clutch linings, the novel feature being in the method of stitching. Instead of stitching the ply-cloth by passing warp threads from face to back, the layers are stitched in progression; that is, one layer to two, two to three, three to four and so on. The ply-fabric is also bound together by a chemical process.

**Ribbon Loom.** Chorlier et Guichard, St. Etienne, France. An improved ribbon-loom, which has been patented in the principal manufacturing countries. The warp is placed in a vertical position, giving easy access, improved visibility and reduced floor space. The loom can be run at 250 to 350 picks per minute, due to the healds being in a horizontal position and free from the usual trembling motion.

**Duster for Carbonized Wool.** T. Brook Crother, Ltd., Huddersfield, Eng. A duster equipped with eight pairs of heavy crushed rollers for carbonized wool.

**Scotch Beaming Frame.** Chorley Beaming Frame Co., Bolton St., Chorley, Eng., have recently brought out an improved beaming frame. A larger production and perfect work are claimed. From 40,000 to 45,000 yards of warp, 24s to 32s, can be put on back beams in 55 hours with this beamer.

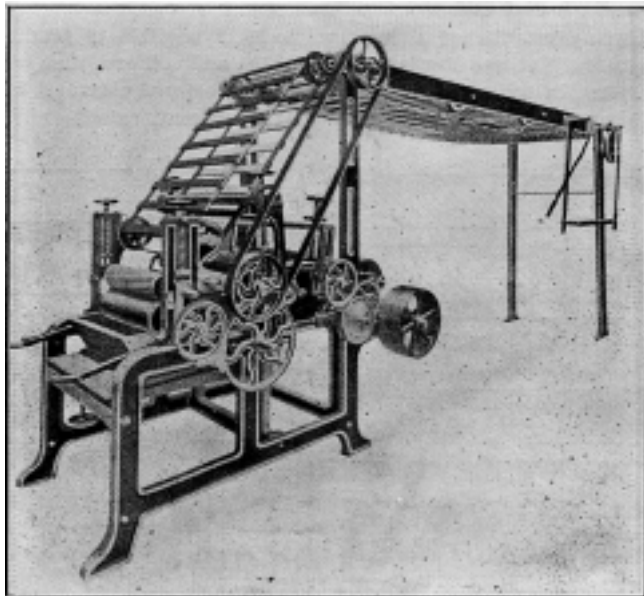
**Faller Cam.** American Gill Screw Co., Providence, R. I. An improved cam for gill-box fallers. Stability and ease of replacements are among the claims.

# Dyeing, Bleaching and Finishing

## VIGOUREUX PRINTING OF WORSTED.

By J. M. Gaudit, in *Revue Generale des Matieres Colorantes*.

The printing of worsted sliver by the process called vigoureux from the name of the inventor, consists in the application of a color paste on the slivers by means of a suitable mechanism. Various ideas were tested when this process was first invented. One machine laid the worsted slivers side by side and passed them between two corrugated rolls of copper



Vigoureux Printing Machine

or wood, which printed them simultaneously on both sides. With another mechanism the slivers were first run through a drawing machine in order to form them into a thin sheet of wool, which was wound into balls on spools and delivered to a printing machine having only one corrugated roll.

At the present time the mills making vigoureux worsted use a machine by which the balls of combed worsted are drawn from a rack and passed into a gill-box which draws the wool into a very thin sheet, which passes under the corrugated printing roll, from which it is drawn by a folding device which lays it on a truck. In this form the wool is steamed, washed and dried, then passed again through a gill-box in preparation for the drawing and spinning processes.

The illustration shows a vigoureux printing machine embodying the most modern construction, and for which Edward Jefferson, 19 So. Second St., Philadelphia, is the American agent. The machine consists of a gill-box and the printing mechanism, the tank, felt-covered roll and printing roll being shown at the left. The gill-box has a set-over of 21 inches, somewhat wider than in the ordinary box, the object being to obtain a thin veiling or sheet of wool in which the printing rolls can produce a thorough penetration of the color. The machine which we inspected had a reach of 20½ inches with a single thread screw of ⅝-inch pitch, and two rows of pins, 2⅛ in. and 2¼ in. in each faller.

From the gill-box the veiling passes between a 6½-inch felt-covered roll and a 5-inch printing roll with spiral corrugations. The color is delivered to the felt-covered roll by a 5½-inch brass furnishing roll. An adjustable doctor-roll is placed behind the felt-covered roll, enabling the quantity of

the color to be increased or decreased as required, and spread uniformly over the felt-covered roll.

From the printing rolls the stock is carried by a traveling rack over and back of the machine to a folder, which delivers it into boxes or on trucks for transportation to the steaming room. This machine is of simple and durable construction, the overseer who was in charge stating that he had run it for years with practically no repairs needed. So far as the mechanical process is concerned, it leaves nothing to be desired in vigoureux printing, the results depending on the composition and consistency of the color solutions and the subsequent steaming operation.

Vigoureux printing, although it appears to be a simple process at the first view, involves certain difficulties, which when it was first introduced caused serious trouble in spinning, weaving and finishing. To overcome these difficulties it is necessary to understand thoroughly the operations through which the sliver must pass and also the object to be attained.

The object of the inventor of the vigoureux process was to obtain mixed fabrics in all shades and having the characteristics of mixtures made in the ordinary way with loose wool, but without the defects of the old mixtures. Now the characteristics of the ordinary mixtures are fastness to washing, to fulling and to light.

Undyed wool when mixed with the dyed wool retains its natural appearance throughout all of the operations. On the other hand, the inherent defects of the mixtures of loose wool consist in the variations or "flames" caused by the irregular distribution of the dyed and undyed fibers throughout the mass of wool. These inequalities cause what are known as "flames" in the mixed goods.

It has been demonstrated that, notwithstanding repeated passages of the wool through the preparatory machine, it is absolutely impossible to mix uniformly the fibers of contrasting colors, which are always arranged parallel to each other. The yarn spun from such mixtures shows very pronounced variations in the proportions of the different colors, producing flame effects in the cloth. The idea of the inventor of the vigoureux process was to overcome this defect by printing the fibers in such a way that the ground color and the undyed portions should always be arranged perpendicular to the fiber during the mixing operations.

The solution of this problem seemed very simple, but in practice various difficulties were encountered. In order to imitate the old mixtures of colored and white wool, it is necessary to have a series of corrugated rolls which give the same mixture effects as those obtained by mixing the dyed and white wool. It was supposed that it would be necessary merely to print the sliver with a roller that was corrugated in the proportion desired in the mixture, that is to say, based on the proportions of dyed and undyed wool.

Suppose, for example, that white wool and black wool are mixed in equal parts. To produce this shade by vigoureux printing without flame effect it is necessary in theory merely to print wool with a cylinder having the corrugations equal to 50 per cent. of the surface. Experience, however, proved that the cylinder must be cut in a certain proportion in order to avoid the flame effects.

Let us suppose for example a sliver of wool composed of several fibers, *a*, *b*, *c*, *d*, *e*, Fig. 1, of different lengths and representing the average of the combed wool. If these fibers are printed with a 50 per cent. roll having the corrugations

and raised portions as shown in Fig. 1, the result would be as follows:

- Fiber *a* printed twice with two white spaces;
- Fiber *b* printed twice with  $1\frac{1}{4}$  white spaces;
- Fiber *c* printed  $1\frac{1}{2}$  times with 1 white space;
- Fiber *d* printed once with 1 white space;
- Fiber *e* printed once with  $\frac{1}{4}$  white space.

If we assume that at the next revolution of the printing roll an equal number of fibers are printed in the opposite manner, the result would be as follows, Fig. 2:

- Fiber *a'* printed twice with two white spaces;
- Fiber *b'* printed  $1\frac{1}{4}$  times with two white spaces;

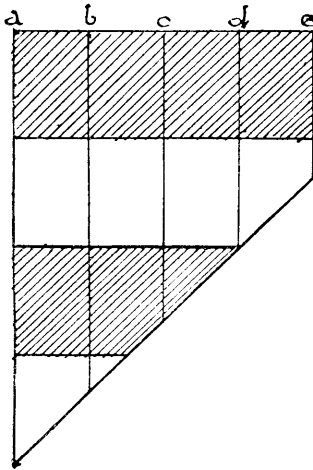


Fig. 1.

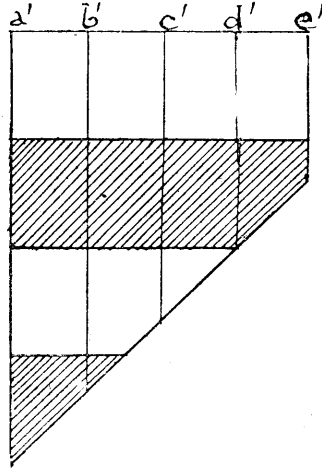


Fig. 2.

- Fiber *c'* printed once with  $1\frac{1}{2}$  white spaces;
- Fiber *d'* printed once with 1 white space;
- Fiber *e'* printed  $\frac{1}{4}$  space with one white space.

If these two sets of fibers are mixed the result will be a 50 per cent. mixture, but if each fiber is examined separately,

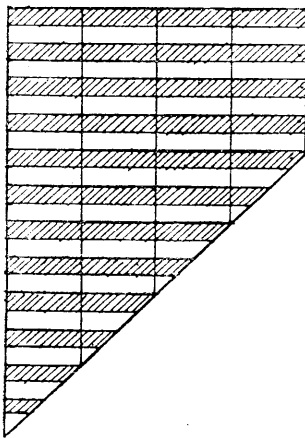


Fig. 3.

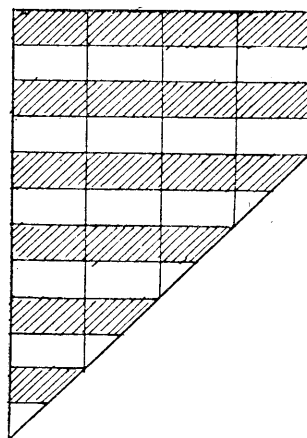


Fig. 4.

it will be found that only one or two of them are printed in a 50-50 proportion. As a result the mixture will be imperfect, several fibers presenting the same black spaces or the same white spaces coming next to each other, with the result that the mixture will form the objectionable flame effects.

Although this first result is a failure so far as a remedy for the flame defect is concerned, the problem remains to obtain a theoretically perfect impression so that the wool will present black and white contrasting uniformly throughout the goods. The vigoureux printing rolls do not give the same result as when printing cloth. The combed wool continually presents inequalities in thickness due to the most diverse causes, which result in irregularities of printing, and these defects are aggravated by the width of the wool sheet to be printed. To overcome these defects the rolls were cut with finer corrugations about 1-5" wide in 50-50 proportion, as shown at Fig. 3. This caused another difficulty, the goods

having the appearance of a mixture of lightly printed spots without boldness or attractiveness, the contrast between the white and color not being sufficiently pronounced.

These two unsatisfactory results point to the remedy, which is to find the relation that should exist between the printed and unprinted parts of the fibers, avoiding spaces that are too wide and those that are too narrow, as shown at Fig. 4. If the printed and unprinted spaces in Fig. 4 are examined it will be found that each of the fibers is printed in a 50-50 proportion, so that when the shortest fiber is placed alongside of the longest fiber the two present the same proportion of white and color, forming a mixture free from the flame defect. It follows from the above that vigoureux printing is based on the following principle: All the fibers in a sliver of combed wool within certain limits should present the same proportion of white and color.

Having established this principle it is possible to produce mixtures that are darker than 50-50 and others that are lighter. In order to obtain more highly colored mixtures the rolls are cut in the proportion of 75 per cent. raised and 25

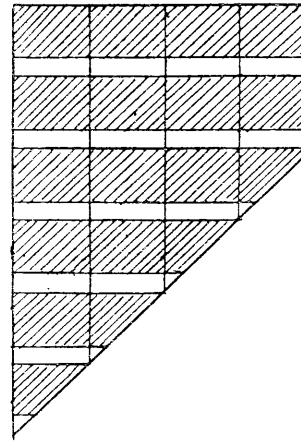


Fig. 5.

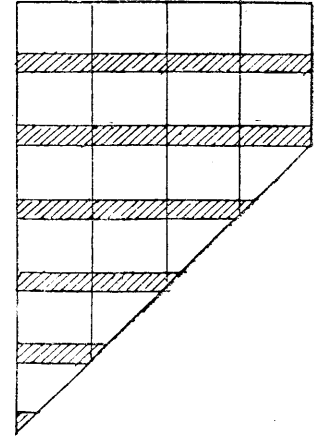


Fig. 6.

per cent. cut, Fig. 5. Lighter mixtures are made by cutting the rolls in the proportion of 25 per cent. raised and 75 per cent. cut. These three rolls are the three indispensable types for vigoureux printing. If darker or lighter mixtures are printed by increasing or decreasing the proportion of the raised part of the roll, the special effect of vigoureux printing is lost.

In practice, however, it is frequently necessary to produce darker or lighter shades than those obtained with the three fundamental types of rolls, either to tone down a color or change a shade. If it becomes necessary to darken a mixture it is better to add a small percentage of solid color. Experience has shown that such an addition, instead of being objectionable, makes the contrast of white and color more marked without causing the flame defect. On the other hand if it becomes necessary to make a mixture lighter, it is better to print one color with a 25 per cent. roll and thus reduce slightly the intensity of the ground shade.

(Concluded in January)

### ALIZARINE ORANGE R P PASTE.

The National Aniline & Chemical Company, Inc., announces the production of a new dye, known as Alizarine Orange R P Paste. As a wool color it possesses excellent fastness to both light and washing. Dyed upon an alum mordant, it produces orange; combined with chrome, a reddish brown. Because of its very good fastness to washing, it finds considerable application in calico printing.

# One Branch of a Giant Industry

**T**EXTILES comprise fabric and color. The fabric is right when the color is right. They stand or fall together. This is why the dyestuff producer must consider his work as a factor in a larger industry.

The textile industry is a great industry. Its annual output is valued at more than one billion dollars. But it is singularly dependent upon the dyestuff producer. Fabric without color is unthinkable.

The National Aniline and Chemical Company, Inc., recognizes this relation to the textile consumer. It is here to serve the textile industry. It is dependent upon that industry for encouragement and for existence. If it does not serve that industry adequately it will have no reason for existence.

The production of dyestuffs is a share in the work of a giant industry.

## National Aniline & Chemical Company

Incorporated

21 BURLING SLIP, NEW YORK

Works: Buffalo, Brooklyn, Marcus Hook

# THE REWARD OF MERIT

Substantially one-half of the Sulphur Black now used in America is being made by us.

Users of our Atlantic Blacks know the reasons behind our enormous production.

Users of Sulphur Blacks other than ours would also benefit by finding out these reasons.

## ATLANTIC DYESTUFF COMPANY

WORKS,  
BURRAGE, MASS.

SALES OFFICES  
Philadelphia Boston New York  
1530 Real Est. Tr. Bldg. 88 Ames Bldg. 230 W. Thirteenth St.  
Chicago  
227 W. Randolph St.  
Charlotte Providence  
706 Com. Nat. Bank Bldg. 334 Westminster St.

# Newport Dyestuffs

Made in the U. S. A. Immediately Available



Trade Mark

New  
Products



Trade Mark

### NEWPORT SULPHUR INDONE 2 R

The brightest Sulphur Blue on the market.

### NEWPORT DIRECT BLACKS—E EXTRA—EE EXTRA—2 G

High concentration and good value

### NEWPORT DEVELOPED BLACK S C

For silk and cotton hosiery, dyeing both fibres the same.

### NEWPORT DEVELOPED BLACK B H

### NEWPORT DIRECT FAST BROWN M

### NEWPORT NEUTRAL GREY G

### NEWPORT DIRECT FAST YELLOW N N

Corresponding with pre-war standards

## Newport Chemical Works, Inc.

OF DELAWARE

PASSAIC, NEW JERSEY

BRANCH SALES OFFICES

Boston, Mass. Philadelphia, Pa. Greensboro, N. C. Chicago, Ill.  
Providence, R. I.

## RECENT TEXTILE PATENTS.

Braiding-machines, Guide-plate for the bobbins of 1,315,265. E. Walter, Melligen, Aargau, Switzerland.

Cloth-laying machine. 1,316,692. A. L. Cutter, St. Louis, Mo.

Dyeing, bleaching, or like treatment of cops. 1,317,220. W. Resch, Binningden, near Basel, Switzerland.

Fabric-guiding device. 1,315,750. M. Swenson, Passaic, N. J.

Fabrics into strips. Machine for cutting sheer. 1,315,340. F. X. Scully, Brooklyn, N. Y.

Fibers from stalks of bast-plants and other adherent fibers. Separation of. 1,315,328. R. L. Pritchard, London, England.

Fabric-steaming device. 1,317,275. H. M. Dudley, Philadelphia, Pa.

Knitting-machine stop-motion. 1,316,928. W. O. Taylor, Limerick, Pa.

Knitting-machine stop-motion. 1,316,929. W. O. Taylor, Limerick, Pa.

Knitting-machines. Let-off and brake-controlling mechanism. 1,316,930. W. O. Taylor, Limerick, Pa.

Knitting machine. Circular. 1,317,151. G. L. Ballard, Norristown, Pa.

Knitting-machine. 1,315,725. A. E. Stewart, Franklin, N. H.

Laminated fabric. 1,315,409. J. Ramsbottom, Helmsshore, England.

Loom. 1,315,631. A. Lavigne, Brunswick, Me.

Looms for making hair goods. Hand. 1,315,912. S. S. Dewitt, Gallipolis, O.

Looms. Check for. 1,315,388. M. Nadeau and A. Bouvier, Lewiston, Me.

Looms. Shuttle-checking mechanism of. 1,315,608. A. Newton-Smith, London, England.

Loom for weaving. 1,316,810. C. Speiser, Gelterkinden, near Basel, Switzerland.

Mercerization. 1,316,958. S. M. Jones, North Adams, Mass.

Unwinding device. 1,317,544. C. A. Brink, Providence, R. I.

Weaving-machine safety appliance. 1,316,914. J. Meiklejohn, Lockport, N. Y.

Warping and beaming machine. Direct. 1,315,458. J. H. Bentley, Midland Park, N. J.

Yarns or threads of fibrous substances. Means for scouring. 1,315,698. G. Bailey, Bradford, England.

Yarn guide. 1,316,452. M. B. King, New Bedford, Mass.

## SWAN & FINCH CO.

Announcement is made of the purchase by Swan & Finch Company of the Cataract Refining & Manufacturing Co. of Buffalo. The Cataract Company operates large lubricant plants at Buffalo and Chicago, and maintains branch offices and warehouses in eight of the principal cities in this country, besides four in England, Scotland and Canada. The increased manufacturing and marketing facilities afforded by these will give to the Swan & Finch Company a pre-eminent place in the lubricant field.

The Cataract Company has given particular attention to the development of specialties in grease lubricants, such as cutting compounds, drawing compounds, etc., and practically every recognized form of lubricating grease is included in their line.

Swan & Finch Company, since 1853, has been one of the leading oil and grease producers of the country. It is the world's largest refiner of Menhaden fish oil. Lubricating oils of all kinds, greases in great variety, semi-liquid oils, and also the numerous vegetable oils are among its products.

With the two refineries now operated by the Swan & Finch Co. and the Cataract plants at Chicago and Buffalo, there will be a production of unlimited capacity. The numerous warehouse stocks strategically situated from coast to coast will insure a service not heretofore possible.

Henry Fletcher, former President of Swan & Finch Company, is chairman of the Board of Directors; W. G. Moncrieff, formerly President of the Cataract Company, becomes President of the Swan & Finch Company; H. C. Hutchins, Vice-President of the Cataract Company, will become a Vice-President and Director of Sales; George Elliott Brown will be Vice-President and Secretary, and John T. Lee, Vice-President and Treasurer.

*MIDLAND*

*BLUE R*

**FASTER  
BRIGHTER  
STRONGER  
BETTER**

**THAN INDIGO**

*A Distinctly New Product of the American Dyestuff Industry*

*For Sale by:*

**ANILINE DYES AND CHEMICALS, INC.**

**CEDAR AND WASHINGTON STS.,  
NEW YORK CITY.**

*Manufactured by:*

**THE DOW CHEMICAL COMPANY**

**MIDLAND, MICHIGAN.**

*Branches:*

**CHICAGO  
PHILADELPHIA  
BOSTON  
COLUMBUS, GA.**



**DOW**

# Dyestuffs and Chemicals

## H. A. METZ & CO.

INCORPORATED  
122 HUDSON STREET  
NEW YORK CITY

BOSTON CHICAGO  
PHILADELPHIA PROVIDENCE  
CHARLOTTE  
SAN FRANCISCO



*In hoc signo vincimus*

### DYE EXCHANGE CORPORATION

*Clearing House for Colors*  
141 BROADWAY, NEW YORK

ESTABLISHED 1851

# RICE STARCH

## PURE

(AMERICAN MAKE)

*Manufactured by*  
**H. KOHNSTAMM & Co.**

83-93 PARK PLACE, NEW YORK

## WOOL TRADE CLUB CHRONOLOGY

(Continued from page 12.)

Standards, where they are to be inspected, sorted and counted by paid employees of Mr. Z., who is financing the metric propaganda, and the results of this cooked-up agitation are then to be sent to the newspapers of the country in the form of fake news items and editorials written in San Francisco.

### Will the Bureau of Standards Explain?

In the first edition of this statement I asked that Mr. Z. make known who is or are back of him, if he is not alone. This he has not yet done, although on Nov. 11 the World Trade Club issued a booklet in which Mr. Z. was described as "the one who receives the money and spends it for the World Trade Club metric movement."

I now ask the Bureau of Standards to explain its connection with the San Francisco propaganda.

How does it happen that petitions mailed to Congress are sent to the Bureau of Standards?

How does it happen that the San Francisco promoter of this metric propaganda can ignore the President of the United States and arrange to have petitions that are addressed to the President mailed directly to, received by and canvassed in the Bureau of Standards?

How does it happen that representatives of a man calling himself "The World Trade Club of San Francisco" are allowed access to petitions sent to Congress and the President and deposited with the Bureau of Standards?

How does it happen that officials of the United States Government, whose salaries are paid by taxation of the people, work with men hired and paid by the World Trade Club of San Francisco in canvassing the results of the metric propaganda conducted by Mr. Z.?

### Will ex-Secretary Redfield Explain?

If the Director of the Bureau of Standards, because of modesty, like Mr. Z., or for other reasons, fails to give the information desired, will not the Hon. W. C. Redfield, who was Secretary of Commerce when this work was going on and who is now diligently engaged in telling the American people how to run the world, pause for a moment and tell us how it happened that the Department of Commerce became an annex to the World Trade Club of San Francisco?

Let us know all about it. The people pay the taxes, bear the burdens of misgovernment, and have a right to know. If the Government at Washington has become a private snap, the sooner that fact is made public and the remedy applied the better.

### BUSINESS LITERATURE.

**Handbook on Warp Sizing;** by Prof. Everett H. Hinckley; 56 pages 4¼x8½; C. J. Tagliabue Mfg. Co., 18 Thirty-third St., Brooklyn, N. Y.

As our readers will remember, the series of articles on sizing and slashing of cotton warps was based on careful tests in the mill to determine the comparative results of sizing and slashing under varying conditions, so as to enable the mill superintendent and overseer to regulate this process to give the largest production of cloth with the smallest number of imperfections at the lowest cost. These articles have now been published by the Tagliabue Co. in book form, making a very useful handbook for cotton mill men. The book begins by pointing out the importance of slashing, and then explains the principles on which the process must be based to get the best results, including the materials used, method of cooking, and adjustment of the machine. This is followed by the results of the mill tests. There are many excellent illustrations of starches under the microscope, slashing rooms, temperature regulators, knots, bunches, coarse threads, charts showing comparative results, and both yarns and cloths under the microscope.

The book also contains a descriptive list of sizing materials, directions for cooking size, tables showing capacity of kettles of different sizes, blank forms for recording sizing formulas, a number of useful calculations for textile work, tables of weights and measures, slasher production tables, comparative temperature and pressure tables, directions for

(Continued on page 36.)



# FAST VAT DYES

MADE BY  
THE SOCIETY OF CHEMICAL INDUSTRY IN BASLE, SWITZERLAND

Sold in America during the whole period of the war by  
**A. KLIPSTEIN & COMPANY, New York**  
and obtainable now in rapidly increasing quantities

## THESE DYES ARE FASTER THAN INDIGO

They are sold under the trade name of  
"CIBA" and "CIBANON" DYES  
and include every necessary shade of color — for example — "CIBA" Blue, Violet, Yellow, Red, Scarlet and Bordeaux  
"CIBANON" Green, Yellow, Orange

The Textile Trade of America need not suffer for the lack of

## FAST VAT DYES

Quotations and samples on application  
**A. KLIPSTEIN & COMPANY**  
644 GREENWICH STREET, NEW YORK CITY

# PROVIDENCE DYE WORKS

PROVIDENCE, RHODE ISLAND

*Dyers of Cotton Yarn  
in skeins*



Yarns Wound  
on Cones and  
Tubes

Our Customers  
Recommend Us to  
Their Friends



# JACQUES WOLF & COMPANY

MANUFACTURING CHEMISTS AND IMPORTERS

ALL SULPHONATED CASTOR OILS  
FINISHING PRODUCTS

For Cotton, Wool and Silk.

**BENSAPOL**

For Scouring Wool.

**BLEACHING OIL**

Special Product for Bleacheries.

**BOIL-OFF OIL**

For Degumming Silk.

**GUMS**

Arabic, Karaya, Tragacanth, Textile.

Main Office and Works

**PASSAIC, N. J.**



New York Office

**100 WILLIAM STREET**

**MORDANTS & CHROME COLORS**

For Fabric Printing.

**HYDROSULPHITES**

(for all purposes)

Stripping, Discharge Printing, Vat  
Colors and Indigo Discharge.

**ALIZARINE YELLOWS**

**FAST GREEN PASTE**

**CHROME BLACK**

**MONOPOLE OIL**

Reg. Trade Mark No. 70991.

# W. D. HUSE & SONS

## LACONIA, N. H.

### The HUSE Improved Winder

Occupies only about half the floor space and runs with half the power required for ordinary winders.

Spindles friction driven—no bands. No vibration. Adapted for winding small sized bobbins by simply changing the cams, or two sizes of bobbins can be run at same time.

Variable speed attachment furnished for skein winding. Extremely simple, durable, smooth-running and has very few parts.

Furnished with any number of spindles desired.

These are but a few of the many points of supremacy.

Write for our catalogue giving full information.

### The HUSE Ribber

This machine is made in any size desired from 2¼ to 6 inches in diameter, and with attachments for making welts, loose courses, tuck stitches and stripes, double knee and high spliced heel.

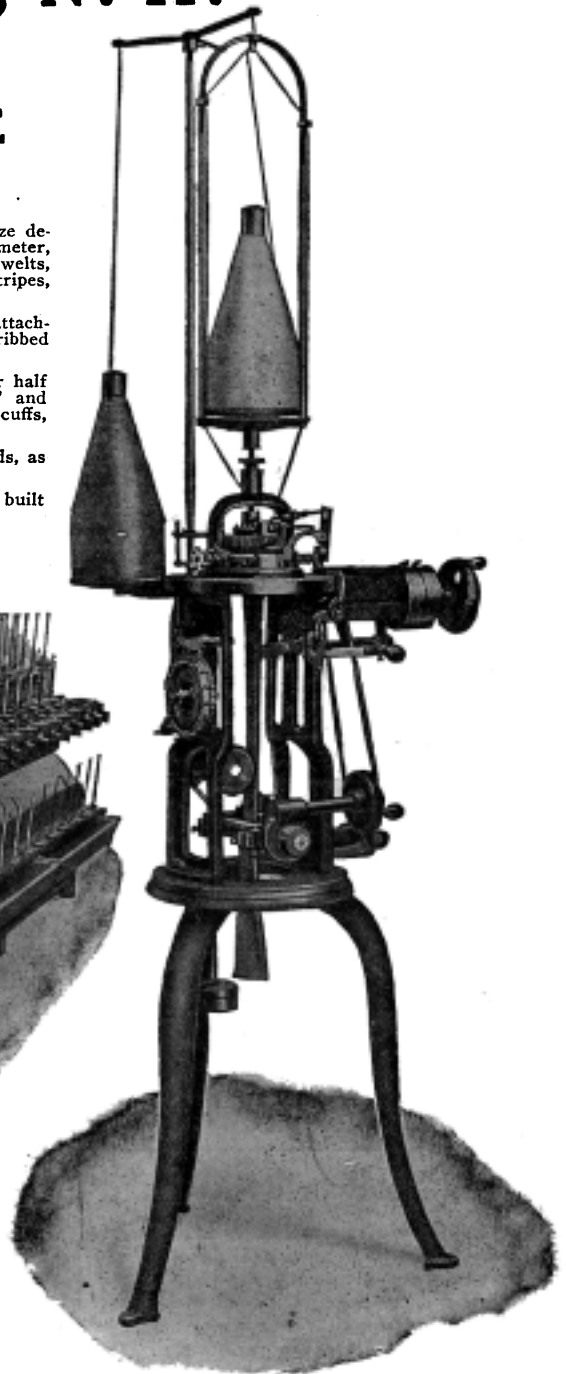
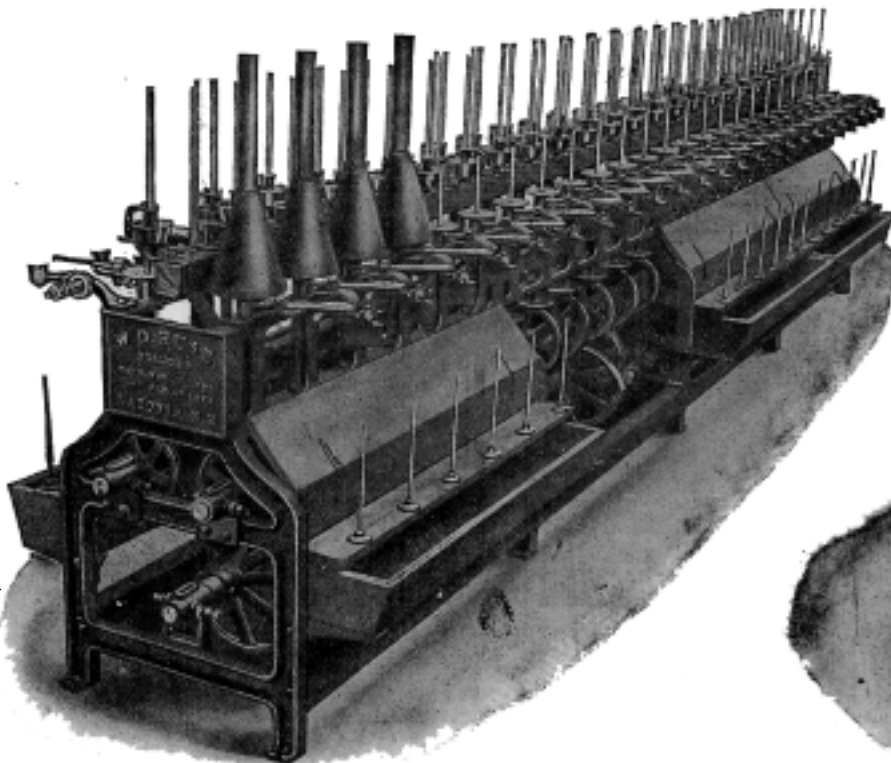
Can also be used without extra attachments for producing straight ribbed work.

Adapted for making rib tops for half hose, rib legs for ladies', misses' and children's stockings, also for shirt cuffs, drawer bottoms, etc.

Built with either one or two feeds, as best adapted for work required.

Simple, very few parts, and well built throughout.

Send for our new catalogue.



# LACONIA NEEDLE COMPANY, LACONIA N. H.

Manufacturers of  
**HIGH GRADE LATCH NEEDLES**

Thoroughly finished, durable and, we believe, the most satisfactory and economical needles that can be produced. Made by skilled needle makers, from the highest grade wire and on new, improved and accurate machinery.

These needles are carefully inspected before leaving our factory and no effort is spared to keep our output up to the very highest standard. We are confident you would be pleased with these needles. May we send you samples?

**KNITTING.**

The Washington Hosiery Mills Co., of Nashville, Tenn., a newly organized concern, will manufacture men's and women's hosiery as soon as the necessary machinery can be installed.

J. G. Scherf is erecting a knitting mill at Andalusia, Ala.

John S. Bowers, worsted and woolen yarn dealer, 242 Chestnut street, Philadelphia, Pa., has recently added a knitting yarn department to his business.

The Wergan Knitting Mill, of Reading, Pa., has recently been established at Mt. Penn by Alexander Werner and Adam Ganter. About fifty people will be employed at the start.

The Amazon Knitting Co., Muskegon, Mich., are establishing a branch in a building formerly occupied by a stone products factory.

Appel & Hall, manufacturers of knit goods, have purchased a factory building in Philadelphia, Pa. It is noted that they are planning to increase their capacity.

The I. E. Morrow Company, manufacturers of underwear, of New York City, will in the near future establish a plant in Fall River, Mass., in which they will employ from 100 to 150 men and women.

The H. B. Ferguson Manufacturing Co., of New London, Ct., will in the near future install 100 machines for the manufacture of underwear.

The Fox River Valley Knitting Co. will in the near future erect a plant at Appleton, Wis., and equip it with machinery procured from a mill in the western part of the State. Yarns will be spun from cotton grown in Oklahoma.

The Howard Mills, of Hagerstown, Md., will in the near future establish a plant with daily capacity of 125 pairs high grade half hose.

H. A. Vestal and H. S. Moody, of Athens, Tenn., have organized the Fashion Mill. They will erect a building and equip it for knitting silk hosiery.

The Advance Hosiery Co., of Philadelphia, Pa., has established a branch in Reading, where women's hose and men's half hose will be manufactured.

**SILK.**

The Walser Manufacturing Co., manufacturers of silk braids, etc., will erect a two-story factory and dyehouse addition to their plant.

H. L. Friend will erect a two-story silk mill at Dupont, Pa.

James A. Batty & Sons, of Gloversville, N. Y., are having plans prepared for the erection of a three-story silk mill.

The Bloomsburg Silk Mills, of New York City, have recently purchased a cotton mill at Richmond, Me., and will equip it with machinery for the manufacture of silk fabrics.

**BLEACHERS!**

Better bleaching is wanted by the Public, by the Selling Agent and therefore, by the Mill.

It costs nothing to get the dope from us about Peroxide bleaching.

Inform yourself. See how simple and safe it is and that it does not cost any more.

After that: Show it to the boss.

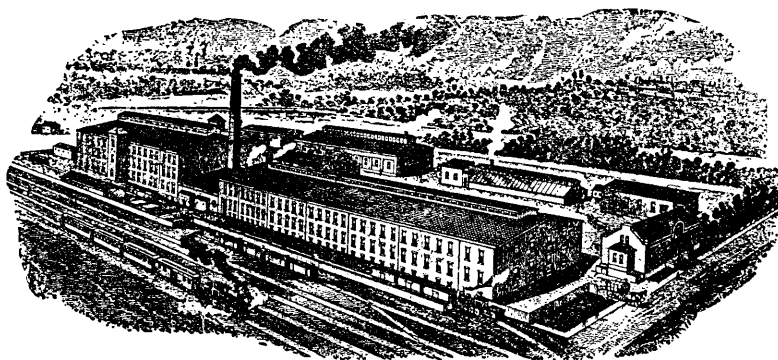
He'll be glad and he'll prove it.

THE ROESSLER & HASSLACHER CHEMICAL CO.  
New York, N. Y.

**S. R. DAVID & COMPANY, Inc.**  
**DYESTUFFS, CHEMICALS, Etc.**

Telephone Main 1684  
100 PURCHASE ST. BOSTON, MASS.  
FACTORY: DYE PRODUCTS & CHEMICAL CO., Inc., NEWARK, N. J.  
NEW HAVEN OFFICE, 944 CHAPEL STREET  
*Well equipped Laboratory for matching and testing*

**MERION WORSTED MILLS**



**SELL DIRECT**

**Fine French-Spun Worsted  
and Worsted Merino Yarns**

WHITE NATURAL AND FANCY MIXES IN SINGLE AND PLY FOR KNITTING AND WEAVING  
Mill and Office  
WEST CONSHOHOCKEN, PA.

**SPUN SILK YARNS**

MADE ESPECIALLY FOR KNITTING AND HOSIERY

In the Grey or Dyed on Cones as Wanted.

**American Silk Spinning Co., Providence, R. I.**

WE ARE OFFERING AN

**ARTIFICIAL SILK YARN**

ADAPTED TO THE KNIT GOODS TRADE

**ALSO REAL SILK**

SAMPLES AND QUOTATIONS ON APPLICATION

**MINDLIN & ROSENMAN**

105-107 EAST 29th STREET, NEW YORK

## CLEAN WATER— GUARANTEED BY NORWOOD FILTERS

Every bit of dirt, grit and suspended matter is removed from the water by **NORWOOD FILTERS**—they are guaranteed to produce perfectly clean water.

Less time and less cleanser are required to wash with water filtered the **NORWOOD** way, and delicate tints and satisfactory bleaching is assured.

Tell us your needs and we will tell you how a **NORWOOD FILTER** will help you.

**Norwood Engineering Co.**  
FLORENCE, MASS.

### BUSINESS LITERATURE.

(Continued from page 32.)

using a hydrometer, density table, a chapter on temperature and heat, and charts from recording thermometers.

A complimentary copy of this book will be sent to anyone interested in textile manufacturing on application to the Tagliabue Co.

### NEW PUBLICATIONS.

**Knit Goods Trade**; 894 pages 4½x7¼; Davison Publishing Co., New York; Price, \$3.00.

The 1919 edition of this directory has been revised to bring it up to date and gives the usual information, including a list of knit goods manufacturers in the United States and Canada, arranged by States and places, a list classified by products and lists of hosiery dyers, mills with dye houses, dealers in yarn, raw silk and waste, manufacturers' agents, New York offices of mills, jobbers and retailers.

**Knitted Fabrics**; by J. Chamberlain and J. H. Quilter; 141 pages 4½x7; Sir Isaac Pitman & Sons, London and New York; Price, \$1.00.

While this book is written for the general reader who seeks information about the manufacture of knit goods, it is also adapted for those who are actually engaged in the knit goods industry. It gives an explanation of the different stitches and fabrics, also the methods manufacturing and finishing the different knit fabrics and garments, the contents being arranged under the following heads: Historical; preparatory operations; principles of knit fabrics; hand-knitting machines and knitting operations; manufacture of hosiery; manufacture of knit underwear; fancy knit fabrics and outer garments; trimming and finishing knit fabrics.

**Applied Science for Metal Workers**; by W. H. Dooley, Principal of New York Textile School; 467 pages 5x7¼; The Ronald Press Co.; Price, \$2.00.

The object of this book is to give a clear explanation of scientific principles underlying the metal working trades. It is written in a clear style, free from unnecessary technicalities, and forms a very useful book for the student and workman. Numerous illustrations are a valuable feature of the volume.

## THE BEST LATCH NEEDLE

Best in workmanship, design, strength and durability, the **COREY LATCH NEEDLE** is unrivalled.

Made of the highest grade steel, finished in the best possible manner, this needle has a permanent smoothness and long wear not found in other needles.

**COREY LATCH NEEDLES** are made in the largest and best individually owned needle factory in America, under the best factory conditions, by employees of great skill and long experience, and it is no empty boast that **COREY LATCH NEEDLES** are the best.

*Send for Samples and Prices*

**William Corey Company**

Chauncey A. Williams, Sole Owner

**Manchester, N. H.**

**RICE STARCH FOR SIZING AND FINISHING.**

In the past two years, H. Kohnstamm & Co., 8393 Park Place, New York, have succeeded in manufacturing for the first time in this country Rice starch in crystal and powdered form, which is used extensively in the textile trade for sizings and finishes. Rice starch has a peculiar property that imparts a transparency to the finished product which no other starch will give.

Furthermore the manufacturers guarantee this starch to be absolutely pure and free from all adulterations. In fact they are so satisfied with the results that they have engaged an expert finisher who would be pleased to call at any plant in the country to demonstrate how to use this starch. This shows the confidence that the manufacturers of this starch have in the product and in its results.

**WINONA MILLS COMPANY.**

The Winona Mills Hosiery Corporation and the Winona Underwear Co. of Connecticut have been consolidated with the offices and factory at New Haven, Conn. The new Winona Mills Company is capitalized at \$300,000, with \$213,500 paid in. About \$60,000 has lately been paid in in cash and the concern has orders exceeding its capacity. The company now has a strong board of directors, the latter including C. H. Jockmus, president Ansonia Mfg. Co., Adolph Mendel of Mendel & Freedman, New Haven, Mahlon H. Marlin, formerly of the Marlin Arms Co., who is a director of the First National Bank of New Haven and the Beacon Falls Rubber Shoe Co. The company is headed by Robert J. Kennedy, the treasurer and general manager, who has a thorough knowledge of the business, gained by long experience.

**STARCHES  
GUMS — DEXTRINES**

Specialties for the Textile Trade

**QUALITY—SERVICE—UNIFORMITY**



This mark will assure you of the same high quality of materials, the same Service and the same Uniformity in deliveries with which we have supplied our customers during the past sixty-nine years.

**Our Service Department**

As a means of rendering a still greater service to our customers we have established a service department for the purpose of furnishing definite and accurate advice in connection with use and application of any of our products. This department is unusual and distinctive in that it is in charge of a well-known textile chemical expert, who has had a wide experience in the textile finishing field. This service is at your disposal.

**Chas. Morningstar & Co., Inc.**

**349 Broadway, NEW YORK**

**BOSTON**

**CHICAGO**

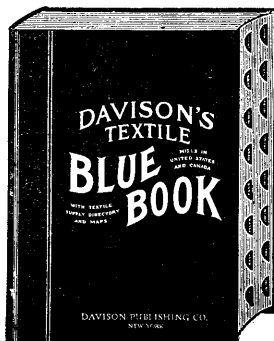
**BIGGER BUSINESS!**

There are some 9,000 Textile Mills in the United States and Canada, with 40,000 dealers interested in the Textile Line. Do you realize what an enormous field this is for producing business? Possibly you have a Textile Directory, and make little use of it because it takes so long to find what you want, but have you ever tried DAVISON'S TEXTILE BLUE BOOK? Thumb-Index Labels enable you to instantly refer to all sections, and owing to its quickness of reference, the habit grows to refer often. Time is money. DAVISON'S TEXTILE BLUE BOOK undoubtedly is referred to three times as often as any other Textile Directory because of these labels, and owing to this, it required nearly one month for us to fill the advance orders on the new edition.

**Davison's Textile BLUE BOOK is 22 directories in one volume.**

*Directories of*

- Cotton Mills
- Woolen Mills
- Worsted Mills
- Carpet Mills
- Silk Mills
- Knitting Mills
- Jute and Linen Mills
- Canada Mills
- Dyers, Finishers, Etc.
- Mills with Dye Houses
- Commission Merchants



- Cotton Goods Converters
- Yarn Dealers
- Raw and Art Silk
- Cotton Dealers
- Wool Dealers
- Rag and Remnant Dealers
- Waste Dealers and Mfrs.
- Linter Dealers
- Mattress Makers
- Textile Supplies
- Classified Directory of Mills

*New Edition 32nd Annual Now Ready*

Office Size \$6.00

Salesman's Directory \$3.00

Handy Size \$4.00

**DAVISON PUBLISHING CO., 50 Union Square, NEW YORK**

**EMPLOYMENT DEPARTMENT**  
WHERE EMPLOYERS AND EMPLOYEES MEET

**WANTED**

**Banner Superintendent and Fixer for new mill with eighty machines. Will have entire charge. Exceptional opportunity for future. State salary and experience. Address in confidence, Box 530, TEXTILES, 79 Milk St., Boston, Mass.**

**SITUATIONS WANTED**

**Overseer of Weaving. 2 years' experience. Draper looms. Age 36. Married. Address Box 239, TEXTILES, 79 Milk St., Boston, Mass.**

**Overseer of Jacquard Weaving. 10 years' experience. Table damask, towels and napkins. Age 31. Married. Address Box 246, TEXTILES, 79 Milk St., Boston, Mass.**

**Weaving Overseer. Eight years' experience. Gingham. Age 38. Married. Address Box 204, TEXTILES, 79 Milk St., Boston, Mass.**

**Overseer of Spinning. 20 years' experience. 3s to 30s yarns. Age 44. Married. Address Box 219, TEXTILES, 79 Milk St., Boston, Mass.**

**Overseer of Spinning. 15 years' experience. 30s hosiery, 40s weaving. Age 29. Married. Address Box 218, TEXTILES, 79 Milk St., Boston, Mass.**

**Weaving Overseer. 12 years' experience. All kinds of fancies and looms. Age 36. Married. Address Box 217, TEXTILES, 79 Milk St., Boston, Mass.**

**Superintendent. 8½ years' experience. Yarns, twines, rope drills, twills, sheeting and ducks. Age 33. Married. Address Box 216, TEXTILES, 79 Milk St., Boston, Mass.**

**Hosiery Carder and Spinner. 12 years' experience. Hosiery and hard yarns. Age 35. Married. Address Box 220, TEXTILES, 79 Milk St., Boston, Mass.**

**Master mechanic. 25 years' experience. Woolen, worsted and cotton. Age 45. Married. Address Box 301, TEXTILES, 79 Milk St., Boston, Mass.**

**Overseer of Weaving. 3 years' experience as second-hand and 2½ years' experience as overseer. Plain and fancy. Age 35. Married. Address Box 249 TEXTILES, 79 Milk St., Boston, Mass.**

**Superintendent. 15 years' experience. Brown sheeting 80x80 and print cloth. Age 49. Married. Address Box 251, TEXTILES, 79 Milk St., Boston, Mass.**

**Superintendent or Boss Finisher. 26 years' experience. Age 46. Married. Address Box 267, TEXTILES, 79 Milk St., Boston, Mass.**

**Overseer of Weaving. 7 years' experience. Drills and heavy sheetings. Age 42. Married. Address Box 242, TEXTILES, 79 Milk St., Boston, Mass.**

**Weaving or Cloth Room Overseer. 28 years' experience. Sheeting and drills. Age 46. Married. Address Box 234, TEXTILES, 79 Milk St., Boston, Mass.**

**OVERSEER OF DYEING**

**WANTED, in the near future, overseer of dyeing for large concern. Must have good executive ability and a thorough knowledge of dyeing and bleaching cotton skeins. Liberal salary to the right man. Address W. G., care of TEXTILES, 79 Milk St., Boston, Mass.**

**PRACTICAL MAN**

**Exceptional opportunity for one with practical experience in the manufacture of Sulphonated Oils for Textile and Tanners use, Textile Soaps, Finishing Materials, etc. Write, giving full particulars. Correspondence strictly confidential.—Address Box 529, care of TEXTILES, Boston, Mass.**

**SITUATIONS WANTED**

**Superintendent. 12 years' experience as designer and overseer and 2 years' experience as superintendent. Fancy shirting and bed spreads. Age 39. Married. Address Box 257, TEXTILES, 79 Milk St., Boston, Mass.**

**Cotton Mill Superintendent. 14 years' experience. Twine and rope. Age 39. Married. Address Box 221, TEXTILES, 79 Milk St., Boston, Mass.**

**Wool and Worsted Loom Fixer. 28 years' experience. Woolen and Worsted. Address Box 222, TEXTILES, 79 Milk St., Boston, Mass.**

**CLIFT & GOODRICH**

Established 1891

328-330 Broadway

New York, U. S. A.

Sales Agent

**KNIT UNDERWEAR—SWEATER COATS**

**WE** are exclusive selling agents for FIFTY-TWO MILLS producing all grades of underwear in all weights and in all fabrics for all climates in every part of the world.

Our lines consist of—

Flat and ribbed wool and flat and ribbed cotton underwear in shirts, drawers, vests, pants and union suits for men, women and children.

There is no requirement in popular priced underwear that we cannot supply to the wholesale and export trade.

Our line of popular priced Sweater Coats is also complete for all demands.

**KNIT UNDERWEAR—SWEATER COATS**

Established 1870

Incorporated 1890

# The Warren Soap Manufacturing Company

77 Summer Street Boston, Mass.

## NATIONAL SILK DYEING COMPANY

5 COLT ST.  
PATERSON N. J.



### SKEIN AND PIECE DYERS FINISHERS AND PRINTERS

NEW YORK SALESROOM  
102 MADISON AVE.

WORKS  
PATERSON N. J.  
DUNDEE LAKE N. J.  
ALLENTOWN PA.  
WILLIAMSPORT PA.

## The White Tar Aniline Corp.

56 Vesey Street, New York  
Works: Kearny, N. J.

Headquarters for

### ACID BASIC DIRECT AND CHROME COLORS

Specialties

ALKALI BLUE METYLENE BLUE  
METHYL VIOLET ACID ORANGE  
SULPHUR BLACK & BLUE

Special shades matched

FOR GREATER PRODUCTION AND LOWER COST

USE THE

## PAYNE WINDER

Over 2,500 in Successful Operation in Progressive Hosiery and Underwear Mills

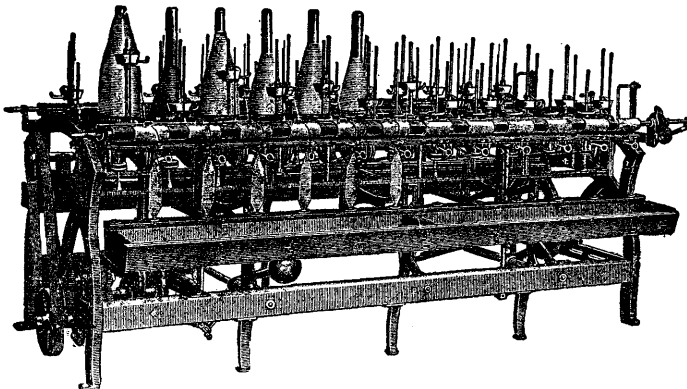
### IMPROVED UPRIGHT SPOOLERS

To Spool from Cop, Skein or Bobbin. Doubling Spoolers for doubling 2, 3 or more ends into one. Upright Quillers, Quill from Cop, Skein or Bobbin.

Ring Dresser, Spooler and Reel Spindles. Cop Skewers, Warp, Spool, Spooler Guides, Bolsters, and Stops Made and Repaired at Short Notice.

GEO. W. PAYNE CO. 102 BROAD STREET  
PAWTUCKET, R. I.

Established 1885—Incorporated 1903.



**DELAHUNTY DYEING MACHINE CO.**

ESTABLISHED 1880

**Manufacturers of Textile and Mining Machinery**

Revolving Cylinder Raw Stock Dyeing and Bleaching Machines  
 Revolving Cylinder Hosiery Dyeing and Bleaching Machines  
 Hosiery, Oxidizing, and Tom Tom Machines  
 Circulating Type Raw Stock Dyeing and Bleaching Machines  
 Circulating Type Beam Dyeing Machines for Dyeing  
 Cotton Warp on Beams, 1 to 12 Beams in One Operation

**SPECIAL MACHINES FOR ANILINE, SULPHUR, INDIGO, AND OTHER VAT COLORS****OFFICE AND WORKS, PITSTON, PA., U. S. A.****WILDT & CO., Limited,**

The Boulevard,

Leicester, England

**KNITTING MACHINE BUILDERS AND EXPORTERS***Please write for catalogues*

We are also open to negotiate for the import of American  
 Underwear Machinery for the European market.

**THE NEW BEDFORD TEXTILE SCHOOL**

The New Bedford Textile School is now a cotton textile institute of the Commonwealth of Massachusetts. It is located in New Bedford, Mass., an attractive residential city situated on Buzzards Bay, and the largest producer of fine yarns and fancy woven fabrics in this country.

Diplomas are granted for completion of three years' study and practice in any one of the following courses: Cotton Manufacturing, Textile Designing, Carding and Spinning, Textile Chemistry (Dyeing and Finishing), Seamless Hosiery Knitting, and Latch Needle Underwear Knitting. Mechanical drawing, machine shop practice, steam, electrical and textile engineering given in connection with the above courses. Special shorter courses may be arranged for.

**Tuition free to residents of Massachusetts**

Illustrated catalogue supplied free on application.

WILLIAM E. HATCH, A.M., *President.***LOWELL TEXTILE SCHOOL**

Four-year degree courses in

**CHEMISTRY AND TEXTILE COLORING — TEXTILE ENGINEERING**

Degrees of B. T. C. (Bachelor of Textile Chemistry) and B. T. E. (Bachelor of Textile Engineering) offered for completion of prescribed four-year courses.

Three-year diploma courses in

**COTTON MANUFACTURING****WOOL MANUFACTURING****TEXTILE DESIGNING**

Scientific and practical training in all processes of textile manufacture, including all commercial fibres.

Certified graduates of High Schools and Academies admitted without examination. For catalogue address

CHARLES H. EAMES, S. B., *President, LOWELL, MASSACHUSETTS***THE FRANKLIN MACHINE COMPANY**

Providence, Rhode Island

OPERATING

FRANKLIN FOUNDRY & MACHINE SHOPS Telephone Union 963  
 HARRIS CORLISS ENGINE PLANT " " 1857

**ENGINEERS****FOUNDERS****MACHINISTS**

Manufacturers of Harris Corliss Engines—Brown Valve Gear applied to all makes of Corliss Engines, Reborring Cylinders, Overhauling and Repairs on all kinds of Engines and Machinery—Shafting, Pulleys, Bearings, Couplings, Hangers, etc. Silk Spinning Machinery, French Worsted Drawing Frames (Frotteurs), Iron Castings and General Mill Repairs, Ball Winding Machines, Shoe Lace Tipping Machines, Cotton Bat Heads, Yarn Dressers, Special Machinery for Textile Work.

**MILL NOTES.**

The Anchor Duck Mills, of Rome, Ga., will erect an addition to their plant.

The Jenckes Spinning Co., of Pawtucket, R. I., are erecting an additional building to their plant. This company will also build an extension to their present office.

W. T. Heffner, of Maiden, N. C., will erect a 5,000-spindle yarn mill.

The Darlington Textile Co., of Pawtucket, R. I., will in the near future erect a one-story addition to their plant.

The Southern Mercerizing Co., of Tryon, N. C., will erect an addition to be equipped for mercerizing textile products.

The Sharp Manufacturing Co., of New Bedford, Mass., have recently opened a first-aid building in connection with their plant.

The Notafaw Webbing Co. has recently established a plant which is equipped with twenty-four narrow looms.

The Fitchburg (Mass.) Yarn Co. will erect an addition to their picker house.

The Fultonville (N. Y.) Textile Company has awarded a contract for the erection of a plant.

The Rabell Manufacturing Co., of Selma, Ala., will install 2,000 additional spindles, all of which have been ordered.

The Kalbileisch Chemical Co., of Waterbury, Ct., have awarded a contract for the erection of a factory addition.

The Sterling Spinning Co., of Belmont, N. C., have awarded contracts for the erection of a yarn plant.

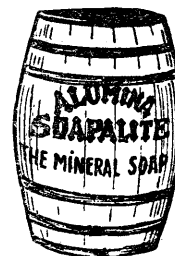
The Warwick Mills, of Centredale, R. I., have awarded a contract for the erection of additions to their plant. A four-story 150-foot addition to the spinning mill and a picker house 60 feet square are planned.

**"Crest" Flaked Soap**

88% or more real soap  
 12% or less moisture

**WOODLEY SOAP MFG. CO.**

29-49 Norfolk Ave., Boston, Mass.

**SAVES SOAP**

SAMPLE FREE

**The Electric Smelting  
 & Aluminum Co.**  
 LOCKPORT, N. Y.



PERSONALS.

W. L. Phillips, formerly overseer of spinning at the Avondale Mills, Birmingham, Ala., has taken the position of superintendent of the Social Circle (Ga.) Mills.

Charles D. Voss has been promoted from superintendent to general manager of the Buck Creek Mills, Siluria, Ala.

J. T. Hancock has been appointed overseer of weaving at the Jackson Mills, Monroe, N. C.

J. A. Snipes, formerly of Gastonia, N. C., has accepted the position of overseer of spinning at the Fidelity Mills, Charlotte, N. C.

C. K. Taylor has been appointed general manager of the McComb (Miss.) Cotton Mills.

C. E. Davis, formerly of Columbus, Ga., has accepted the position of superintendent at the Bibb Mills, No. 1, Macon, Ga.

M. T. Poovey, formerly of Kanapolis, N. C., has been appointed superintendent of the Gastonia Mfg. Co., Gastonia, N. C.

C. H. Eldridge has accepted the position of superintendent at the Aldora Mills, Barnesville, Ga.

W. F. Campbell, formerly with the Dixie Spindle & Flyer Co., Charlotte, N. C., has accepted the position with the Erwin Cotton Mills, Durham, N. C.

George Messick, formerly of Hudson, N. C., has taken the position of master mechanic for the Pinkney Mills, Gastonia, N. C.

Arthur Brearley, formerly boss superintendent of drawing and spinning Pa., has accepted the position of suener at H. C. Ball & Co., Manayunk, at the Penn Worsted Co., Philadelphia, Pa.

Andrew W. Smith, formerly employed at the Ponemah Mills, Taftville, Conn., has accepted the position of overseer of slashing at the Page Mfg. Co., New Bedford, Mass.

COTTON.

The Ray Tire & Rubber Co., of Chicago, Ill., will invest \$250,000 to erect and equip a large cotton mill in Birmingham, Ala.

Proximity Manufacturing Co., of Greensboro, N. C., are planning the installation of 1,000 additional new looms in their White Oak Mills.

The Easley (S. C.) Cotton Mills will construct a large community laundry, to serve four mills in that section.

**FOR SALE OR RENT**  
Mill with Good Water Power  
**E. W. CLARKE**  
115 West Broad St., Westerly, R. I.

Enterprising, energetic, young and progressive firm is open to accept Agency for England for American-built Hosiery Machinery. Advertisers possess practical knowledge of machinery, with capabilities of demonstration, and are in direct contact with all the leading hosiery manufacturers in Great Britain. Undeniable references. Address  
**HARRY COLLINS (Leicester), Ltd.,**  
*Hosiery Knitting Machinists,*  
16 Millstone Lane, LEICESTER, ENG.

**FOR SALE AT A BARGAIN**  
on account of lack of space  
**AUTOMATIC LOOP DRYER**  
For Piece Goods, Silks, Plushes, Underwear, Toweling, etc.  
Can be seen in operation  
Also  
2 Windle Doubling and Winding Machines.  
2 Hebdon Cloth Sponging Machines.  
1 Curtis and Marble Dewing Machine.  
2 Windle Power Measuring Machines.  
**UNITED COMPANY**  
107 West 25th St. New York City

**WANTED**  
Weavers and Spinners on  
Fancy Woolens  
**CROWN MILLS**  
Marcellus, New York

**SCREW MACHINE PRODUCTS**  
for Textile Mills and allied industries. We make special shaped turnings in steel or brass. Send samples or blue prints for quotations. Please state quantities ordered.  
**SHAMBOU SHUTTLE COMPANY,**  
Woonsocket, R. I.

**FOR SALE**  
Approximately 3,000 Davis & Furber Spindles for 7" bobbins. Immediate delivery. Sample on application.  
**Columbiaville Woolen Company**  
Columbiaville, Michigan.

**FOR SALE**  
5 D. & F. 240 spindle mules 17/8" gauge, 9 1/2" above collar board, first-class condition.  
2 J. & B. 300 spdle mules 17/8" gauge, 9" above collar board, good condition.  
10 looms 92 to 117".  
1 D. & F. 36" mixing picker, 4 feed rolls.  
4—48" Bramwell feeds.  
4—48" S. & F. metallic breasts.  
1—5 bowl wool scouring machine.  
**JOHN J. HEALY, Newtonville, Mass.**

**Knitting Machines**  
**FOR SALE**  
Nine knitters for making fine tubular fabric one inch wide when flat. Apply P. O. Box 1604, Boston.

**WANTED**  
Second-hand American 32-inch over-driven EXTRACTOR, motor driven for D. C., with or without motor attached. State price, condition and age. **BRIGHAM-HOPKINS COMPANY,** 409 W. Redwood St., Baltimore, Md.

**WANTED**  
HALF HOSE IN THE GRAY OR DYED AND BOXED, CASH TERMS. ADDRESS BOX 528, TEXTILES, 79 MILK ST., BOSTON, MASS.

**WANTED**—A COTTON DRYER with continuous apron. Will buy quick for cash.  
**WRITE AMERICAN FIBRE CHAIR SEAT CORP.**  
540 Van Alst Ave. Long Island City

**A Client's Experience**  
"Your system enables us to accurately estimate the cost of new styles and is of great assistance in choosing the most profitable of several styles."—A Client.  
A copy of "Where Profits Go in Textile Plants" will be mailed free upon request. Write for it today.  
**RALPH E. LOPER, Fall River, Mass.**  
Textile Production Engineer  
Specialist in  
Textile Cost Methods

**J. K. LAMB TEXTILE MACHINERY CO.**  
**SECOND-HAND TEXTILE MACHINERY**  
For cotton, woolen and worsted  
246 Chestnut St. Philadelphia, Pa.

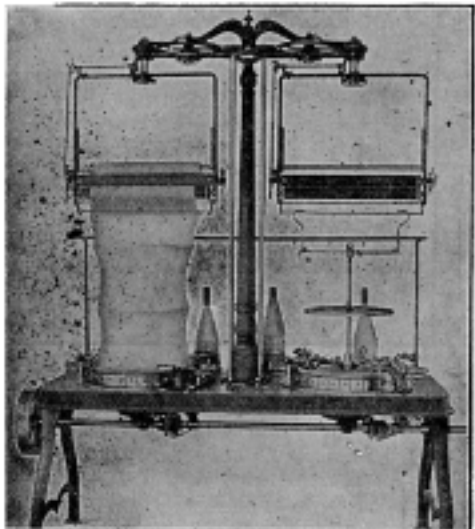
ESTABLISHED 1870  
INCORPORATED 1890

CODE ABC  
5TH EDITION

# CRANE

## SPRING AND LATCH NEEDLE KNITTING MACHINES

Will Enable Any User To Improve His Business



### Spring Needle Underwear Machine

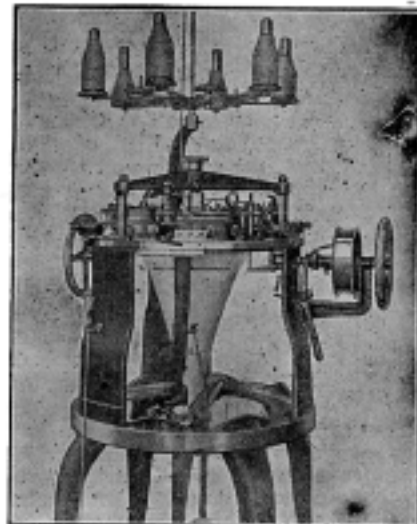
A splendid machine for balbriggan underwear, stockingettes, eiderdowns and all kinds of fleeced fabrics.

Made in large variety of sizes with automatic take-up, etc.

### New Spring Needle Rib Machine

Has new style feed, stop motion and take-up features.

Especially made to produce high grade ribbed underwear. Will make finest fabric on the market. An ideal machine with all parts handy to get at.

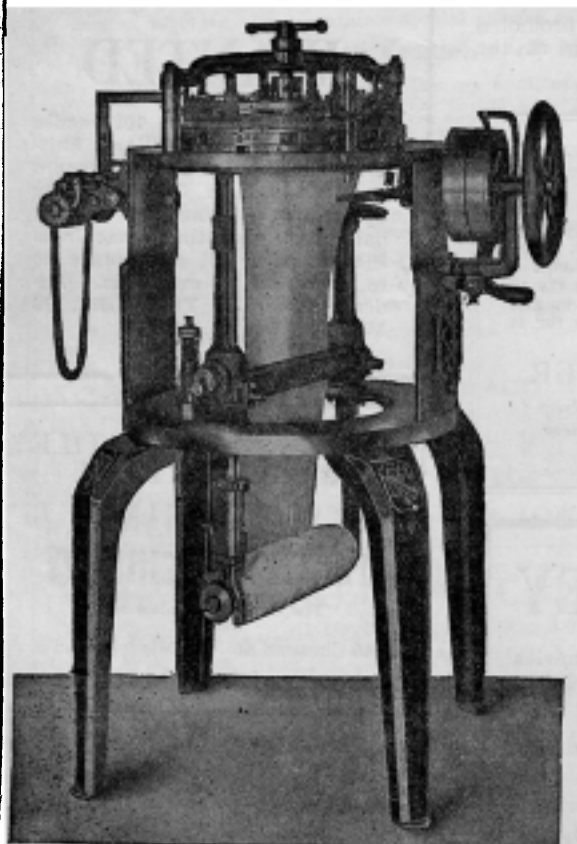


Improved Spring Needle Underwear Machine

New Spring Needle Rib Machine

Our late models challenge comparison. Write for further information.

**CRANE MANUFACTURING CO. : LAKEPORT, N. H.**



## Circular Rib

## Knitting Machinery

For making Ribbed Underwear, Combination Suits, Cuffs, Shirt Borders, Ribbed Hosiery, Fancy Knit Goods, Etc.

CORRECT Construction, Excellence and Durability—Quality of Fabric and Production  
Unexcelled—Latest Improvements.

**NYE & TREDICK COMPANY**

718-720 Cherry Street

**PHILADELPHIA - - - PA.**

**GERMAN COMBING ON BRADFORD ACCOUNT.**

The German woolcombers, apparently, are making a thoroughly organized effort to secure commission work on account of Bradford firms, of topmakers. They have been unable to get their wool through the Bradford machinery, which also applies to spinners who have obtainable wool under the outright purchase scheme, and the German woolcombers, who must be thoroughly cognizant of the existence of the Bradford bottle-neck, clearly intend to make the most of the situation. They have appointed an agent in Bradford, who is authorized to receive orders, and who states on behalf of the German firms that they can comb large quantities promptly. They are offering storage, including insurance, free for one year for wool, tops and noils, and delivery of tops and noils carriage paid by the combers to Hamburg. The following are the German charges for sorting and combing expressed in marks and pence respectively:—

**Charges for Sorting.**

	Merino crossbred.
	For 220 lbs. raw wool.
Any kind of wool up to 5% contraries.....	M. 3.0 M. 4.0
Any kind of wool up to 15% contraries .....	M. 4.0 M. 5.0
Fleeces over 15%.....	M. 6.0 M. 7.0
Pieces, lambs, Bagdad fleeces over 15%.....	M. 8.0 M. 8.0
Stained scoured pieces.....	M. 8.0 M. 8.0

**Combing Charges.**

At the rate of exchange of 20.45 marks to £1.

	For tops and noils
Merinoes and comebacks.....	10.374d. per lb.
50's—56's super .....	10.108d. per lb.
44's—48's super .....	9.578d. per lb.
40's and lower qualities .....	9.044d. per lb.

—Textile Mercury.

**RESEARCH IN THE COTTON INDUSTRY.**

By Dr. H. E. Howe, Division of Industrial Research, National Research Council.

The Third International Cotton Conference afforded an excellent opportunity for discussion among those familiar with the progress of applied science in the cotton industry and the present status of the work in various parts of the world. There has been much individual effort in our country and certain industrial laboratories, textile schools and agricultural experiment stations have made many valuable contributions to the improvement of various phases of the cotton trade. It would seem, however, that the time has now come when more co-operation should be obtained between the various groups and new work undertaken. This may make it advisable to form a cotton research association somewhat along the lines of the British Cotton Industry Research Association, which has just been incorporated and is prepared for active work.

A cotton research association in the United States should have represented in it all the steps from the growing of the raw material to the marketing of the finished fabric. While this may make it necessary to set up special machinery for the problems of direct interest to various groups there is still so much in common that these groups can work together to mutual advantage. As an outcome of the several discussions a committee is about to be appointed to study the question in its broad aspect, consider the problems which should be undertaken at once, determine the availability of men and facilities for such studies, and prepare a budget to cover the expense of the work. The committee will then report to the various organizations in the cotton trade in America in the expectation that associations and individuals will be prepared to join in financing the undertaking, which is at the same time both important and of self-interest to them. The universal interest in cotton would seem to make it possible for research associations in various countries to apply themselves to the study of problems of immediate national interest and to co-operate with each other in many studies of international importance.

The Committee on Research, Reports and Statistics of the Conference could do no more than initiate these two great projects, both of which will require much time for realization. They afford unusual opportunity for useful constructive work and will ultimately become foundation stones in the cotton trade both national and international.

**MILL NOTES.**

The Manchester Mills, of Rockhill, S. C., are erecting a new dye house.

The Eford Mills, of Albemarle, N. C., have awarded a contract for the erection of another 18,000 spindle mill to make yarns.

The Fairfax (Ala.) Mills have just awarded a contract to J. E. Serrine, of Greenville, S. C., for an addition to their bleachery.

An equipment of 5,000 spindles for the production of high-grade carded frame-spun yarn will be installed by the Ernsdson Manufacturing Co., St. Pauls, N. C.

An additional weave shed and other buildings will be erected by the Columbus (Ga.) Mfg. Co.

The Tennessee Mills, manufacturers of men's union suits, Knoxville, Tenn., are erecting an addition for the manufacture of shirts and drawers.

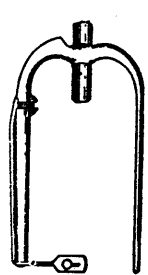
The Crompton & Knowles Loom Works will in the near future erect an addition to their plant at Tingley and Ashley streets, Providence, R. I., which will be used as a foundry.

The John S. Boyd Co., manufacturer of corduroy, Williamstown, Mass., have started work on an extensive addition to their plant.

The Park Yarn Mills, recently established, of Kings Mountain, N. C., will in the near future erect a mill of 5,000 ring and 2,200 twister spindles, for manufacturing coarse carded yarns.

The Ingraham & Tirrell Silk Co., of Phillipsburg, N. J. will erect an additional mill at Milford.

The Stewart Silk Mill of Easton, Pa., are erecting a new addition to their plant.



**FOR SALE—All Size Flyers, Practically as Good as New, Polished Inside and Out at Bargain Prices.**

**Southern Spindle and Flyer Co., Inc.**  
CHARLOTTE, N. C.

Manufacturers, Overhauled and Repairers of Cotton Mill Machinery

W. H. Monty, Pres. & Treas.      W. H. Hutchins, V.-Pres. & Sec'y

**LOMBARD**  
**Foundry, Machine, Boiler Works**  
**and Mill Supply House**

AUGUSTA, : : GEORGIA


Capacity, 300 Hands  
Hundred Thousand Feet Floor Space

Cotton, Oil, Gin, Saw, Grist, Fertilizer, Cane, Shingle Mill Machinery Supplies and Repairs and Castings, Shafting, Pulleys, Hangers, Wood, Coal and Sawdust Grate Bars, Pumps, Pipe, Valves and Fittings, Injectors, Belting, Packing Hoses, etc. Cast every day. One hundred machines and good men ready to do your work quick.

T. L. Louis has been appointed superintendent of the Acworth Cotton Manufacturing Co., Acworth, Ga.

G. B. McCombs has taken the position of superintendent at the Inverness Mills, Winston Salem, N. C.

**TURBINE WATER WHEELS**  
**OF GUARANTEED EFFICIENCY**



CYLINDER GATE, WICKET GATE, REGISTER GATE TURBINES, VERTICAL AND HORIZONTAL; SINGLE OR IN PAIRS.

ALSO, IMPULSE WATER WHEELS.

FOR PRICES AND CATALOGUES,  
Address  
**DAVIS FOUNDRY & MACHINE WORKS**  
ROME, GEORGIA



2/40s ½ blood .....	3.85-4.00
2/50s ½ blood .....	4.25-4.50
2/70s Australian .....	Nominal
FRENCH SPUN MERINO	
2/40s ½ blood .....	3.10-3.15
1/40-50-50 .....	2.75-2.85
1/40-70-30 .....	2.20-2.40
1/40-80-20 .....	2.35-2.45

**OLD WOOLEN RAGS**

**GOVERNMENT MAXIMUM**

<b>Merinos</b>	
Fine	34½-35½
Coarse light	19-20
Fine dark	21½-22½
Coarse dark	13-14
Fine black	18-19
<b>Serges</b>	
Light	28-30
Brown	27-28
Blue	23-24
Black	23-24
Red	25-26
Green	33-35
<b>Flannels</b>	
White (Fine)	55-60
Red	37-38
Blue	38-40
<b>Knit</b>	
White	50-51
Blue	22½-23½
Black trimmed	35-37
Red	25-26
Brown	32-33
Light gray	18-19
Light hoods	33-35
Mixed hoods	18-19
Silver gray	31-32
<b>Skirted worsteds</b>	
Light	19-20
Black	26-26½
Blue	23-24
Dark	17-18
Brown	20-21
<b>Skirted cloth</b>	
Fine light	13½-14½
Light	10-11½
Blue	8½-9
Dark	7-7¼
Plain black	7½-8
Skirted, tan cloth	24-25

J. L. Brown, formerly at Winston Salem, N. C., has accepted the position of superintendent of the Piedmont Commission Co., Charlotte, N. C.

A. P. Ritchie, formerly with the Pomona Mills, Greensboro, N. C., has been appointed superintendent of the Dixon Cotton Mills, Gastonia, N. C.

E. G. Putnam has been promoted from second hand to overseer of weaving at the Calcine Mills, Charlotte, N. C.

**GUMBINSKY BROS. CO.**

Reliable Graders of

**WOOLEN RAGS**

Graded Linseys a Specialty

CHICAGO, ILL.

**B. COHEN & SONS**

LARGEST GRADERS OF

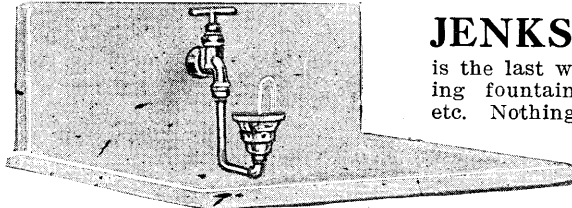
**New Woolen and Cotton Clippings**

AND ALL KINDS OF REMNANTS

*Write Us for Prices Before Shipping*

OFFICE AND WAREHOUSES

Office 1244-46 So. Union Avenue  
Old Rag Department, 1511 So. Sangamon St.  
New Cotton Department, 757-759 W. Taylor St. } **CHICAGO, ILL.**



**THE JENKS BUBBLER**

is the last word in sanitary drinking fountains for mills, schools, etc. Nothing to get out of order.

Flow of water regulated as you wish. Reasonable in price. Will give absolute satisfaction and last

Showing How Bubbler is Used many years. If your plumber hasn't it in stock write us.

**H. F. JENKS COMPANY, Pawtucket, R. I.**  
Established 1870 Incorporated 1911

**ALL STEEL ECONOMY BALING PRESSES**  
FIRE PROOF  
ALL SIZES FOR ALL PURPOSES  
LARGEST LINE BUILT IN U.S.A.  
ECONOMY BALER CO., DEPT.  ANN ARBOR, MICH., U.S.A.

**JENNISON CO. PIPERS FITCHBURG, MASS.**

**Do You Want a Silent Partner?**

One who gives advice but does not talk back.

He is the "Daily News Record!"

The Daily Newspaper of the Textile Trade  
8 East 13th Street, New York

**FILL OUT AND RETURN**

Please let me know how the DAILY NEWS RECORD can be made to work for me.

Name .....

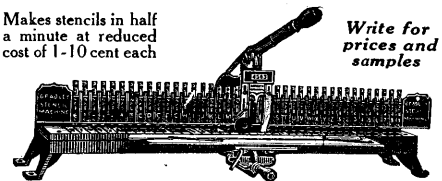
Business .....

Address .....

**THE BRADLEY STENCIL MACHINE**

Makes stencils in half a minute at reduced cost of 1-10 cent each

Write for prices and samples



In Universal use by thousands of manufacturers and shippers. Manufacturers of Oil Stencil Board

A. J. BRADLEY, GEN. SALES AGENT  
101 Beekman Street New York City, N. Y.

It Pays to Advertise in "Textiles" Because Progressive Mill Men Everywhere Are Its Readers.

**WATER WE-FU-GO AND SCAIFE PURIFICATION SYSTEMS SOFTENING & FILTRATION FOR BOILER FEED AND ALL INDUSTRIAL USES WM. B. SCAIFE & SONS CO. PITTSBURGH, PA.**

# CLASSIFIED INDEX TO ADVERTISERS

- Accountants and Engineers**  
 Cooley & Marvin Co., Boston  
 Ralph E. Loper, Fall River, Mass.
- Air Moistening**  
 Carrier Engineering Corporation, New York.  
 Parks-Cramer Co., Fitchburg, Mass.
- Albion**  
 Roessler & Hasslacher Chemical Co., New York.
- Asbestos Machinery**  
 Smith & Furbush Machine Co., Philadelphia, Pa.
- Automatic Feeds**  
 (For cotton and wool)  
 Smith & Furbush Machine Co., Philadelphia, Pa.  
 Philadelphia Drying Machinery Co., Philadelphia, Pa.
- Baling Presses**  
 Economy Baler Co., Ann Arbor, Mich.  
 Philadelphia Drying Machinery Co., Philadelphia, Pa.  
 Smith & Furbush Machine Co., Philadelphia, Pa.
- Ball Winding Machinery**  
 Franklin Machinery Co., Providence, R. I.
- Bleaching Kiers**  
 Worcester Steam Boiler Works, Worcester, Mass.  
 Philadelphia Drying Machinery Co., Philadelphia, Pa.
- Bleaching Machinery**  
 Delahunty Dyeing Machine Co., Pittston, Pa.
- Bleaching Materials**  
 Arnold, Hoffman & Co., Inc., Providence, R. I.  
 Roessler & Hasslacher Chemical Co., New York.
- Bleaching Oil**  
 Arnold, Hoffman & Co., Inc., Providence, R. I.  
 Jacques Wolf & Co., Passaic, N. J.
- Blowers and Blower Systems**  
 Philadelphia Drying Machinery Co., Philadelphia, Pa.
- Boilers**  
 Worcester Steam Boiler Works, Worcester, Mass.
- Boiler Feed Purifiers**  
 Scaife & Sons Co., Wm. B., Pittsburgh, Pa.
- Boxes and Box Sheeks**  
 Jos. T. Pearson, Philadelphia.
- Braiding Machinery**  
 Textile Machine Works, Reading, Pa.
- Bubblers (for sinks)**  
 H. F. Jenks Co., Pawtucket, R. I.
- Causticizing Machinery**  
 Philadelphia Drying Machinery Co., Philadelphia, Pa.
- Chairs (for Mill Use)**  
 H. F. Jenks Co., Pawtucket, R. I.
- Chrome Colors**  
 Arnold, Hoffman & Co., Inc., Providence, R. I.  
 Jacques Wolf & Co., Passaic, N. J.
- Clipping Machines (shoe lace)**  
 Franklin Machine Co., Providence, R. I.
- Cloth Cutting Machines**  
 Eastman Machine Co., Buffalo  
 Universal Cutter Co., St. Louis.
- Cloth Testers**  
 Scott, H. L. & Co., Providence, R. I.
- Cloth Washers**  
 Hunter, James, Machine Co., No. Adams, Mass.  
 Philadelphia Drying Machinery Co., Philadelphia, Pa.
- Cones, Paper**  
 Fairpoint Corp., New Bedford, Mass.
- Card Grinders**  
 B. S. Roy & Son Co., Worcester, Mass.
- Cop Skewers**  
 Shambow Shuttle Co., Woonsocket, R. I.
- Cotton Bat Heads**  
 Franklin Machine Co., Providence, R. I.
- Cotton Machinery**  
 Philadelphia Drying Machinery Co., Philadelphia.  
 Smith & Furbush Machine Co., Philadelphia.  
 Wildman Manufacturing Co., Norristown, Pa.
- Cotton Yarn Bleachers**  
 Home Bleach & Dye Works, Pawtucket, R. I.
- Cutting Machines**  
 Eastman Machine Co., Buffalo.  
 Universal Cutter Co., St. Louis.  
 Wildman Mfg. Co., Norristown, Pa.
- Drawing Frames (French Worted)**  
 Franklin Machine Co., Providence, R. I.
- Drinking Fountains**  
 H. F. Jenks Co., Pawtucket, R. I.
- Drying Machinery**  
 Philadelphia Drying Machinery Co., Philadelphia.
- Dusters**  
 Smith & Furbush Machine Co., Philadelphia.
- Dyers, Bleachers and Finishers**  
 Home Bleach and Dye Works, Pawtucket, R. I.  
 National Silk Dyeing Co., Paterson, N. J.  
 Providence Dye Works, Providence, R. I.
- Dyeing, Drying, Bleaching and Finishing Machinery**  
 Delahunty Dyeing Machine Co., Pittston, Pa.  
 Philadelphia Drying Machinery Co., Philadelphia.
- Dyestuffs and Chemicals**  
 Arnold, Hoffman & Co., Inc., Providence, R. I.  
 Atlantic Dyestuff Co., Boston  
 S. R. David & Co., Inc., Boston, Mass.  
 Dow Chemical Co., Midland, Mich.  
 Du Pont de Nemours & Co., Wilmington, Del.  
 Dye Exchange Corp., New York.  
 Hellenic Chemical & Color Co., New York City.  
 Klipstein & Co., A., New York.  
 Metz & Co., H. A., New York.  
 Hemingway, Inc., Frank, New York.  
 Kohnstamm & Co., K., New York.  
 Levinstein, I., & Co., Inc., Boston.  
 National Aniline & Chemical Co., New York.  
 Newport Chemical Works, Passaic, N. J.  
 White Tar Aniline Corporation, New York.  
 Jacques Wolf & Co., Passaic, N. J.
- Dyeing Temperature Regulators**  
 Tagliabue Mfg. Co., C. J., Brooklyn, N. Y.
- Electrical Constructors**  
 General Electric Co., Schenectady, N. Y.
- Electric Lamps**  
 General Electric Co., Schenectady, N. Y.  
 Lord Manufacturing Co., N. Y. C.,
- Electric Motors**  
 General Electric Co., Schenectady, New York.
- Engines**  
 Franklin Machine Co., Providence, R. I.
- Export Publicity**  
 Salades Export Publishing Co., New York City.
- Extractors, Logwood**  
 Tolhurst Machine Works, Troy, N. Y.  
 Worcester Steam Boiler Works, Worcester, Mass.
- Feed Water Purifiers**  
 Scaife & Sons Co., Wm. B., Pittsburgh, Pa.
- Flooring**  
 Philadelphia Mineral Flooring Co., Philadelphia, Pa.
- Flyers**  
 Southern Spindle & Flyer Co., Inc., Charlotte, N. C.
- Fly Frames**  
 Sheridan, E. L. & Fred, Windsor, Ga.
- Flyer Pressers**  
 Southern Spindle & Flyer Co., Inc., Charlotte, N. C.
- Felt Machinery**  
 Smith & Furbush Machine Co., Philadelphia.
- Filters (Water)**  
 Norwood Engineering Co.  
 Scaife & Sons Co., Wm. B., Pittsburgh, Pa.
- Grinding Machinery**  
 Roy & Son Co., B. S.
- Gums**  
 Arnold, Hoffman & Co., Inc., Providence, R. I.  
 Klipstein, A. & Co., New York.  
 Chas. Morningstar & Co., New York.  
 Jacques Wolf & Co., Passaic, N. J.
- Heddles**  
 Litchfield Shuttle Co., Southbridge, Mass.
- Hosiery Boards**  
 Pearson, J. T., Philadelphia.  
 Philadelphia Drying Machinery Co., Philadelphia.
- Hosiery Machines**  
 Brinton, H., Co., Philadelphia.  
 Crane Manufacturing Co., Lakeport, N. H.  
 Nye & Tredick, Philadelphia.  
 Textile Machine Works, Reading, Pa.  
 Wildman Manufacturing Co., Norristown, Pa.
- Humidifying Apparatus**  
 Carrier Engineering Corp., New York.  
 Parks-Cramer Co., Fitchburg, Mass.
- Hydro-Extractors**  
 Tolhurst Machine Works, Troy, N. Y.
- Hydrometers**  
 Tagliabue Mfg. Co., C. J., Brooklyn, N. Y.
- Iron Castings**  
 Franklin Machine Co., Providence, R. I.
- Knitting Machinery**  
 Brinton, H., Co., Philadelphia.  
 Crane Manufacturing Co., Lakeport, N. H.  
 Huse & Sons, W. D., Laconia, N. H.  
 Hemphill Co., Pawtucket, R. I.  
 Nye & Tredick, Philadelphia.  
 Stafford & Holt, Little Falls, N. Y.
- Textile Machine Works, Reading, Pa.**  
 Tompkins Bros. Co., Syracuse, N. Y.  
 Wildman Manufacturing Co., Norristown, Pa.  
 Wildt & Co., Leicester, Eng.
- Knitting Machinery, Full Fashioned**  
 Textile Machine Works, Reading, Pa.
- Knitting Needles, Etc.**  
 Brinton, H., Co., Philadelphia.  
 Corey, William, Co., Manchester, N. H.  
 Laconia Needle Co., Laconia, N. H.  
 M. M. McCormick & Co., Philadelphia.
- Lighting Fixtures**  
 General Electric Co., Schenectady, N. Y.  
 Lord Manufacturing Co., N. Y. C.
- Mercerizing**  
 Home Bleach & Dye Works, Pawtucket, R. I.
- Mill Supplies**  
 Lombard Foundry & Mill Supply House, Augusta, Ga.
- Mordants**  
 Jacques Wolf & Co., Passaic, N. J.
- Oiling Machinery**  
 Park Co., G. M., The, Fitchburg, Mass.
- Oils**  
 Borne, Scrymser Co., New York  
 Bradford Oil Co., Lynn, Mass.  
 Swan & Finch Co., New York.
- Overhaulers**  
 Southern Spindle & Flyer Co., Inc., Charlotte, N. Y.
- Paints**  
 Coledge & Sons, Inc., F. J., Augusta, Ga.
- Paper Cones and Tubes**  
 Fairpoint Corporation, New Bedford, Mass.
- Peroxides**  
 Roessler & Hasslacher Chemical Co., New York.
- Pickers, Rag or Shoddy**  
 Smith & Furbush Machine Co., Philadelphia.
- Pipers**  
 Jennison Co., Fitchburg, Mass.
- Pulleys**  
 Franklin Machine Co., Providence, R. I.
- Recording Gauges**  
 Tagliabue Mfg. Co., C. J., Brooklyn, N. Y.
- Recording Thermometers**  
 Tagliabue Mfg. Co., C. J., Brooklyn, N. Y.
- Regulators for Temperature**  
 Tagliabue Mfg. Co., C. J., Brooklyn, N. Y.
- Woolen Rags**  
 Cohen & Sons, B., Chicago, Ill.
- Rings, Spinning and Twister**  
 Southern Spindle & Flyer Co., Inc., Charlotte, N. C.
- Rolls**  
 Southern Spindle & Flyer Co., Inc., Charlotte, N. C.
- Schools**  
 Lowell Textile School, Lowell, Mass.  
 New Bedford Textile School, New Bedford, Mass.
- Second Hand Textile Machinery**  
 John J. Healy, Newtonville, Mass.  
 Lamb, J. K., Textile Machinery Co., Philadelphia.  
 Edward Jefferson, Philadelphia.
- Shuttle Irons**  
 Litchfield Shuttle Co., Southbridge, Mass.
- Shuttles**  
 Litchfield Shuttle Co., Southbridge, Mass.  
 Shambow Shuttle Co., Woonsocket, R. I.

(Continued on following page)



Ask for demonstration,  
there is no charge made

## Persistent Demands for Shipments

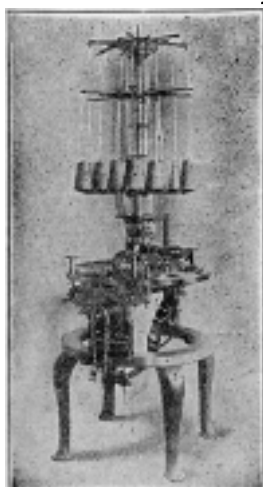
result from lack of or inefficient manufacturing facilities. If the delay is in the cutting rooms

# EASTMAN GOLD MEDAL CUTTERS

may solve your problem and help you to satisfy your customers' demands.

## EASTMAN MACHINE CO., OF BUFFALO, U. S. A.

NEW YORK 816 Broadway	PHILADELPHIA Heed Building, 1213 Filbert Street	ST. LOUIS 1420 Olive Street
BOSTON 87 Summer Street	DETROIT 119 E. Jefferson Avenue	SAN FRANCISCO 444 Market Street
CLEVELAND 1234 Superior Avenue, N. E.	CHICAGO 815 W. Van Buren Street	BALTIMORE 417 W. Baltimore Street
NEW ORLEANS, Godehaux Bldg.	HAMILTON, ONTARIO, Main & McNab Sts.	



Sweater Machine

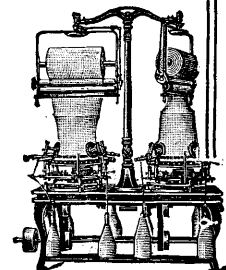
# CIRCULAR SPRING and LATCH NEEDLE KNITTING MACHINERY

For the Manufacture of

Flat Wool and Cotton Under- wear	Astrakhans
Balbriggan	Fur Cloths
Silk Skirts	Skirts and Toques with three color stripes
Fleece-Lined Fabrics	Sweaters with rack stitch, stripes and selvage edge
Jersey Cloth	

**TOMPKINS BROS. CO.,**  
ESTABLISHED 1846

583 South Clinton St.  
SYRACUSE, N. Y.



Spring Needle Machine

## CLASSIFIED INDEX TO ADVERTISERS—(Continued from page 46)

**Silk Nolls**  
Fawcett, Hughes, New York.

**Silks (Raw)**  
General Silk Importing Co.,  
New York.

**Selling Agents for Mills**  
Clift & Goodrich, New York.

**Singeing Machines**  
Arnold, Hoffman & Co., Inc  
Providence, R. I.  
Philadelphia Drying Machinery  
Co., Philadelphia.

**Soaps**  
Arnold, Hoffman & Co., Inc  
Providence, R. I.  
Electric Smelting and Alumi-  
num Co., Lockport, N. Y.  
Warren Soap Mfg. Co., The,  
Boston, Mass.  
Woodley Soap Mfg. Co.,  
Boston, Mass.

**Special Textile Machinery**  
Franklin Machinery Co., Prov-  
idence, R. I.

**Spindles**  
Southern Spindle & Flyer Co.,  
Inc., Charlotte, N. C.

**Spun Silk Machinery**  
Franklin Machine Co., Prov-  
idence, R. I.

**Starch**  
Arnold, Hoffman & Co., Inc  
Providence, R. I.  
Kohnstamm & Co., H., New  
York City. (Rice Starch)  
Chas. Morningstar & Co., New  
York.

**Stencil Machines**  
Bradley, A. J., New York.

**Stools (for mill use)**  
Jenks Co., H. F., Pawtucket, R. I.

**Temperature Regulators**  
Carrier Engineering Corpora-  
tion, New York.

**Tagliabue Mfg. Co., C. J.,**  
Brooklyn, N. Y.

**Testing Establishments**  
U. S. Conditioning & Testing  
Co., New York.

**Thermometers**  
Tagliabue Mfg. Co., C. J.  
Brooklyn, N. Y.

**Transmission Machinery**  
Franklin Machine Co., Prov-  
idence, R. I.  
Hunter, James, Machine Co.,  
North Adams, Mass.

**Tubes, Paper**  
Pairpoint Corp., New Bedford,  
Mass.

**Ventilating Apparatus**  
General Electric Co., Schene-  
ctady, N. Y.  
Philadelphia Drying Machinery  
Co., Philadelphia.

**Waste Preparing Machinery**  
Smith & Furbush Machine Co.,  
Philadelphia.

**Water Softeners**  
Scaife & Sons Co., Wm. B.,  
Pittsburgh, Pa.

**Water Wheels**  
Davis Foundry and Machine  
Works, Rome, Ga.

**Winders**  
Payne, Geo. W., Co., Paw-  
tucket, R. I.

**Wool Oil**  
Borne, Scrymser Co.  
Bradford Oil Co., Lynn, Mass.

**Tape Drives**  
Barber Mfg. Co., Lowell, Mass.

**Woolen and Worsted Machinery**  
Hunter, James, Machine Co.,  
No. Adams, Mass.  
Jefferson, Edward, Philadel-  
phia.  
Philadelphia Drying Machinery  
Co., Philadelphia.  
Smith & Furbush Machine Co.,  
Philadelphia.

**Yarn Dressers**  
Franklin Machine Co., Prov-  
idence, R. I.

**Yarn Testers**  
Scott, H. L. & Co., Providence,  
R. I.

**YARNS, THREADS, ETC.**  
(Artificial silk)  
Mindlin & Rosenman, New  
York.

**Cotton Yarn**  
Dana Warp Mills, Westbrook,  
Me.  
Jamieson, James B., Boston.  
Mindlin & Rosenman, New  
York.  
Rivers & Lewis, Fall River,  
Mass.  
Sternberg, Fred. & Co., New  
York.  
Textile Yarn Agency, New  
York.  
Tolar & Hart, New York.  
Whitman, William, Co., New  
York.

**Glazed Yarns**  
Jamieson, James B., Boston.  
Mindlin & Rosenman, New  
York.

**Sternberg, Fred., & Co., New  
York.**  
Whitman, William, Co., New  
York.

**Linen, Hemp, Jute, Flax, Etc.**  
Fawcett, Hughes, New York.  
Mindlin & Rosenman, New  
York.

**Mercerized Yarns**  
Jamieson, J. B., Boston  
Sternberg, Fred. & Co., New  
York.  
Whitman, William, Co., New  
York.

**Merino Yarns**  
J. B. Jamieson, Boston.  
Mindlin & Rosenman, New  
York.

**Silk Yarns**  
American Silk Spinning Co.,  
Providence, R. I.  
Cheney Bros., New York.  
Textile Yarn Agency, New  
York.

**Woolen Yarns**  
Fred S. Gilley, Boston.  
Jamieson, James B., Boston.  
Mindlin & Rosenman, New  
York.  
Textile Yarn Agency, New  
York.

**Worsted Yarns**  
Fred S. Gilley, Boston.  
Mindlin & Rosenman, New  
York.  
Textile Yarn Agency, New  
York.  
Whitman, William, Co., New  
York.

In Writing Advertisers Kindly Mention "Textiles"



# ALPHABETICAL INDEX TO ADVERTISERS

Allen, Wm., Sons Co. ....	7	Laconia Needle Co. ....	34
American Fibre Chair Seat Corp. ....	41	Lamb, J. K., Textile Machinery Co. ....	41
American Silk Spinning Co. ....	35	Litchfield Shuttle Co. ....	37
Arnold, Hoffman & Co. ....	4	Lombard Foundry & Mill Supply House. ....	43
Atlantic Dyestuff Co. ....	30	<b>Loper, Ralph E.</b> ....	41
		Lord Manufacturing Co. ....	6
		Lowell Textile School ....	40
Barber Mfg. Co. ....	44		
Borne, Scrymser Co. ....	8	Merion Worsted Mills ....	35
Bradford Oil Co., Inc. ....	2	Metz & Co., H. A. ....	32
Bradley, A. J. Mfg. Co. ....	45	Mindlin & Rosenman ....	35
Brigham-Hopkins Co. ....	41	Morningstar & Co., Chas. ....	37
Brinton, H. Co. ....	2		
		National Aniline & Chemical Co. ....	29
Carrier Engineering Corporation .....Front cover		<b>National Silk Dyeing Co.</b> ....	39
Clift & Goodrich ....	38	New Bedford Textile School ....	40
Cohen & Sons, B. ....	45	Newport Chemical Works, Inc. ....	30
Columbiaville Woolen Co. ....	41	Norwood Engineering Co. ....	36
Cooley & Marvin Co. ....Front cover		Nye & Tredick Co. ....	42
Corey Co., William. ....	36		
Crane Mfg. Co. ....	42	Pairpoint Corporation, The ....	8
Crown Mills ....	41	Parks-Cramer Co. ....	3
		<b>Payne Co., Geo. W.</b> ....	39
Daily News Record ....	45	Pearson, Jos. T. ....	44
Dana Warp Mills. ....	44	Philadelphia Drying Machinery Co. ....	9
David & Co., Inc., S. R. ....	35	Providence Dye Works ....	33
Davis Foundry and Machine Works ....	43		
Delahunty Dyeing Machine Co. ....	40	Rivers & Lewis. ....	44
Dow Chemical Co. ....	31	Roessler & Hasslacher Chemical Co. ....	35
Du Pont de Nemours & Co., E. I. ....	10	Roy & Son Co., B. S. ....	8
Dye Exchange Corporation ....	32		
		Scaife & Sons Co., Wm. B. ....	45
Eastman Machine Co. ....	47	Shambow Shuttle Co. ....	41
Economy Baler Co. ....	45	Siewertsen, H. ....	37
Electric Smelting & Aluminum Co. ....	40	Smith & Furbush Machine Co. ....Front cover	
		Southern Spindle & Flyer Co. ....	43
Farbwerke-Hoechst Co. ....	32	Stafford & Holt .....Second cover	
Fawcett, Hughes ....	44	Sternberg, Fred & Co. ....	44
Franklin Machine Co. ....	40	Swan & Finch Co. ....	5
General Electric Co. ....Back cover		Tagliabue Mfg. Co., C. J. ....	1
General Silk Importing Co. ....Front cover		Textile Machine Works .....Second cover	
Gumbinsky Bros. Co. ....	45	Tolar & Hart ....	44
		Tolhurst Machine Works ....	2
Healy, John J. ....	41	Tompkins Bros. Co. ....	47
Hunter, James, Machine Co. ....Third cover			
Huse & Sons, W. D. ....	34	United Co. ....	41
		United States Conditioning & Testing Co. ....	44
Jamieson, J. B. ....	44	Universal Cutter Co. ....	37
Jefferson, Edward .....Third cover			
Jenks Co., H. F. ....	45	<b>Warren Soap Mfg. Co.</b> ....	39
Jennison Co. ....	45	White Tar Aniline Corporation, The. ....	39
		Whitman, William Co., Inc. ....	44
Klipstein & Co., A. ....	33	Wildman Mfg. Co. ....Third cover	
Kohnstamm & Co., H. ....	32	Wildt & Co. ....	40
		Wolf, Jacques & Co. ....	33
		Woodley Soap Mfg. Co. ....	40
		Worcester Steam Boiler Works ....	7