

# TEXTILES

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*Proprietors of  
Providence Combing Mills*

June 25, 1919.

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

Gentlemen:-

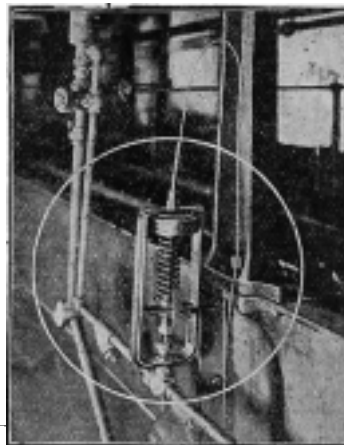
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*Providence Combing Mills*  
H. K. M.

RECEIVED  
JUN 25 1919  
AMENDED BY  
O. K. FOR FILE



**"Send two more  
as early as possible"**



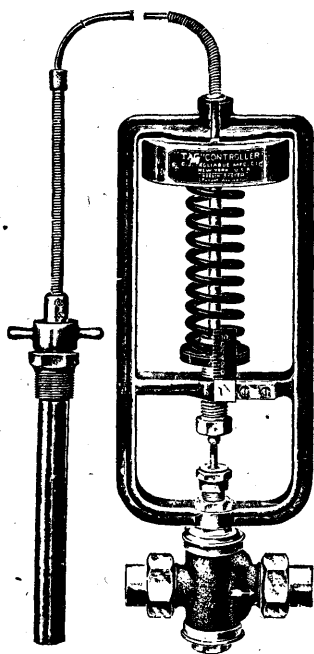
**HIS** letter typifies the experience of many mill men who were previously experimenting with some makeshift in an effort to overcome the shortcomings of crude and wasteful *hand regulation* of the steam inlet valves.

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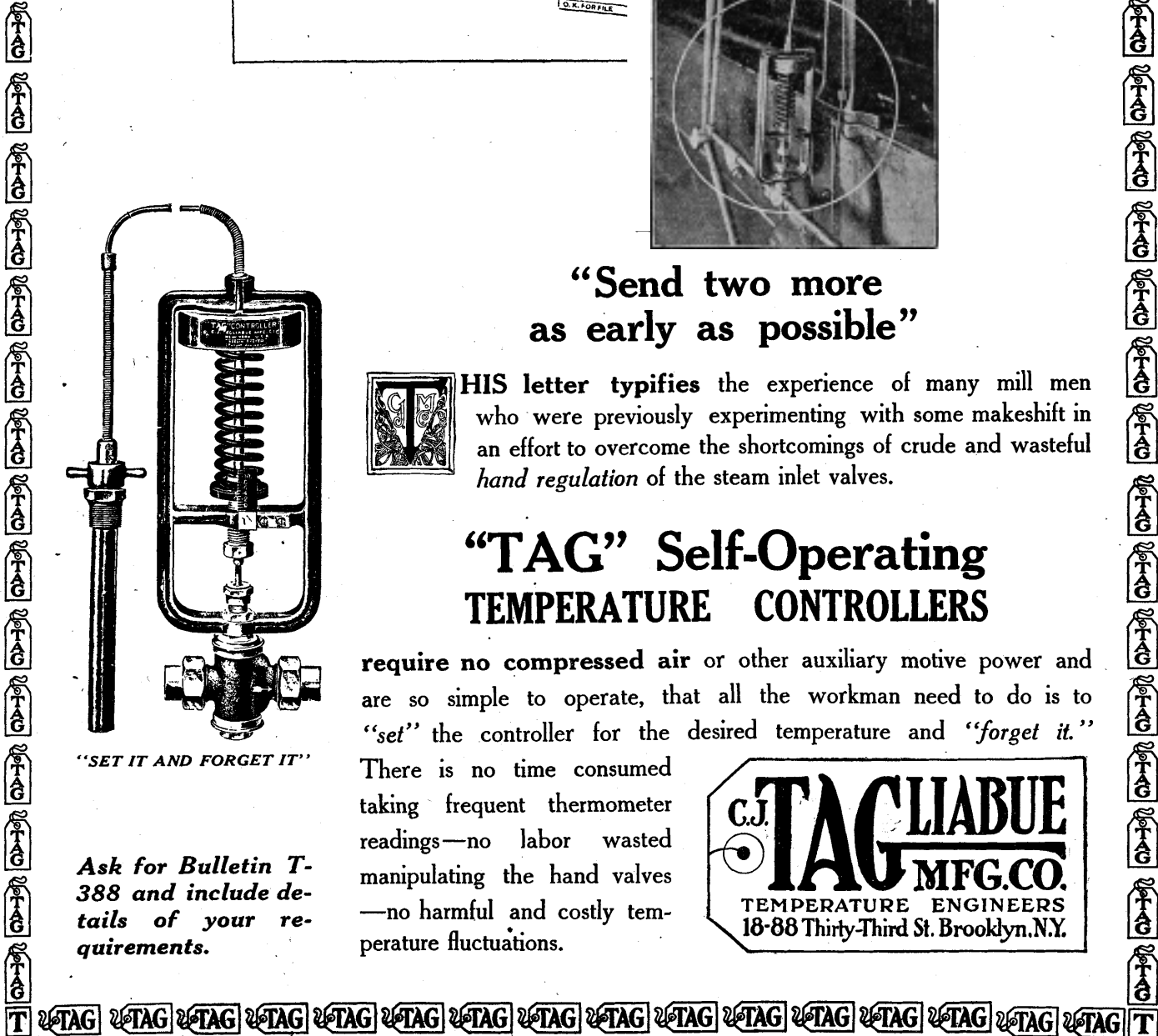


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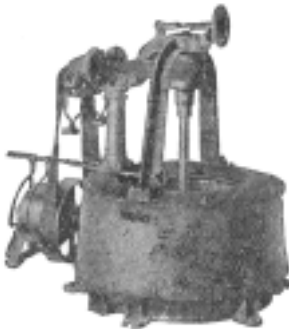
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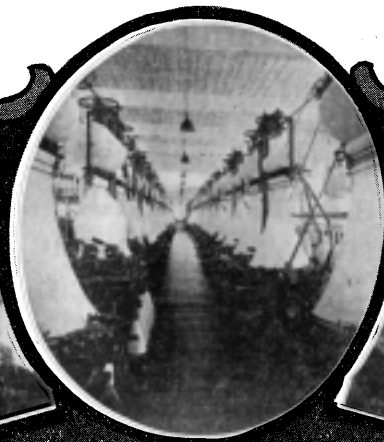
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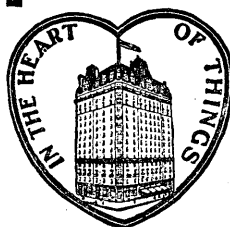
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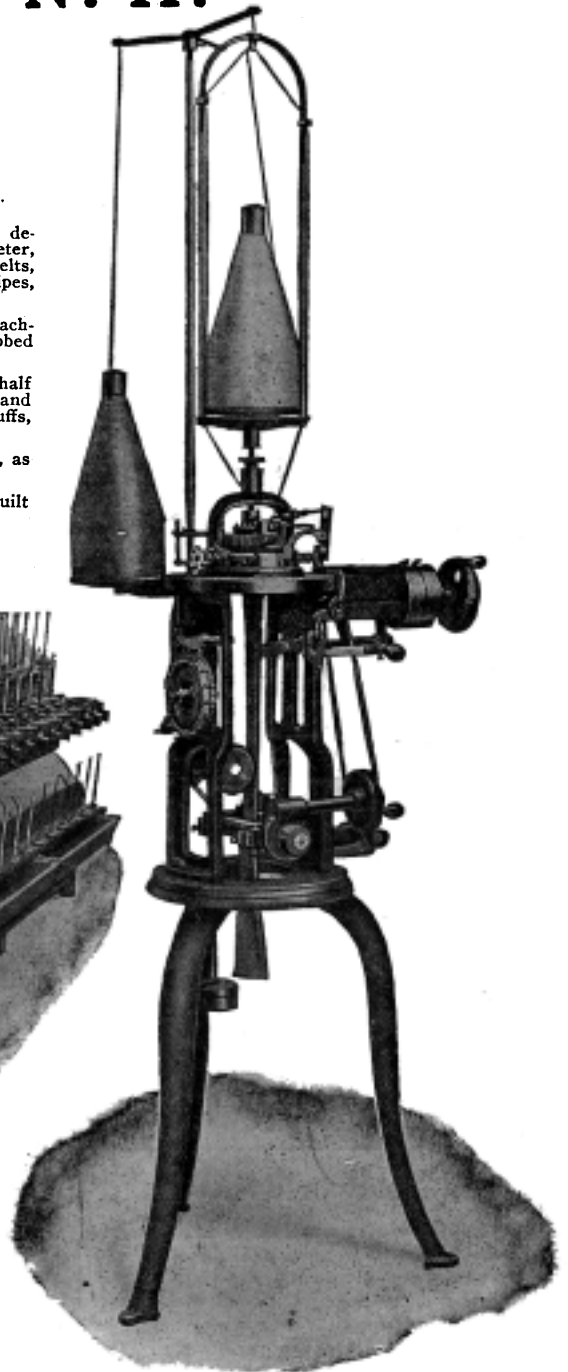
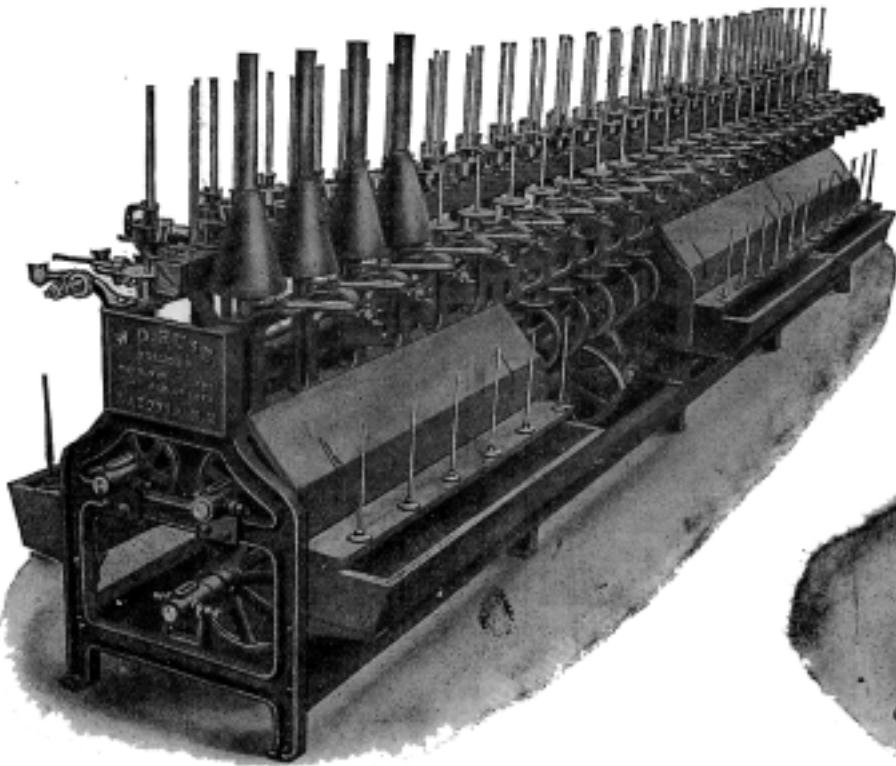
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# TEXTILES

A MONTHLY TECHNICAL JOURNAL OF THE  
TEXTILE TRADE

Published by

## THE TEXTILES COMPANY

Post Office Square Building

Telephone Main 19

79 Milk Street, Boston, Mass.

EDWIN B. PILLSBURY, Business Manager

SAMUEL S. DALE, Editor

Cable Address, "Textiles, Boston"

New York Office: 42 West 39th Street. Telephone Greeley 4295

J. CARLISLE LORD, Manager

### SUBSCRIPTION

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

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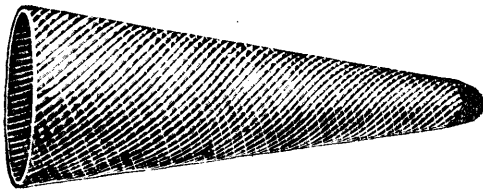
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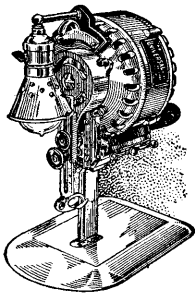
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# TEXTILES

VOL. XV

SEPTEMBER, 1919

NO. 3

## AMERICAN DYES OR NATIONAL DISASTER.

The letter which follows is from a prominent manufacturer of gingham and wash goods. As it undoubtedly represents the mistaken attitude of a number of textile manufacturers, we are replying to it here at some length in order to point out their error and secure their support for the only right policy for Americans at the present time:

Editor of TEXTILES,  
Boston, Mass.

August 13, 1919.

Dear Sir:—

As there is so much talk in regard to the present dye situation, I would like to give you my opinion and find out, if possible, how you stand on this subject.

We manufacture at this mill a high grade romper cloth which requires a very fast dye. Up to the beginning of the war these colors were dyed almost wholly with vat dye stuffs. These vat colors are not being manufactured in this country today, and upon inquiry various dye stuff manufacturers have advised me that they will have none on the market in the near future. We are using indigo for our dark blues and have been forced to use a vat blue imported from Switzerland at a very high price for our light blues. We have managed to struggle along with sulphur colors on some of the other shades, but have been forced to use a direct pink on all goods dyed that shade. Direct colors at their best are very unsatisfactory and only a few plants in this country are equipped properly for the dyeing of alizarine reds or pinks.

Vat dyes are being manufactured in England, but the agents of these manufacturers in this country have advised me that they are unable to obtain the proper license to import these dye stuffs. Shirtings being imported from England are dyed with these dye stuffs and shirtings imported from Japan are also dyed with dye stuffs in this class, whose origin, I have every reason to believe, is German.

Shall the American manufacturer be handicapped due to a hate propaganda, started from the Lord knows where, while his competitors in other countries go merrily on and manufacture goods containing dye stuffs which are impossible for him to obtain? We are using and want to use American dye stuffs, but do not want to be forced to be without dye stuffs of certain classes as long as they are obtainable in other countries, and we believe that until such a time as the American manufacturers are able to put a dye stuff of this class on the market, the requirements of dye stuffs of this class by the American manufacturer should be satisfied. Then, and only then, should foreign products be barred.

Thanking you for your opinion on this matter at an early date, I am,

Very truly yours,

### Chemical Warfare.

The one decisive factor in this dyestuffs problem is that the United States must have a self-contained chemical and coal-tar dyestuff industry in order to prepare the nation for defense against external aggression. In the face of this necessity all conflicting considerations sink into insignificance. The Great War that is now drawing to a close marked the extraordinary development of warfare with chemicals, which is certain to be carried still further in future conflicts between the nations.

No nation is safe that is without a well equipped industry

for the production of an ample supply of explosives and poison gases equal and if possible superior in efficiency to those possessed by any possible aggressor. It is not enough to pattern the destructive power and the quantity of these chemicals on the experience of the Great War. The ablest and most highly organized chemists in the world will continue in the employ of our prospective antagonists, their efforts stimulated by a spirit of revenge, obtaining by laborious research new and more terrible methods of destruction, which will be revealed to us only when the hour for the attack on America arrives.

America must have a self-contained chemical industry if America is to remain free. And that industry can be obtained only by the establishment in time of peace of a coal-tar dyestuff industry second to none in the world. Here are a few passages from the testimony of military experts, bearing on this national necessity:

### Dyestuffs, Explosives and Poison Gas.

Major General W. L. Sibert, U. S. A., Chief of the Chemical Warfare Service in the United States: "Dyestuffs are directly related to several of our gases; the same crudes or intermediates that are used in making dyes are also utilized in making such gases. The processes involved in the making of dyes, explosives, and poison gases are identical to a certain stage. They all begin with the dry distillation of coal. The crudes, benzol, toluol, xylol, when subjected to chemical processing, yield intermediates which on further treatment enable us to obtain dyes, explosives, or poison gases. The dyestuff industry is the one peace-time enterprise which will, therefore, furnish us with the plants and equipment which can be hurriedly converted to essential uses in time of war. There is another point which is worthy of special emphasis: We are not only concerned with plants and equipment but also with the trained personnel needed.

"Chemical warfare is a new warfare, but one that was responsible for about 30 per cent. of our casualties. At the same time it is probably the most humane system of warfare, because there are fewer deaths from those casualties than from any other cause, but it has in it an element that no other kind of warfare has, and that is the element of surprise sprung on an army through the development of some new substance, rendering you absolutely helpless, as the English were at Ypres.

"Germany always had a large supply of explosives and had a larger quantity of gas than the Allies had until near the end of the war. This was largely due to the existence of dyestuff plants in Germany. When our troops entered Germany they found a phosgene gas plant with a capacity of ten tons a day built before the war in connection with the dyestuff industry.

"It was the unexpected use of gas on a large scale that caused the Germans nearly to win the war last spring, a year ago. It was for that reason that we immediately decided to multiply by five our output.

"Certain materials which are indispensable for dyes are also indispensable for gas and high explosives. There is no substitute, but they are all indispensable for war purposes.

"A nation absolutely unprepared in so far as gas is concerned, and defenseless against gas, would be helpless. Any country which had a large supply or a potential supply for gas would be a bad country to declare war against."

Lieut. Col. Amos A. Fries, Chief of the Chemical Warfare Service of the American Expeditionary Forces: "We found in attacks against these machine-gun nests and strong points that if we filled these bombs with T. N. T. instead of poisonous gas and 50 to 100 were dropped we simply wiped everything off the surface. A very famous incident occurred at the time of the fighting at St. Mihiel when at a place called Cotes des Eparges our troops captured what the French had been trying three or four years to take. Our officers stated that they could take it by firing a hundred of these bombs,

and they installed them the night before the attack and fired them so successfully the next morning that our men got across without any loss or a hostile shot being fired until they got across. That is a part of warfare that will increase the use of T. N. T. very much.

"If we ever get into a very serious war in the future, it will require a very much greater use of high explosives than were used in this war, as we would throw bombs over in quantities of 2,000 or 3,000 at a time. The projectiles are fired together by using closely synchronized watches. The British fired into Lens 2,000 of these projectiles at one time.

"Research can be made in these dyestuff factories so independently of any outside appearance that it looks impossible for any country to be sure that another country is not working on this matter, no matter what one country might try to do.

"If you are going to fight a defensive campaign you would use mustard gas, which is a very low volatile liquid and lies on the ground two or three days on days like this and a week or 10 days in moist, cool weather. The vapors come up and burn the body, and you are never safe from it, and hence you have got to wear a mask all the time. It is that persistence which gets so many casualties, because it is so difficult to get away from it. I would like to add that because the Germans had run out of their reserve of gas, they had no mustard gas whatever which is what saved many boys in the Argonne fight.

"One of the principal elements in preparedness for war consists in a well-developed chemical industry."

**Lieut. Commander O. M. Hustvedt, Bureau of Ordnance, U. S. Navy Department:** "The development of the dye industry would give us plants which could readily be converted to war purposes for the manufacture of gas or for the manufacture of high explosives, and would give us the trained personnel, especially chemists, that we would need in adapting and developing the dye industry to war uses; and also during normal times would give us the benefit of researches which are conducted by the dye people in the development of their colorings. In those researches they have found in the past and probably in the future will find developments of a great deal of importance to the explosive industry, as well as in poison gases for military use."

The United States must have a self-contained and complete coal-tar dyestuff industry in time of peace in order to be ready to defend itself against external aggression. We all hope that there will never be another war, but it would be criminal folly to shut our eyes to the fact that in the future we shall be in danger of an attack from the East by the enemies that are now defeated, but not conquered, and also from the West by the Asiatic empire that is so closely patterned after the Prussian military autocracy, and that a realignment of nations might force us to defend ourselves against a simultaneous attack from both directions. We can prepare ourselves against these dangers only by establishing on American soil a self-contained chemical and coal-tar dyestuff industry of ample proportions.

### The War Against Disease.

There is another controlling reason for our possession of a complete chemical and dyestuff industry, namely, the vast possibilities in chemical research for conquering disease and prolonging human life. This phase of the question was well stated by Joseph H. Choate, Jr., counsel for the Chemical Foundation and American Dyes Institute, before the Ways and Means Committee:

"The human body consists of hundreds of little chemical factories pouring into the human system drugs of their own and upon the balance of those drugs depends human health. These drugs are organic chemicals, and until the process of studying out their effects has been completed and the innumerable millions of combinations of chemicals which they produce in the human inside have been reduced to scientific formulae that can be known and studied, that science will remain in its infancy.

"Now, the dye laboratories furnish the means and the only means for the furtherance of that science, and that science has but recently begun to grow. It has been held back by the immense development of bacteriological medicine with its serums and antitoxins, which has been so successful that the physicians of the world have only recently turned back from it to the study of drugs. Yet the results have been startling. Many of those results have been not only the product of industrial chemists at our laboratories of coal-tar

research, but in many cases the discoveries have been made in the dye laboratories themselves.

"In Germany the co-operation between the academic and coal-tar chemists was so complete that it was not an uncommon sight to see in the dye works laboratory, dozens of academic chemists working side by side with the dye-works chemists on their own individual problems. Many of the greatest discoveries have been made in that way. Salvarsan itself was a dye-works product. Dr. Ehrlich had a theory that arsenic disseminated in the system in a particular way would kill the germs of the cruelest scourge of humanity and he had an idea that it could be done without injury by one of a particular group of compounds that number, say 10,000. But how was he to get the facilities to make the experiments? Where could he get the apparatus, materials, and assistants for the work? No university, no private laboratory could undertake it. He found the means at his hands in the dye-works laboratory of the great Cassella dye works, and the Cassella laboratories were placed at his disposal. And within a very few months that immense problem was worked out and that amazing triumph achieved.

"So in like manner drugs for hundreds of other ailments have been developed. The most noted example is that of adrenalin, one of the most valuable and commonly used drugs. That was discovered in this country from an animal source. The German plants, as is possible with almost any of the drugs from an animal source, produced the substance synthetically from coal-tar products at a mere fraction of the cost of the animal product.

"And so we say to you that the hope of the future in medical science lies in the great coal-tar industry; that there you find the promise and the only promise for the discovery of drugs to cure the cruel diseases which are the scourge of humanity. *There and there only lies the hope of the permanent cure of such diseases as tuberculosis and even cancer.*"

Dr. Lulius Stieglitz, professor of organic chemistry at the University of Chicago and chairman of the National Research Council of the Council of National Defense, made this statement on the same subject:

"Dr. Cantell, of the Mayo Foundation, has isolated the active principle of the thyroid gland and pure cocaine and determined its nature, and the difference the injection makes between health and diseases is tremendous. Lack of the principle leaves a dwarfed physical and mental condition. The injection of a minute quantity brings these people into a condition of health. Now, Dr. Cantell himself proved this principle from slaughtered animals, getting a minute trace from the thyroid of each animal. The principal material is a derivative we call indo, because it is related to indigo, and there is no question but that in the course of time we will be able to prepare this in pure form from coal-tar products.

"Those are the directions in which synthetic work is going on, the production of specifics for the killing of invading germs; improvement of the natural products like cocaine and quinine, and also the artificial production of internal secretions in which a given patient may show a deficiency. Now, all of these developments would be tremendously strengthened if we had, as the roots of organic chemistry, a dye industry. That is the one branch of organic chemistry which has to be developed on a large scale, and given the strong roots we have in the dye industry the rest will take care of itself. Many of the institutions, like the Rockefeller Institution, the Mayo Foundation, and many of the universities are developing these lines of medicinal drugs. We are dependent, however, on the original source of supply for our crude materials and also on the source of supply of what we call organic chemists as against the mineral chemists, who are sufficiently strongly represented in this country. The dye industry is the sole industry from which we can get our materials and our chemists, and which can support the type of work which we have in mind."

It is inconceivable that America will be satisfied with anything less than a leading part in this chemical warfare against physical and mental weakness, disease and death.

### A German Plot That Failed.

A complete chemical and dyestuff industry is a necessity not only for the safety of the nation and for taking our rightful part in the chemical warfare against disease and death, but for the prosperity and safety of American industries. We have had the proof of this in recent years. When the war cut off the United States from the supply of German dyestuffs in 1914, the country faced a period of black and white in the textile industry. Only the courage and enterprise of

the few men engaged in the dyestuff assembling plants saved us from that disgraceful situation. The United States Government was on the point of being forced to close its printing and engraving plants because of the lack of German colors and the faded tint of the United States postage stamps excited the taunts and jeers of the Germans, while great industries giving employment to millions were facing a general shutdown. That all this was part of the German attack on the world is proved by the following cable, discovered by the agents of the Department of Justice, from Ambassador Bernstorff to the Berlin Government, the Hossenfelder mentioned being the German consul at New York:

"Serial No. 432, of March 13, 1915. It is reported to me by Hossenfelder, telegram No. 4, that the stock of dyes in this country is so small that by a German embargo about 4,000,000 American workmen might be thrown out of employment."

A few weeks later a delegation of textile manufacturers called at the White House and also on Secretary of State Lansing and Secretary of Commerce Redfield to make an urgent appeal that steps be taken to obtain England's permission for the importation of German dyes. Later in the day they also called on Ambassador Bernstorff, the following report from the New York Times, of their conference at the German Embassy showing plainly how Germany was using her dyestuff monopoly to carry on the war against the Entente and even then against the United States:

"When the textile representatives called at the German Embassy after their conference with Government officials, the Ambassador, Count von Bernstorff suggested that there would be no further trouble about dyestuffs shipments if they could get the United States to threaten an embargo on exports of war supplies to Great Britain unless interference with trade between American and Germany in foodstuffs, cotton and other non-contraband goods ceased."

A month later a German torpedo, loaded with explosives made in the same industry that produced the German dyes with which Bernstorff hoped to force the United States into collision with England, sunk the Lusitania, revealed the great truth of the war to the American people and made the German plot impossible.

If it had succeeded Germany in all probability would have won the war and the terms of peace would have been dictated from Berlin.

The signing of a peace treaty will not end Germany's war on the world. Germany knows that a dyestuff monopoly under certain conditions is a more effective instrument of destruction than an army or navy. That today is the lesson for Americans in connection with the building up of the dyestuff industry in the United States.

A complete and wholly self-contained chemical and dyestuff industry is an American necessity on the score of military and naval defense, the physical and mental well-being of mankind, and the industrial prosperity of the United States. This brings us to the only remaining question: How can such an industry be created and maintained? It can be done only by allowing the American dyestuff and chemical industry to organize in as large units as may be necessary for the highest attainable efficiency and economy of production and research, and by protecting this home industry against every form of injurious competition from foreign countries. This protection must not be limited to tariffs, but must be provided in every effective form, whether by tariff, control of imports by licenses, exclusion of imports if necessary, control and compulsory working of patents or by any other effective measure that can be devised. No one of these methods will be enough. All combined are essential to success.

### A Giant Industry.

The industry must be allowed to combine in order to produce as efficiently as the gigantic German industry which has forty years the start of us and which will wage relentless war against American products. Here are two statements on the present size and resources of the German industry:

**Joseph H. Choate, Jr., before Ways and Means Committee:** "The smallest of the German companies employed before the war began, more than the largest three, certainly the largest two, American houses now employ or have ever employed. They (the German companies) employed together, before the beginning of the war, approximately 50,000 men. About 1910 they coalesced into two large trusts, one consisting of three of the big six, the Bayer, Badische, and Berlin, and the other consisting of the other three, the Hoechst, Cassella and Kalle. These companies were closely united and assisted each other in every possible way. They had joint funds for fighting foreign competition and dividing the expense of new things, and dividing the expense of campaigns against competing industries in other countries.

"But it did not stop here. In 1916, finding the danger they were placed in as a result of the war, the two trusts were combined with all the other outlying companies into one gigantic trust. This enormous trust has a nominal capital, adding up the nominal capitals of the various companies of which it is composed, of about \$100,000,000. But the stocks of these companies were, on the average, worth on the Berlin Stock Exchange, at the time of the combination, about 400. So you can see the actual assets of the company were valued by the German public at above \$400,000,000."

**Lord Moulton, British Minister of Munitions, letter to Mr. Choate:** "In the year 1916 the Chemische Fabrik Gaisheim-Electron entered into a community of interests with the following firms: Badische Anilin & Soda Fabrik, Ludwigshafen-on-the-Rhine; Farbenfabriken vorm. Friedrich Bayer & Co., Leverkusen, Aktien-Gesellschaft fur Anilinfabrikation, Berlin; Farbwerke vorm. Meister, Lucius & Bruning, Höchst-on-Main; Leopold Casella & Co. G.m.b.H., Frankfurt-on-Main; Kalle & Co., A. G., Beibrich-on-Rhine; Chemische Fabriken vorm. Weiler-ter-Meer, Uerdingen—from January 1, 1917, so far as the Chemische Fabrik Greisheim-Elektron is concerned for a period of 50 years from January 1, 1918."

The choice for America is between safety with a unified chemical and dyestuff industry which our people can control at home, or political and industrial dependence on a foreign monopoly over which we can exercise no control whatever.

### Ruthless German Methods.

Now as to the ruthless methods of this German trust. Here are a few examples, which can be multiplied indefinitely:

**Henri Hauser, Professor at Dijon University, France:** "Why, at the outbreak of the war, were we (the French) short of essential products for the manufacture of our explosives, such as phenic acid? Because in peace time, in the tenders to the French Ministry of War, the Germans always offered enormous abatements, descending below the French cost price, and thus carried off the orders. Thus, discouraged, our manufacturers abandoned the sinking of capital in installations so costly to retrieve, and therefore the industry of phenic acid disappeared in France."

**Joseph H. Choate, Jr.:** "You will find in the Alien Property Custodian's report a number of instances of the way in which they (the Germans) operated. As soon as an industry began to show its head in another country, they went at it tooth and nail. They began to sell not only below what it cost in this country but below the cost of production in their own country, and in some instances, I think in many, there was no limit to which they were not willing to cut prices in order to get business. A few examples will be as good as a million. Until about 1910 there was no production of anilin oil in this country. And in that year the Benzol Products Co. was organized to make anilin oil on a large scale. At that time the price of anilin oil was about 11½ cents. The Benzol Products Co. could do the work and make money at that figure. They had not got fairly started when the Germans began cutting the price for the first time. The cutting continued until the German price reached about 6 cents. One large customer was approached by the Benzol Products Co. with an offer of anilin oil for 8½ cents, an unheard of price up to that time. The answer was, 'I won't take your product at 8½ cents or any other price, because whatever price you name I have the assurance that the German producers will undersell you.'"

### Protection Against German Methods.

Having given the industry liberty to organize on the most efficient basis, protection must be provided against foreign competition. Protective tariffs must be imposed, but no practicable tariff will alone provide the necessary protection. Why? Because of German dumping, which Prof. Henri Hauser describes in these words:

"German dumping is a coherent system. It first kills the preparative industries in the country in which it installs itself. Thanks to the system of bonuses, it can then challenge the transformation industries.

"German industry thus shatters all the forces which can compete with it, in such a way as to reign over the ruins. Once again, German dumping is not a procedure of economic action; it is, in times of unclouded peace and under deceptively peaceful aspects, a measure of war. It carries agitation into the internal life of competitors of Germany, it puts out of tune the normal play of their Customs system; it absolutely falsifies every formula of commercial liberty, of equality of treatment, or of reciprocity inscribed in treaties."

#### Secret Report of a German Agent.

Here is one illustration of the German methods of circumventing protective tariffs. It is taken from a report by Dr. Hugo Schweitzer, American representative of the Bayer Co., and secret service agent of the German Government in the United States, which Wolf von Igel sent to von Bernstorff on Jan. 26, 1917, six weeks before the United States entered the war, with the recommendation that it be passed on to Berlin, and the copy of which was seized by the United States Department of Justice. At that time a new tariff on dyestuffs had been imposed:

"The dyestuffs which are excepted from this specific duty are the so-called vat dyes and these vat dyes are a comparatively modern achievement of the German dye technique and are in general regarded as the most genuine dyes.

"The preeminent coloring qualities of these products have already brought it about and will do it even more so in the future that the older anthracite coal-tar dyes, which in many respects are inferior to these vat dyes, will be driven from the market. The manufacture of these vat dyes is very complicated and can be undertaken only in a very highly developed industry. It is wholly out of the question that a new industry like the American can take up the manufacture of these vat dyestuffs, and it may well take a very long time before the dyestuff industry outside of Germany can concern itself with the manufacture of these complicated products. Here the very greatest exertions will not make it possible to cope with the competition of Germany.

"The history of American tariff legislation has shown that, in general, a protective tariff of 30 per cent. ad valorem does not afford sufficient protection to create an American industry. A protective tariff of 30 per cent. is, of course, absolutely insufficient for the complicated vat dyestuffs."

Referring to the provision in the tariff law requiring the President to remove the special duties on dyestuffs if in five years the domestic production does not amount to 60 per cent. of the domestic consumption, Schweitzer went on to say:

"Here is where the German industry must apply the lever. It must, in any case, of these vat dyes which must be regarded as the "highest quality" goods of the industry, dispose of in the American market more than 40 per cent. of the total consumption in derivatives and dyestuffs, in order that the President will be in the position to abolish the specific duties. If this is actually made possible, and the President must abolish these specific duties, then the German industry will be in the same position as before the war and has only to deal with the duty of 30 per cent. ad valorem, which as has already been elucidated above, was insufficient in the past to create an American industry.

"That it should be as easy as child's play for the German industry to sell as much vat dyestuffs in the United States that the value of the same will amount to 60 per cent. in value of the domestic consumption of the articles mentioned in Groups II and III of section 500, is apparent from the following considerations:

"1. The vat dyestuffs have in the past and will even more so in the future supplant the old anthracite coal-tar dyestuffs.

"2. The money value of the vat dyestuffs is uncommonly higher than the money value of the old anthracite coal-tar dyestuffs.

"3. The importation from Germany of these vat dyes amounts today already to 27.63 per cent. of the money value of the total dyestuff importation.

"From these arguments it is clear that the salvation of the German dyestuff industry is to be sought in the development of vat-dyestuff chemistry."

And in this connection it is well to remember the German practice of "full line forcing" by which orders for special dyestuffs are refused unless the customer agrees to buy from the Germans all of the dyestuffs he uses. "Buy all your dyes from us or go without vat-dyes."

**American vat-dyes are the key to the American dyestuff and chemical industry, the key to our national security and independence.**

#### A Tariff and a License System Both Essential.

The complex character of chemicals, and particularly of coal-tar chemicals, makes it possible for the Germans to camouflage the products beyond the possibility of detecting undervaluation.

The lesson which the Germans themselves teach us is that any tariff we impose should be specific as well as ad valorem, and even then considered only as one of several methods of protection. So far as import restrictions are concerned the additional measures must consist of the exclusion of products that are being made in the United States, and licenses to import, subject to the regular tariff rates, other products that are not made here in sufficient quantity for domestic needs, the import licenses to continue as long as may be necessary. This system of exclusion, modified by import licenses, has already been adopted by England, France and Japan, and must be adopted here if the United States is to have a complete dyestuff industry.

No sound objection has been raised to this system of control by import licenses. Its opponents assert that under the license system it would be impossible for a textile manufacturer to get the dyestuffs from Germany in time for the dyeing and delivery of goods on orders. Those who advance that claim either have an ulterior object in preventing the development of an American dyestuff industry or a very poor opinion of the power and resources of the United States Government. As we write these lines a Washington dispatch reports that Alien Property Custodian Garvan has asked the President for permission to import a six months' supply of German vat-dyes, thus showing the entire practicability of the proposed system of licenses. It is also pretended by opponents of the license system that under it the dyestuff purchases by a manufacturer would be made known to his competitors. These opponents of real protection to American dyestuffs would have us believe that the United States Government would not or could not protect its own citizens by holding such details in confidence. And it is for such flimsy pretexts that they would have us abandon the great essential to the safety and welfare of the nation.

#### Compulsory Working of Patents.

Another necessary method of protection is the control and compulsory working of foreign patents in the United States as has been practiced in Germany for over forty years. Before the war our patent laws enabled the Germans to patent their processes here and then leave them unworked, the purpose being to prevent competitors from using the German processes. The United States law thus served as a complete protection to the German dyestuff monopoly. It is plain that these conditions must be abolished and our patent law so changed that a foreign patent will remain in force only on condition that the patentee either works it adequately in the United States or grants proper licenses for such working.

#### The Situation Today.

As a result of the war a promising dyestuff industry has been built up in the United States, but is threatened with sure destruction unless protected against the unscrupulous competition of the German trust when commercial relations with Germany are restored. Far-seeing men in the office of the Alien Property Custodian seized time by the forelock and had most of the German dyestuff patents to the number of 4500 sold to trustees under the name of the Chemical Foundation in order to keep them free from control by pri-



vate monopoly and used only in the interest of the nation. The remaining 1200 German patents had been sold to a private company at the auction sale of the Bayer Co.'s assets before the trust was organized, but arrangements have been made with the purchasers by which these privately owned patents also are to be made available for building up the dyestuff industry of the whole country. The Longworth bill has been framed by the friends of an American dyestuff industry and provides for the necessary protection by a system of import licenses under which a commission representing the consumers and producers of dyestuffs and the general public is *compelled to grant licenses* for the importation of dyestuffs that are not produced in adequate amounts for domestic requirements. And finally the Alien Property Custodian is seeking permission to import a six months' supply of vat-dyes to tide over our manufacturers until vat-dyes can be made in America.

### The Duty of Americans.

Under such conditions the plain duty of every American whether a user of dyestuffs or a consumer of dyed products is to say: "We are ready to wait as long as may be necessary and to submit to any necessary restriction or deprivation in order that America may possess a chemical and coal-tar dyestuff industry second to none, which will protect our nation against external aggression, enable America to do its full duty in the chemical warfare against physical and mental weakness, disease and death and provide a safe and sure foundation for American industry and enterprise."

The difficulties of which our correspondent complains, even if they were not temporary and the remedy were not already in sight, amount to nothing compared with the great objects to be attained by establishing an American dyestuff and chemical industry or with the disaster that may befall this country if we neglect this great duty because of a lack of moral strength to see it through. Now is the appointed time. If we weakly yield now it may not be possible to succeed before the nation is suddenly overwhelmed with military and economic ruin. The producers of dyestuffs, manufacturers of textiles, and the people of the United States should be a unit in this work. Most of the German patents have been placed in the control of trustees to be used in this national enterprise. The bill now before Congress aims to provide all the legislative means for protecting and developing the industry, and to afford relief from temporary inconvenience to users of dyestuffs not yet made in the United States. Great aggregations of capital and skill are concentrating their resources on the solution of the still unsolved problems. All that is needed are the enactment of the necessary protective laws and time in which to discover and perfect the chemical processes of producing certain dyestuffs. Complete success is certain if Americans stand together.

If there is any hate propaganda it is made, not in America, but in Germany where hate is one of the manufactured products of Prussia, directed first against one nation and then against another, France, Russia, England, Japan or the United States in turn, in order to serve the purposes of the German autocracy in its schemes for world dominion.

Our correspondent complains that American importers cannot get licenses from the English Government to bring English vat-dyes into the United States. That is not the fault of the United States Government, for the Washington authorities have been ready at all times to allow the importation of English vat-dyes. It is because the importers cannot get licenses from the British Government to export these English vat-dyes. Of course they cannot. The citizens of a country have the first right to the consumption of what they produce. England has had a bigger and far more bitter dose of German frightfulness than we have had, and has resolved never again to expose the Em-

pire to destruction industrially and politically by forces gathered in German chemical works. A good example for the United States to follow.

Our correspondent also complains of the importation of Japanese cotton goods dyed with German dyestuffs. Well, let us shut them out by an adequate protective tariff. But what right have textile manufacturers to ask protection for the products they sell if they do not insist on protection for the products they buy. American industries stand or fall together. The citizens of a country have the first right to the production of what they consume.

We hope that our correspondent and all who are in his state of mind will see their mistake and lose no time in getting on the right track. Let them write to the President and members of both Houses of Congress and insist that party politics have no part in the settlement of this chemical and dyestuff problem; that Republican protectionists be broad enough to admit that this is a problem of which a tariff alone will not afford a complete solution; that Democratic supporters of a revenue tariff recognize that dyestuffs present a case involving the safety of the nation in which Adam Smith himself would have supported the most rigid restrictions on imports. Let us all be for America first in order that in the years to come we may look back with pride to the part we took in protecting our country and civilization by the development of a complete and self-contained dyestuff and chemical industry in the United States.

### LONDON WOOL AUCTIONS.

The fourth series of London wool auctions closed on Aug. 1 with total sales of 100,000 bales, half of which was taken by English buyers, the remainder being divided between France (30,000 bales) and Belgium (20,000 bales). The next series from Aug. 11 to 22 was opened to the United States, Japan, and all neutral countries. The amount of wool bought for each country will be limited so as to prevent excessive buying for any country and the increase of prices against the home consumer. The Board of Trade on Aug. 2 stated that the British Government holds 900,000 bales of Australian and New Zealand wool in England, 158,000 bales in transit and 1,220,000 bales in the producing countries, a total of 2,278,000 bales. This situation shows plainly the commanding position of the British Empire, in the production of wool. Since the war began in 1914 the British Government has rightfully controlled the wool supply on the principle that each country has the first right to the consumption of what it produces, a policy that it is still carrying out in the period of reconstruction.

### FRENCH WOOL TARIFF INCREASED.

Judging by the increases in the tariff rates on wool goods imported into France, the French Government intends that the home market shall belong to the French manufacturer. Burdened as France is with the war debt and with a large part of her textile industry wrecked by the Germans, this protective policy is unavoidable. The tariff has been advanced by providing that the old rates shall be multiplied by certain factors in order to determine the new rates. For example, the old rate on wool yarns is multiplied by 3, an increase of 200 per cent.; on carpets, by 2.5, an increase of 150 per cent.; cloths, by 2.3 or 3, increases of 130 or 200 per cent.

# The Identification of Textile Fibers

By Dr. Louis J. Matos

In the previous article mention was made of the bast fibers in one of the butter dishes and cover them with nitric that group of plants to which they belong, which give strength to the growing and mature stem. They require for their identification a preliminary chemical treatment to which special attention is directed. The most important operation is to digest the fibers in a test tube with a solution of weak caustic acid at a gentle heat, which will more or less readily remove the fiber binding substance or lignin and enable the individual fibers to become separated.

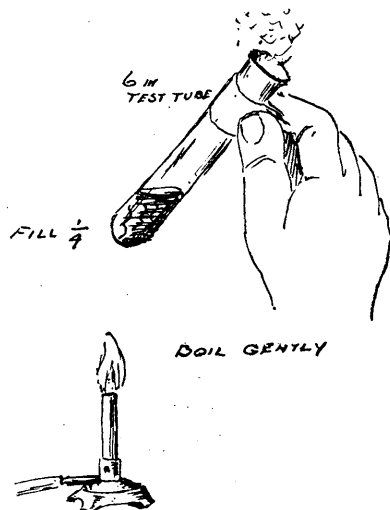


Fig. 11. Heating the Solution.

Heating is best done by means of a bunsen gas flame, or over an alcohol lamp, Fig. 11. Boiling of the fibers to be tested should continue until the original sample appears to be loosened. When this is apparent, the contents of the test-tube is poured into a vessel containing clean water, from which the separated fibers may be lifted with the aid of a glass rod. If permanent microscopic mounts are desired, it is well to repeat the washing of the fibers two or three times in successive portions of water.

There are several other methods that can be used for isolating the fibers, but weak caustic soda does it most effectively. A general scheme that can be followed with advantage in microscopic tests, and covering every property of commercial bast fiber is as follows:

1. Place on a glass slide several drops of glycerine diluted with an equal volume of water, and in these few drops place the digested fibers.

2. Separate the fibers by means of the teasing needle. Some bast fibers are difficult to separate, in which case recourse should be had to more drastic methods. Place the fibers in one of the butter dishes and cover them with nitric acid diluted (1 to 3) with water, to which add 2 or 3 small crystals of potassium chlorate. Stir gently with a glass rod until the lignin appears to be completely dissolved. Drain off the acid solution and carefully wash the fibers in several transfers of distilled water and finally with a little water containing two to three drops of caustic soda. Then wash with pure water. The fibers may now be laid longitudinal on the slide; place upon them one to two drops of glycerine and cover with a thin glass, carefully excluding air bubbles. The slide is now ready for observation.

In using the microscope a high degree of magnification is not essential. Too great a magnification is sometimes responsible for imperfect conclusions. A magnification of twelve diameters is ample for most fibers, while a further magnification up to sixty diameters is sufficient in most cases. In examining the fibers under the microscope two methods of observation are to be followed; one being direct,

that is, the pure fiber is examined with various intensities of light, but without the addition of any chemical reagent.

After the peculiar characteristics of the fibers have been noted under these different conditions, they are subjected to the action of certain chemical reagents, the most important and generally satisfactory reagent being that of Vetillard. This investigator employs a test solution bearing his name, which has been previously referred to as Reagent No. 1 (solution of iodine), and Reagent No. 2 (glycerine and sulphuric acid mixture). To use this reagent properly, the fiber to be examined should have been previously isolated according to the method above described and kept for several hours immersed in distilled water. The practical details of applying Vetillard's reagent is as follows:

1. Transfer the soaked fibers to a clean slide and straighten them out as well as possible with the needles.
2. With the aid of the dropping tube, wet them with two to three drops of Reagent No. 1.
3. Allow to stand several minutes in contact with the iodine solution and remove any excess of this solution with the aid of a piece of filter or blotting paper; holding the slide in an inclined position to facilitate draining the fibers. Note that the purpose of this manipulation is to remove the excess of iodine, after which:

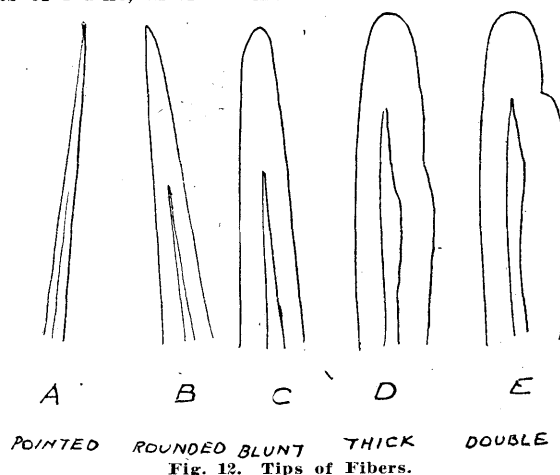


Fig. 12. Tips of Fibers.

4. Place the cover glass in position.
5. Hold the slide horizontally. Place at one end of the cover glass a few drops of Reagent No. 2 and apply to the other end a piece of filter or blotting paper, which will soak up some of the solution as it works its way from one end of the cover glass to the other end. This Reagent No. 2 gradually displaces the iodine solution and this displacing action is repeated several times with small fresh additions of the acid, until all of the iodine has been removed, after which the slide is ready for observation. The operator should be cautioned not to allow any of the chemical reagent to drop upon the top of the cover glass.

The characteristics of the fiber are now to be noted, not by examining one fiber, but several fibers; since occasionally there are some individual fibers that do not react. Note particularly the kind of points or tips, Fig. 12, that some of the fibers have.

Should the fibers be terminated by two points, some of which are needle like or very sharp pointed, and the color reaction is blue, *flax* is to be suspected.

If the tip of the fiber is blunt and the color blue, we have *China Grass* or *ramie*.

If the blue has a greenish tint, *hemp* is to be suspected.

If the fiber is somewhat flattish in appearance and the coloration yellowish, *jute* is to be suspected.

Should the fibre, however, be terminated by a single point, the other one being more or less broken, it is without doubt



cotton, since, as stated in the previous article, this fiber is the seed hair, one end of which is broken from the seed while the free end has a sharp point.

One of the most important applications of Vetillard's reagent is to cross sections of fibers. Cross sections or "transverse" sections of fibers are not difficult to make, but to make

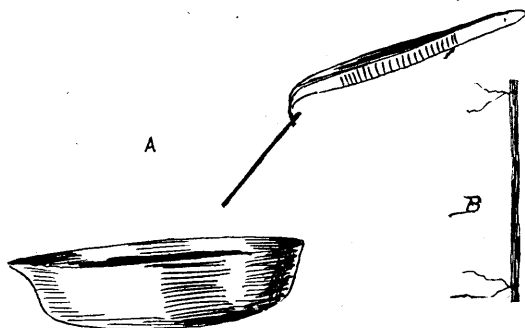


Fig. 13. Dish for Binding Fibers.

them properly requires a little practice. The following is a general outline of the method and should be carefully studied before attempting the work.

Several short bundles of fibers are taken either directly from the plant or from woven textiles. The amount of fiber should be about as much as would make a bundle, say 1/16 inch in diameter, and about one and one-half to two inches in length, A, Fig. 13. The end of this bundle should be tied by means of small loops of sewing thread and then immersed either in melted glycerine jelly or ordinary gelatine, to cause the fibers to adhere together, B, Fig. 13. Set aside for a day

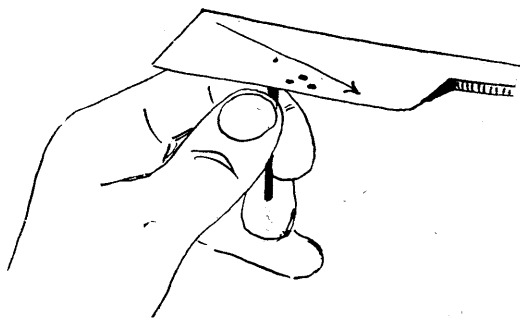


Fig. 14. Slicing Cross-Section.

to harden. These hard bundles are then placed between the thumb and forefinger of the left hand and sliced crosswise by means of a razor, Fig. 14. The razor should be preferably ground flat on one side, but an ordinary razor may suffice. Extremely uniform slices of the fiber bundles may be cut by carefully gauging the position of the razor blade by means of the index finger.

These very uniform slices are allowed to accumulate on the blade of the razor from which they are removed with a few drops of water and the aid of a fine camel's hair brush. They are then mixed with a few drops of a solution of potassium iodide. With the aid of an easily made section lifter, Fig. 15, or a fine pointed brush, transfer two or three of the best

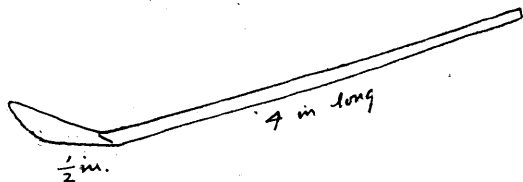


Fig. 15. Section Lifter.

sections to a clean microscope slide and place the cover glass in position. Next displace the iodine solution by means of the glycerine-sulphuric acid solution with the aid of filter paper as previously described, until all the iodine solution has been removed, when the slide will be ready for examination.

FRENCH WORSTED SPINNING.

BY LEON FAUX.

(A Series of Articles on French Worsted Spinning.)

S. A. C. M. INTERSECTING GILLS

There are 17 fallers in the upper set, P, Fig. 113, of this intersecting gill-box and twenty-one fallers in the lower set P'. The lower set P' has 15 fallers constantly in action on the fibers, their movement being horizontal from a to c and inclined upward from c to o for the purpose of increasing the compression on the fibers at the moment when the draft increases, the object being to maintain the echelon position of the short fibers until they are brought as near as possible to the drawing point.

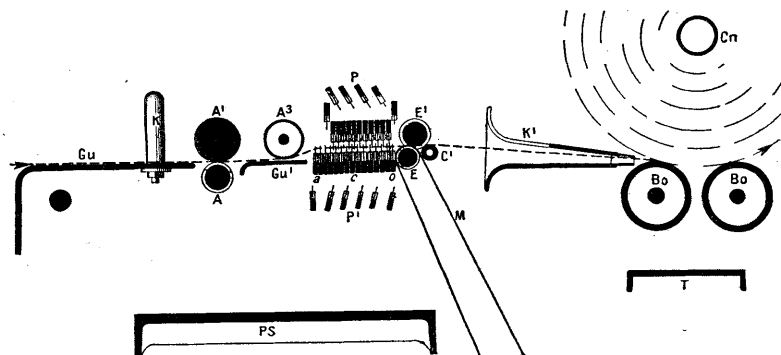


Fig. 113. S. A. C. M. Intersecting Gills.

The upper set P has 11 fallers constantly in action on the fibers and they penetrate the stock between the third and fourth fallers of the lower set P' so that the rows of pins in the two sets of fallers penetrate the wool successively. The movement of the upper set of fallers is horizontal.

The size of the fallers, profile and set of the pins are the same as in the other gill boxes, but the rows of pins are offset .08 in. on the face of the fallers.

O. P. S. STEP GILL-BOXES

Aside from the method of operating the fallers and the construction of the pins as previously explained, these gill-boxes are distinguished by the arrangement of the gilling zone P, Fig. 114, which consists of 24 fallers of which 15 are constantly in action on the fibers. The gilling zone consists therefore of (15x2) 30 rows of pins.

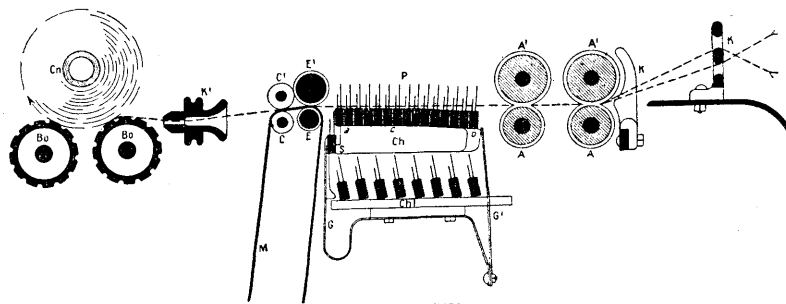


Fig. 114. O. P. S. Step Gill-Box.

From o to c the fallers rise on an incline in order to give a progressive penetration of the pins into the fibers; from c to a the fallers move in a horizontal line. The drawing point is about .08 in. above the faller bar, which enables the pins to hold the fibers for a longer time during the two steps in the drop of the fallers.

The slivers are delivered to the pins by two pairs of feed rolls AA. The arrangement of the drawing rolls is the same as in the Gruen intersecting gill-box, but the bottom roll is removable. The tube K' which condenses the stock into a sliver is revolved alternately in each direction as in the N S C and M G B gill-boxes. The sliver is wound in the spool by means of the two rollers B o.

# Boiling-Off Silk

By J. L. Girard, Chemical Engineer

## RINSING THE SILK

Rinsing out the soap held by the boiled-off silk is one of the delicate operations of silk dyeing which, if carried out improperly, gives rise to a large number of difficulties in subsequent operations. The complete removal of the soap is almost impossible in practice, for the following reason: If a neutral solution of fairly neutral soap, 1 part of soap by weight to 1,000 parts of water, and dilute it with 10 volumes of distilled water to 1 of the solution, giving a soap content of 1 part in 10,000, an alkaline reaction is disclosed by phenolptaline. If this solution is then exactly neutralized and again diluted, the alkaline reaction reappears. This phenomenon shows clearly that diluted soap solutions set at liberty alkali on one hand and on the other hand a more acid soap or even fatty acid.

When silk carrying soap is rinsed in a large volume of water this separation takes place and a small proportion of fatty acid remains fixed on the fibre. It is this fatty acid which gives to silk that special handle which is called *craquant* in the mill. The silk therefore is to be rinsed in such a way as to leave a trace of acid, enough to give the *craquant* and eliminate the remainder. To accomplish this result the following conditions are necessary:

1. Avoid first of all the formation of insoluble salts with an earthy base which become fixed on the silk.

2. Retard the separation of the soap so that the quantity of fixed fatty acid on the fiber may be sufficient and not too large.

3. Produce this separation at the right moment and complete it by the action of an acid. This is the process of *avivage*, which completes the rinsing.

An examination of the three points will give us the explanation of and the key to good conditions for rinsing:

1. Avoid the formation of all earthy soaps or insoluble alkaline salts. It is at this point that the full importance of pure water becomes evident. If silk loaded with soap is rinsed in water containing salts of lime or magnesia, there is immediately formed by double decomposition an insoluble lime or magnesia soap which becomes firmly fixed on the fiber and can be removed only with great difficulty by subsequent treatment. The presence of this insoluble soap changes completely the luster and imparts a very disagreeable touch to the silk. I have even seen in one mill where the silk was rinsed in defective water, the fabrics carry all the lime soaps that they took up, and when dried after certain finishing operations they gave out a decided odor of rancid grease.

It is therefore necessary to rinse the silk in water that is free from lime and magnesia. Natural water can be used when it does not show over 4 or 5 hydrometric degrees. Above that it is necessary to purify the water.

2. Retard the separation of the soap so that the quantity of fixed fatty acid on the fiber may be sufficient and not too large. To attain this result it is necessary:

- (a) To use a soap for boiling-off that does not separate too easily. This property is found only in the soaps in which the fatty acids are liquid at ordinary temperatures or that liquify at a slightly higher temperature. These soaps are said to "rinse well." Those generally used are oleine and olive oil soaps.

- (b) Prevent the separation of the soap at the beginning of the rinsing process in a weak solution of carbonate of soda which does not separate the soap like pure water and holds the fatty acid in solution in the form of basic soap. This process is called *lisbordage* in French mills.

3. Produce this separation at the right moment and complete it by the action of an acid. When the silk has been freed from the excess of soap by rinsing in an alkaline bath clear water is applied, which removes at first the carbonate of soda and then causes the separation of the soap. At this moment the silk acquires the touch known as *craquant*.

Does this separation fix on the fibre an acid soap or a fatty acid? This question has never been satisfactorily answered. I consider the former hypothesis the more probable because the ulterior action of the acid increases materially the *craquant* touch. This action of the acid takes place in practice during the operation of *avivage*, which consists in passing the pieces or yarn through a dilute acid bath. The object of *avivage* is not only to give the silk a distinct touch, but also has a close relation with the operation of dyeing and it generally is practised after these last named operations have been completed.

Having dealt with the theory we are now in a position to describe the practice of rinsing. The boiled-off silk is first extracted in order to remove the greater quantity of the soap solution that still remains on the fiber. The mechanical conditions of this operation vary with the class of goods being handled. Next follows the rinsing in an alkaline solution called *lisbordage*, which is simply a weak solution of carbonate of soda intended to remove the excess of soap without separating it. In the case of delicate fabrics which cannot be extracted it is a good plan to repeat this treatment, and this is also the case with certain goods which it is necessary to free from the slightest trace of soap.

The same mechanical devices are used for the alkaline bath as for the boiling-off process except that the spreader is used only in the soap bath. The boiled-off pieces are rinsed in rope form in a tub. The temperature of the alkaline bath is kept between 100° and 120° F. After this alkaline rinsing the material is rinsed several times in soft or purified water. It is during these rinsings that the last traces of soap begin to separate and the silk begins to acquire the peculiar touch. There are various models of machines used for rinsing the various kinds of silk goods. A description of them does not come within the scope of this article, but will be found in general works on dyeing and in the catalogs of the builders.

In conclusion it would be well to state that rinsing is very important in connection with the succeeding operations in dyeing. It is nearly impossible, for example, to give silk the right amount of weighting if it has not been well rinsed after boiling-off.

## STANDARD CLOTHING IN ENGLAND.

The Wool Council has published a very comprehensive report, the gist of which is that British manufacturers, and by that is meant all sections of the trade, will have to put their backs into the production of standard clothes. This is a compulsory measure. For once the labor members of the Wool Council have won the day, although we are of the opinion that both spinners and manufacturers would have risen to the occasion and voluntarily produced a big supply of standard cloth for next winter and spring wear. Twenty-five million yards of standard cloth are to be made, and although it will take considerable time to do this, yet to all intents and purposes it should become an accomplished fact within twelve months. The conversion costs established by the Department leave behind a satisfactory profit, and if it leads to the production of more reasonable clothes, all sections will have cause to be thankful. Sir Arthur Goldfinch deplored the present high price of wool compared with the issue price of the Department, and apparently every effort is to be made to force prices to a lower level.—*Textile Mercury*.

# The Mechanics of Textile Processes

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

Ex. A weight of 16 lbs. is hung 15 in. from the fulcrum F, Fig. 137. What upward pressure must be exerted at a point 7 in. from F?

First find the result by experiment as shown in Fig. 137. Then check by calculation.

$$W \times x = P \times y$$

$$16 \times 15 = P \times 7$$

$$P = (16 \times 15) \div 7 = 34.28 \text{ lbs.}$$

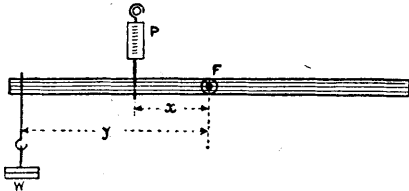


Fig. 137.

Ex. A weight of 23 lbs. is hung 6½ in. from the fulcrum F in Fig 138. What will be the indications on a spring P which supports the arm 15 in. from F?

As in the previous examples we have

$$W \times x = P \times y$$

$$23 \times 6\frac{1}{2} = P \times 15$$

$$P = (23 \times 6\frac{1}{2}) \div 15 = 9.96 \text{ lbs.}$$

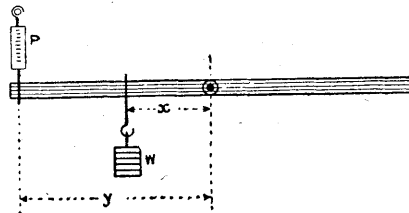


Fig. 138.

Ex. A safety valve is 3 in. dia. The center of the valve is 5 in. from the fulcrum. Find weight to be placed 20 in. from the fulcrum so that the valve will blow off when the steam pressure is 50 lbs. per sq. in. in the boiler, Fig. 139.

Area of valve = 7.0686 sq. in.  
 $P = 7.0686 \times 50 = 353.43 \text{ lbs., total pressure.}$

$$P \times y = W \times x$$

$$(P \times y) \div x = W$$

$$(353.43 \times 3) \div 20 = 53 \text{ lbs., weight at W}$$

Weight to be hung at W = 53 lbs.

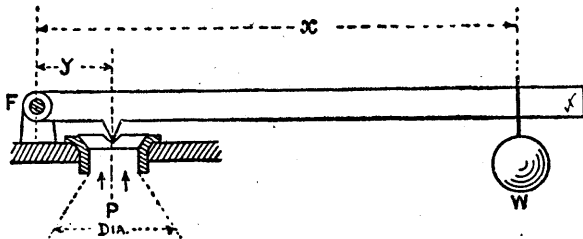


Fig. 139.

Ex. Four calender rollers of a lap end are weighted as shown in Fig. 140. The top lever FW is 14 in. long, FP is 3 in. The bottom lever FW is 60 in. long, FP is 6 in. What pressure is exerted at P, and what is the pressure on the cotton as it passes between each pair of rollers if the top roller weighs 60 lbs., the second roller 65 lbs., and the third roller 72 lbs.? The weight on the bottom lever is 12 lbs. Both sides of the machine are provided with levers and weights.

In the bottom lever the pressure P is found as follows:—

$$P = (W \times x) \div y$$

$$P \times y = W \times x$$

$$P = (12 \times 60) \div 6 = 120 \text{ lbs.}$$

$$P = 120 \text{ lbs.}$$

In the top lever the weight W is the same as the pressure P on the bottom lever, so that—

$$(W \times x) \div y = P$$

$$(W \times x) = (P \times y)$$

$$P = (120 \times 14) \div 3 = 560 \text{ lbs.}$$

$$560 \times 2 = 1120 \text{ lbs., total pressure.}$$

Pressure on top roller is 1120 lbs.  
 Pressure between top rollers = 1120 + 60 = 1180 lbs.  
 Pressure between second rollers = 1180 + 65 = 1245 lbs.  
 Pressure between bottom rollers = 1245 + 72 = 1317 lbs.

Ex. The calender rollers of the lap end of an opener are weighted as shown in Fig. 141. The lever is 72 in. long and the pressure is applied 3 in. from the fulcrum. If a weight of 22 lb. is placed 66 in. from the fulcrum, what pressure is put on the cotton between each pair of rollers if the top roller weighs 70 lbs., the second roller 78 lbs., and the third roller 82 lbs.? Separate levers act on each end of the top roller.

$$x = 66 \text{ in. } y = 3 \text{ in. } W = 22 \text{ lbs.}$$

$$Wx = Py$$

$$Wx \div y = P$$

$$P = (22 \times 66) \div 3 = 484 \text{ lbs.}$$

$$484 \times 2 = 968 \text{ lbs., total pressure.}$$

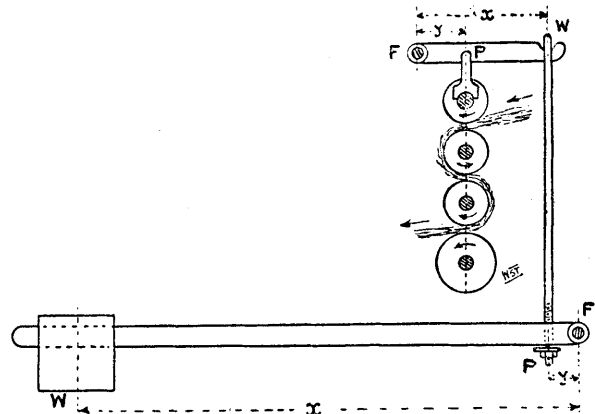


Fig. 140.

### CENTER OF GRAVITY

Every particle of a body is acted upon by the force of gravity, and the sum of these forces over the whole body gives it the quality of weight. Some parts of a body may be heavier than other parts, and such parts will be pulled downwards with greater force than the rest. The center of gravity is therefore that point in a body where the resultant of

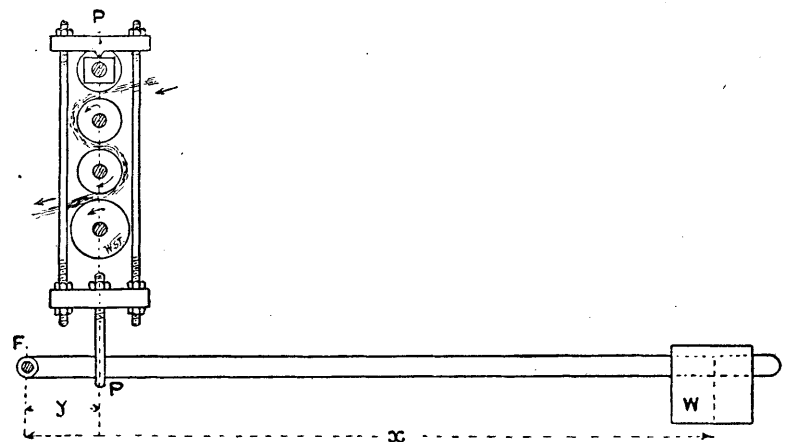


Fig. 141.

the force of gravity acts. In other words, when a body is acted upon by gravity alone, the center of gravity is the point upon which the body will balance; if supported at that point, the body will be in equilibrium.

Inspection alone in many cases is sufficient to inform us as to the position of the center of gravity. A thin symmetrical plate of uniform material will have its center of gravity in the center as, for instance, a square plate, a circular or a uniform rod of any section will have its center of gravity at its middle point.

# Practical Fixing of Cotton Looms

By John Reynolds

## Box-Loom Multiplier Motion.

As the fixer in a gingham mill has to build his own box-chains, the chain building formerly took up much of his time which could have been better employed. The multiplier motion eliminated the building of long chains, resulting in the saving of labor and cost of a large amount of chain stock.

The multiplier motion as used on gingham looms is one of the most efficient devices ever placed on a loom. By the use of different cams, which are easily changed, one bar of

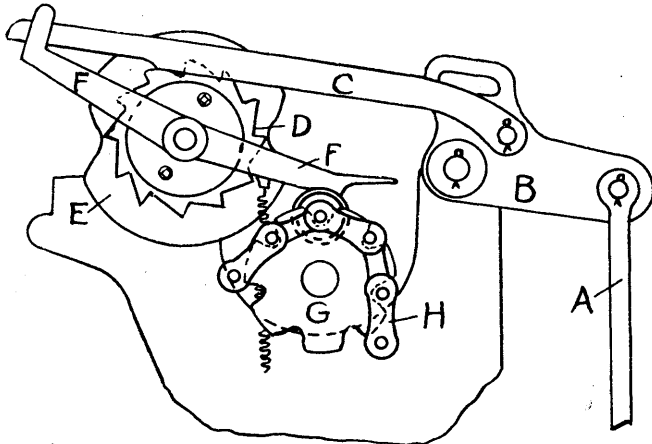


Fig. 104. Multiplier Motion.

the chain can be made to serve for 8, 12 or 24 picks. One revolution of an 8-multiplier cam with three depressions will give 24 picks with 3 bars of chain. A cam with two depressions will give 24 picks with 2 bars. A cam with one depression will give 24 picks with one bar.

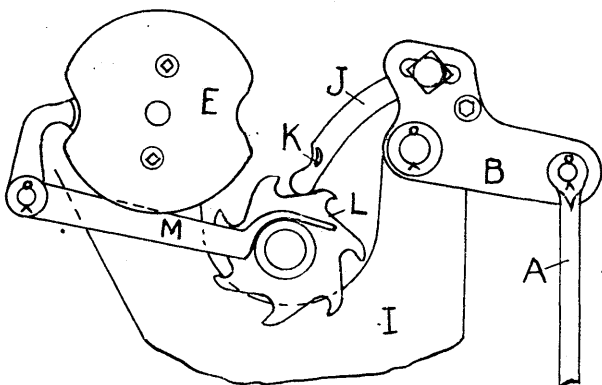


Fig. 105. Multiplier Motion.

Fig. 104 shows a multiplier motion equipped with a 2-depression cam equal to 24 picks for 2 bars of the chain at one revolution. A is the rod driven by a double cam on the bottom shaft; B, oscillating casting to which is attached the pattern cylinder pawl also the multiplier pawl; C, driving pawl for multiplier; D, cam sprocket; E, the cam; F, tipping lever; G, pattern chain cylinder; H, pattern chain.

Fig. 105 is a view of the opposite side of a multiplier motion, showing the pattern-cylinder pawl, stop pin K, pattern cylinder sprocket L and pawl lifter M.

Fig. 106 shows 5 bars of the pattern chain. The first bar is built with one extension ball which operates the multiplier for the shuttle in the first or top box. This kind of a ball can be used in the same position on any bar, no matter

how many box operating balls there are on the same bar. The second bar is built to operate the first box also. The third bar has one ball which engages the sliding tooth that turns the eccentric one-half revolution, which gives the second box. The fourth bar has a ball which engages the sliding tooth operating the box crank in the rear of the motion. This crank turns one-half revolution and raises a distance of two boxes. On the same pick the eccentric is again engaged and, turning back one-half revolution, lowers the box which is raised on the third bar. While the box crank is raising two the eccentric takes away one which brings the third box in line. The fifth bar has two balls, one of which keeps the third box in position. The other one again engages the eccentric which gives one box and brings the fourth box in line.

The boxes can be raised or lowered in any desired order. Fig. 106 merely shows the manner of building a bar of the chain to operate either the multiplier or any of the boxes. If a dobby is used instead of a box-head, two harness levers is all that will be required to operate the box motion for the four boxes.

Take, for example, 60 picks of white using a 2-depression or 12-multiplier cam as shown at Fig. 104. One complete

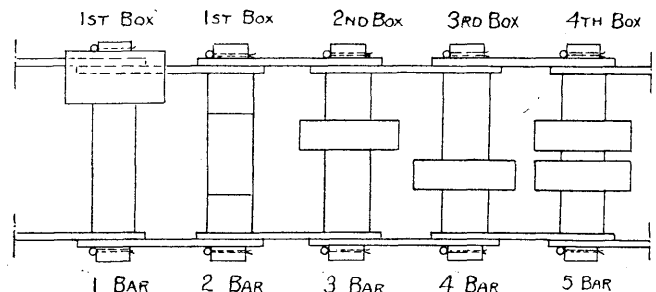


Fig. 106. Pattern Chain.

revolution of this cam corresponds to two bars of the pattern chain or 24 picks, each depression being equivalent to 12 picks. Five bars ( $60 \div 12$ ) of the pattern chain would be required to give 60 picks, whereas 30 bars would be required if no multiplier were used.

Fig. 104 shows a multiplier ball lifting the tipping lever F. This permits the pawl C to engage the sprocket D and turn the cam one pick. As the depression on cam E is turned out of position, the pawl lifter M, Fig. 105, rises and covers the outer surface of the pattern cylinder sprocket, stopping the pawl J from engaging with the sprocket. This continues until another depression appears on cam E, which permits the lifter to fall and lowers the cylinder pawl, which turns the pattern chain one bar. If the next bar contains an extension or multiplier ball, the operation of the multiplier cam is continued.

The sprocket D is bolted to the cam E. If the fixer wishes to change to a more convenient multiple, he can do so in a very few minutes. The resetting of the cam and sprocket is an easy matter.

## Setting the Pattern Cylinder.

The multiplier and pattern cylinder pawls are located on the oscillating casting B, which is operated by rod A through the medium of a double-faced cam on the bottom shaft. With the shuttle on the handle side of the loom, move the lay of the loom forward until the oscillating casting B has

(Continued on following page)

# The Construction of Weaves

By E. Bittner

Fig. 527. Similar to Fig. 525. Pattern, 16x16.

Fig. 528. Warp, 2 dark 1 light. Filling, 2 dark 2 light. Pattern 6x4.

Fig. 529. Warp pattern, 2 threads; filling pattern 12 threads. Pattern 2x12.

Fig. 530. Pattern 8x8.

Fig. 527.

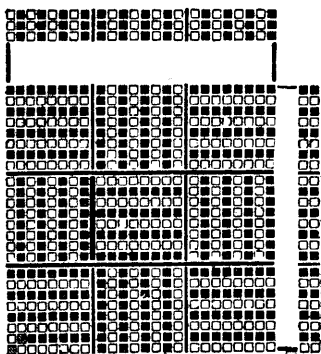


Fig. 528.

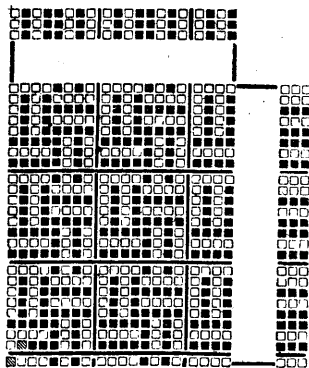
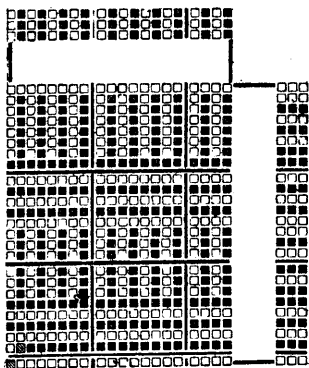
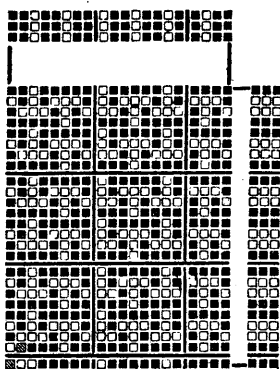


Fig. 529.

Fig. 530.

Fig. 531. Plain weave offset every 8 threads. Warp and filling, 1 light 1 dark.

Fig. 532. Plain weave offset at certain places. Warp and filling, 1 light 1 dark. Effect is a combination of warp and filling stripes.

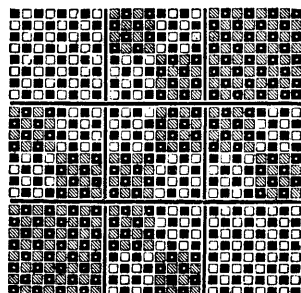
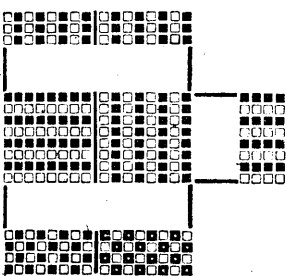


Fig. 531.

533b.

Figs. 533. Motif which in Fig. 533*a* is enlarged 4 times.

Fig. 533*b* shows a plain weave offset to correspond with the enlarged motif. Fig. 533*c* shows the color effect produced by Fig. 533*b* with a warp and filling pattern 1 light 1 dark. It is not necessary to make these separate sketches, which are given here to make the construction clear. The draft can be completed on one sketch.

### COLOR EFFECTS ON PLAIN WEAVE

In forming color effects on a plain weave the filling pattern is greatly simplified by arranging the warp and filling 1 light 1 dark. The weave is then offset in accordance with the desired figure, very attractive effects being obtained in this way. Fig. 531 shows a stripe effect obtained in this way; Fig. 533, a figured effect.

### COLOR EFFECTS ON TWILL WEAVES

A great variety of weaves can be used to advantage in producing color effects. Longitudinal, horizontal and figured

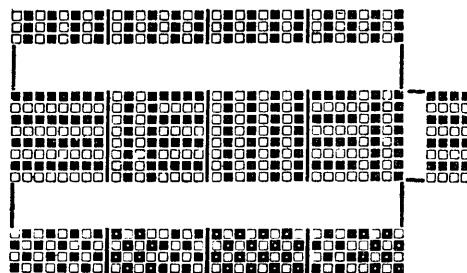


Fig. 533.

effects can be obtained, also longitudinal and horizontal stripes combined in the same pattern, Figs 534 to 548.

The twill is shown in the lower lefthand corner of each of these drafts; the color effect is shown in the remainder of the draft.

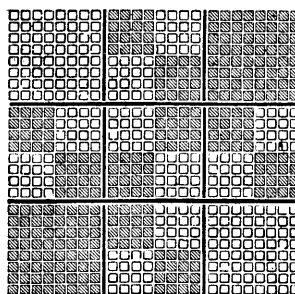


Fig. 533a.

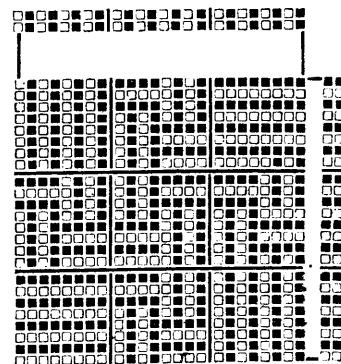


Fig. 533c.

Figs. 549 *a* to *d* and 550 *a* to *f* show color effects obtained by combining warp and filling twills in the same pattern.

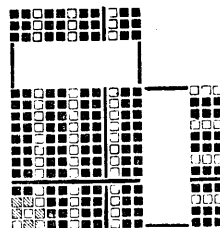


Fig. 534.

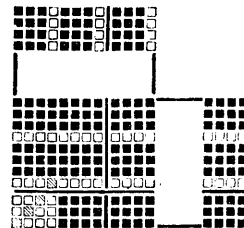


Fig. 535.

Fig. 534. 3-leaf warp twill; warp and filling, 2 dark 1 light. Fig. 535. 4-leaf filling twill; warp and filling; 3 dark 1 light.

## THE PRACTICAL FIXING OF COTTON LOOMS

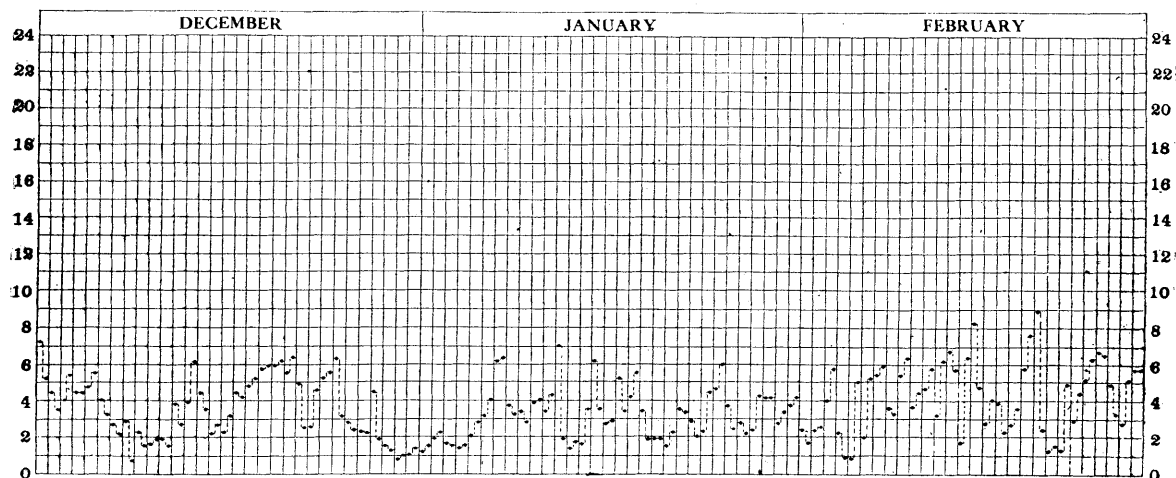
(Continued from previous page)

been given its full movement upwards. Set the pawl J in full engagement with the sprocket L. Now turn the loom until the casting B is in its lowest position and set cam E so that the offset on the lifter M is completely in a depression and the pawl C, Fig. 104, is fully engaged with sprocket D. This is the correct setting for position. The timing will be given under the next heading.

# Air Moistening in Textile Mills

The accompanying chart shows the moisture regain for silk in process of manufacture during the winter months, December, January and February, which concludes the record for the entire year, the three charts for spring, summer and fall having appeared in the three preceding issues. The charts are based on the U. S. Weather Bureau observations of temperature and humidity at New York for the year ending February, 1918, the relative humidity at temperatures below 70° being reduced to its 70° equivalent on the assumption that

of water for every 100 parts of bone-dry material. Referring now to Feb. 5, one of the days on which the lowest regain was reached, we find outside of the mill a temperature of 5° below zero and a vapor pressure of .016 inch, equal to a relative humidity of 55 per cent. The air in the mill, however, was heated to 70°, at which temperature the vapor pressure of .016 inch, which prevailed both inside and outside of the mill, was equivalent to a relative humidity of only 2.2 per cent., under which conditions silk carries only 8/10ths of 1 per cent. of moisture.



DAILY FLUCTUATIONS OF MOISTURE IN SILK IN PROCESS OF MANUFACTURE.

the temperature inside the mill was not allowed to fall below that point. From the atmospheric data thus obtained the moisture regain for silk was determined from Schloesing's tables, a complete set of which, covering regain for cotton, wool and silk, have appeared in preceding articles.

It may be well to explain here that the days are indicated by the spaces between the upright lines, the horizontal lines with the figures at each side of the chart indicating the parts by weight of moisture in 100 parts of bone-dry silk. The regain is given twice for each day, the dot at the left of the space indicating the regain at 8 A. M., that at the right, the regain at 8 P. M. The two are connected by a broken line, the length of which shows the variation of regain.

The moisture in textile materials in process of manufacture drops to the lowest point during the winter months, creating the most trying conditions for manipulating the stock in the various operations. The normal regain for silk is approximately 11 per cent., but by reference to the chart it is found that during the winter months the actual regain fell as low as 8/10ths of 1 per cent., which is practically a bone-dry condition, rising only once as high as 9 per cent., while the average is about 3 per cent. By referring to the summer chart in our July issue the reader can compare the extremes of moisture regain for the year. During the dog-day weather of August the regain reached its highest point, 23½ per cent., the extreme variation for the year thus being nearly 23 per cent., from 8/10 to 23½ per cent.

The reasons for this wide fluctuation in the moisture in silk in process of manufacture become plain by referring to the weather conditions on the days on which the extremes were reached. On August 29 the thermometer stood at 69.9° with a relative humidity of 96 per cent., which is nearly a state of saturation. Under these atmospheric conditions, according to Schloesing's investigations, silk carries 23½ parts

of water for every 100 parts of bone-dry material. These charts, representing, as they do, the fluctuations of moisture regain from forenoon to afternoon, day to day, month to month and from season to season should be studied carefully by textile manufacturers, as they reveal the uncertain conditions under which textile manufacturing is carried on in mills that are not equipped with apparatus for controlling the atmospheric humidity.

## THE WHITE PLAGUE.

These facts have been gathered together by experts on the staff of the National Tuberculosis Association to help editors in commenting editorially on the campaign to fight the spread of tuberculosis.

Tuberculosis kills producers—chiefly men and women between the ages of 16 and 45.

It claims workers—active men and women in the homes, the office and the shop.

It causes 150,000 deaths in the United States every year.

It cost the United States in economic waste alone about \$500,000,000 annually.

More than 1,000,000 persons in this country are suffering from active tuberculosis right now.

It menaces every community, every home and every individual.

And yet tuberculosis is curable and preventable.

It is spread largely by ignorance, carelessness and neglect.

The National Tuberculosis Association and its 1,000 affiliated state and local organizations wage a continuous winning war on tuberculosis.

The work of these organizations is financed chiefly by the sale of Red Cross Christmas Seals.

Drive the menace of tuberculosis from your door.

Buy and use Red Cross Christmas Seals!

# “Straight Line Textile Calculations”

By Samuel S. Dale

## PRODUCTION OF LOOMS.

The theoretical or 100 per cent. production of a loom is the cloth that would be woven if the loom were kept running without any interruption during working hours. The total number of picks in the cloth woven is assumed to be equal to the number of picks taken by the loom running without interruption.

Take for illustration 60 looms running 90 picks per minute and 60 hours per week, with a weekly production of 10,125 yards of 40-pick cloth.

$60 \text{ (looms)} \times 90 \text{ (picks per min.)} \times 3,600 \text{ (min.)} = 19,440,000 \text{ picks by the looms.}$

$10,125 \text{ (yds.)} \times 36 \text{ (in. per yd.)} \times 40 \text{ (picks per in.)} = 14,580,000 \text{ picks in the cloth.}$

The proportion of the actual production to the theoretical production is called the percentage of efficiency.

$14,580,000 \div 19,440,000 = 75 \text{ per cent. efficiency of the looms for the week. Or,}$

$(10,125 \times 36 \times 40) \div (60 \times 90 \times 3,600) = 75 \text{ per cent. efficiency.}$

In this calculation the yards and average picks are the only factors that change. The other factors can be reduced to a constant and the calculation thus simplified:

$36 \text{ in.} \div (60 \text{ looms} \times 90 \text{ speed} \times 3,600 \text{ min.}) = 1 \div 540,000.$   
 $540,000 = \text{production constant for 60 looms, 90 picks per min., 60 hrs.}$

$(10,125 \times 40) \div 540,000 = 75 \text{ per cent. efficiency.}$

The constant can be calculated for any number of looms speed and working time. Then the efficiency is quickly calculated as above.

For a working time of 60 hours the 100 per cent. per loom is thus found:

$(\text{speed} \times 3,600 \text{ min.}) \div (\text{picks} \times 36 \text{ in.}) = \text{yds. per loom, 100 per cent.}$

$\text{Speed} \div \text{picks} = \text{number of hundred yards per loom in 60 hours, 100 per cent.}$

Thus in the preceding example:

$90 \div 40 = 225 \text{ yds. per loom, 60 hours, 100 per cent.}$

$10,125 \div 60 = 168\frac{3}{4} \text{ yds. per loom per week.}$

$168\frac{3}{4} \div 225 = 75 \text{ per cent. efficiency.}$

If a different number of hours per week is worked the 100 per cent. production can usually be calculated without difficulty from the 60-hour production. Thus:

54 hours = 90 per cent. of 60.

50 hours = five-sixths of 60.

48 hours = 80 per cent. of 60.

Ex. A loom running 90 picks per min. turns off 152 yds. of 40-pick cloth in 54 hours. Find percentage of efficiency.

$90 \div 40 = 225 \text{ yds. per loom, 60 hrs., 100 per cent.}$

$225 \times .90 = 202\frac{1}{2} \text{ yds. per loom, 54 hrs., 100 per cent.}$

$152 \div 202\frac{1}{2} = 75 \text{ per cent. efficiency.}$

Ex. A loom running 90 picks per min. turns off 140½ yds. of 40-pick cloth in 50 hours. Find percentage of efficiency.

$90 \div 40 = 225 \text{ yds. per loom, 60 hrs., 100 per cent.}$

$225 \times 5/6 = 187\frac{1}{2} \text{ yds. per loom, 50 hrs., 100 per cent.}$

$140\frac{1}{2} \div 187\frac{1}{2} = 75 \text{ per cent. efficiency.}$

Ex. A loom running 90 picks per min. turns off 135 yds. of 40-pick cloth in 48 hours. Find percentage of efficiency.

$90 \div 40 = 225 \text{ yds. per loom, 60 hrs., 100 per cent.}$

$225 \times .80 = 180 \text{ yds. per loom, 48 hrs., 100 per cent.}$

$135 \div 180 = 75 \text{ per cent., efficiency.}$

## BALANCE OF PRODUCTION.

The number of spindles at any stage of the drawing process that will be supplied by one spindle in any preceding process is thus found:

$[(\text{first machine}) \text{ size of roll} \times \text{speed} \times \text{weight}] \div [(\text{last machine}) \text{ size of roll} \times \text{speed} \times \text{weight}] = \text{spindles on last machine.}$

The weight of the same length of sliver or roving must be taken for both machines. It is immaterial which roll (front or back) is measured.

Ex. The front roll of a draw-box is 5 inches in diameter,

runs 45 r. p. m. delivering a 200-dram strand. The back roll of the spinning frame is 1¼ inches in diameter, runs 5 r. p. m. on an 8-dram slubbing. Find number of spinning spindles that can be supplied by 1 spindle of the draw box.

$(5 \times 45 \times 200) \div (1\frac{1}{4} \times 5 \times 8) = 900 \text{ spindles.}$

This calculation is based on the assumption that both machines are operated at the same percentage of efficiency.

## SYSTEM IN THE WEAVE ROOM.

The form shown this month is for a daily report of a cotton weave room. It gives in the first column the number of yards per pound for each style woven, and in the other columns the number of looms, picks per minute, idle looms,

### Daily Weave Room Report

Nov 30, 19\_\_

	LOOMS RUN	PICKS PER INCH	PICKS PER MINUTE	LOOMS STANDING	POUNDS PER DAY
2.50 W.	134	70x48	168		2499
2.50	224	64x64	164		4525
2.50 Drills	36	70x48	168		2024
2.35	28	40x40	182		224
2.70	96	48x48	164		1924
2.85					
3.00	190	48x48	168		5497
3.25	100	48x48	168		2373
3.50	88	44x40	168		1660
3.60	18	40x40	182		140
3.65	106	64x60	182		500
4.25	400	44x44	130		4608
7.00	117	64x60	182		550
7.30	28	44x40	182		203
7.60	189	64x60	182		2592
4.00	28	48x40	182		203
4.25	22	33x28	168		272
4.50	56	40x40	182		420
2.35 D.					
Total - -	1860				30214

and production in pounds for the respective fabrics. The report is made out by the overseer of weaving and sent to the main office of the mill where it is examined and the figures entered in the production book. SUMPTER.

## PROFITS OF JAPANESE SPINNING INDUSTRY.

A report issued by the Japanese Cotton Spinners' Union shows that net profits obtained by 35 cotton spinning companies in Japan during last year amounted to \$54,343,479, being a record since the inauguration of the spinning industry some thirty years ago. In 1913, the year before the outbreak of the war, net profits of 35 spinning companies were \$9,533,314 only. The paid-up capital of these companies in 1913 was \$41,782,276, but in 1918 it was increased to \$67,593,609.



## 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.

### BENZINE DYEING.

Editor of "Textiles":

We have heard of a textile mill in which yarn is dyed in a gasoline solution. This seems to be a new one so far as a textile industry is concerned, at least to the writer. We will be pleased to learn if you have heard of such a process, and if you have not doubtless your Questions and Answers Department can give us some information.

BROOKFIELD (203).

One benzine process consists in dissolving oil-soluble dyes in benzine and then immersing the fabric, after which it is wrung out and dried. In this case there is a great deal of benzine lost by evaporation, and the air becomes charged with the vapors, making it a considerable fire risk.

In addition to this there is also the danger of electric sparks, which are likely to shoot across the oil dried goods and often ignite the benzine.

Other processes which are based upon the dry cleaning method involve the use of benzine soaps in the dye bath. These overcome the danger from electric sparks, but do not diminish the danger from evaporation. In this instance it would seem to us that the greatest risk is in the evaporated benzine mixing with the air, making the problem one of good ventilation.

DELAWARE.

### YARN FOR ORDERS.

Editor of TEXTILES:

How many pounds of warp yarn and how much filling yarn must be spun to fill an order for 75,000 yards of a cotton cloth having the following particulars:

Warp, 3,160 ends 60s plus 80 ends selvage; take-up, 3½%. Reed 40 for body of warp drawn 2 per dent; selvage 4 per cent; making cloth 40 in. wide in loom. Filling, 90 picks 80s; estimated slack of filling, 2%. Disregard waste.

PASSAIC (209).

The "straight line" calculation of "Passaic's" problem is as follows:

60s cotton = 31.5 runs.  
 $3240 \div .965 = 3358$  yds. warp.  
 $3358 \div 3150 = 1.07$  ozs. warp.  
 80s cotton = 42 runs.  
 $(90 \times 40) \div .98 = 3673$ .  
 $3673 \div 4200 = .87$  ozs. filling.  
 $1.07 \times 75,000 = 80,250$  ozs. (5016 lbs.) 60s warp.  
 $.87 \times 75,000 = 66,250$  ozs. (4078 lbs.) 80s filling.

MAIN 19.

### WEAVERS' WAGES.

Editor of TEXTILES:

A cotton weaver operates six looms running 160 picks per minute and gets a production of 80 per cent. If paid 45 cents per 50-yard cut on 60 picks goods, what will the weaver's wages be for 58 hours a week.

MULTIPLE (208).

The "straight line" calculation of "Multiple's" problem is as follows:

58 hrs. = 60 hrs. less 3¼%.  
 $160 \div 60 = 267$  yds. per loom, 100%, 60 hrs.  
 267 less 3¼% = 258 yds. per loom, 100%, 58 hrs.  
 $258 \times .80 = 206$  yds. per loom 80%, 58 hrs.  
 $206 \times 6 = 1236$  yds. per 6 looms 80%, 58 hrs.  
 $1236 \div 50 = 24.7$  cuts per 6 looms 80%, 58 hrs.  
 $24.7 \times .45 = \$11.11$ , weekly wage.

MAIN 19.

### CALCULATING SILK FOR RIBBONS.

Editor of Textiles:

Please explain the calculation or organzine and tram for 100 yards of ribbon made as follows:

Warp, 320 ends, 2-thread 13/15 denier, 3 in. wide, 80 picks, 2-thread, 13/15 denier.

Allow 3 per cent. for twist-up on warp (organzine) and 1 per cent. on filling (tram); 4 per cent. for waste of warp, and 7 per cent. for waste of filling; and 6 per cent. for weaving take-up of warp.

DOVER.

"Dover's" calculation is made as follows:

Warp:

$14$  (den.)  $\times 2$  (thrd.) = 28.

$28 \div .97 = 28.8$  den.

$28.8 \div 17.44 = 1.65$  dram.

$320$  (ends)  $\times 100$  (yds.) = 32,000.

$32,000 \div .94 = 34,040$  yds. warp.

$34.04 \times 1.65$  (dram) = 56.16.

$56.16 \div .96 = 58.5$  drams (2.28 lbs.) warp per 100 yards. ribbon.

Filling:

$14$  (den.)  $\times 2$  (thrd.) = 28.

$28 \div .99 = 28.2$  den.

$28.2 \div 17.44 = 1.62$  dram.

$3 \times 80 = 240$ .

$240 \times 100 = 24,000$  yds.

$24 \times 1.62 = 38.9$ .

$38.9 \div .93 = 41.8$  drams (1.63 lbs.) filling per 100 yds. ribbon.

We have given the details of the calculation in order to show each step in the process, but the operations can be greatly shortened by using comparative yarn tables for reducing the denier count to drams and special tables showing weight of silk per 100 yards of ribbon or cloth of different constructions.

MAIN 19.

### EXPLOSIVES FROM WOOL.

From an article appearing in an English exchange it appears that wool has been used extensively in Great Britain in the manufacture of explosives. Experiments and extensive use have proved that those explosives made from nitrocellulose, with a wool basis, were more rapid in combustion and of greater hitting power than those with a cotton basis. Further, it is interesting to note that the best results were obtained by blending Australian with British grown wools. The reason given for this is that the finer and softer texture of Australian wool is the fundamental element in the rapid combustion, while the stronger British varieties contain chemical elements that give added power.

The writer of the article adds that this new use of wool explains the mystery regarding the wool supplies which were available. Wool merchants in the United Kingdom could not understand the great shortage, and they could not make the statistics agree, and they thought the difference in the figures must mean heavy reserves held up somewhere. Now we can see where the balance went—it went to make explosives.—*Pastoral Review, Melbourne.*

### SAFETY IN TEXTILE MILLS.

The eighth annual Safety Congress will be held in Cleveland on Oct. 1 to 4 under the auspices of the National Safety Council. Special attention will be given to safety appliances in textile mills, the program including the following papers:

Safety Education in the Textile Industry, by Wm. S. Ide, Slater & Sons, Webster, Mass.

Standard Guards for Textile Machinery, by James Strang, Saco-Lowell Shops, Boston, Mass.

Plant and Machinery Layout, Kenneth Moller, Lockwood, Greene & Co., Boston, Mass.

General discussion, questions and answers.



# Knitting Department

## THE MANUFACTURE OF KNIT GOODS.

By JOHN CHAMBERLAIN.

### GAUGE OF STRAIGHT-BAR SPRING NEEDLE MACHINES

The gauge of a knitting machine is indicated by the number of certain looping elements in a given length, but, unfortunately, does not give the true needle-spacing in a direct manner. On the Cotton system the gauge is calculated by taking the number of jack sinkers in 3 inches. This usually coincides with the number of leads. In the majority of cases two needles are cast into each lead, and the jack sinkers and dividers are placed alternately, so that:

$$\text{Gauge} \times 2 = \text{needles in 3 inches.}$$

$$(\text{Gauge} \times 2) \div 3 = \text{needles per inch.}$$

In coarse machines the dividers are often omitted, and hence the gauge number is altered; while in fine machines two dividing sinkers are used to each jack sinker, a procedure which again affects the gauge. Usually the gauge is stated as given in the first instance, although the construction and arrangement of the looping elements are varied. Thus a machine with 24 jack sinkers in 3 in. is a 24 gauge, irrespective of the number of dividing sinkers employed. If no dividing sinkers were employed it would be called a 12 gauge in common practice because it contained the same number of needle spacings as a 12-gauge machine with alternating jack and dividing sinkers. Similarly, a 24-gauge machine possessing two dividing sinkers to each jack sinker might be termed a 36-gauge machine because it possesses the same needle spacing as a normal 36-gauge machine. This confusion might be avoided by gauging all machines on the needle spacings per inch.

### YARN COUNT AND MACHINE GAUGE

The relation between yarn count and machine gauge is not wholly dependent upon the needle spacing, as it depends also to a very large extent on the type of machine employed, the kind of needle used, the build and definition of the machine, and, owing to lack of standardization of parts, the thickness of the looping elements. Taking the Cotton system of straight-bar spring needle machine, it does not necessarily follow that a given 21-gauge machine, for example, will knit up the same variation of counts as another. On the other hand, each machine will knit up a certain range of yarn counts, the extreme limits, assisted by stitch modification, of which may be stated as follows on a basis of fixed weight counts:

Coarsest workable count  $\times 1.75 =$  finest workable count.

Theoretically, taking the yarn as a cylindrical thread:

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

The above formula applies to any particular type of machine, except for the extreme gauges, fine and coarse, as the strength of the needle, which may be regarded as a cylindrical shaft, varies according to the cube of its diameter.

The chart, Fig. 16, shows the relation between the cotton yarn count and machine gauge. This chart is applicable only to the Cotton system of straight bar spring needle machines, and the graphs, while constructed on a general theoretical formula, will be found to give approximately the average counts of yarns used in common practice. Thus, reading along the machine-gauge line until 21 gauge is reached, and following the vertical line, it will be found that the suitable yarn count is or should be equal to single 7s cotton, a number usually employed on that gauge of machine. Other read-

ings will be found to conform to modern practice, the greater discrepancies occurring only in the extreme fine and coarse gauges, which are not so much in use. It should be remembered that, as previously stated, each machine will knit from a range of yarns, and either coarser or finer counts may be successfully used. A graph line showing the number of needle spacings per inch, which for comparative purposes is much more adaptable, is also given on the chart.

### SEAMLESS HOSIERY MACHINES

Circular knitting machines as used for the manufacture of seamless hose and half-hose are now invariably built for knitting with the latch needle, which knits automatically from a simple reciprocating movement. These machines, owing to the method employed in the making of seamless

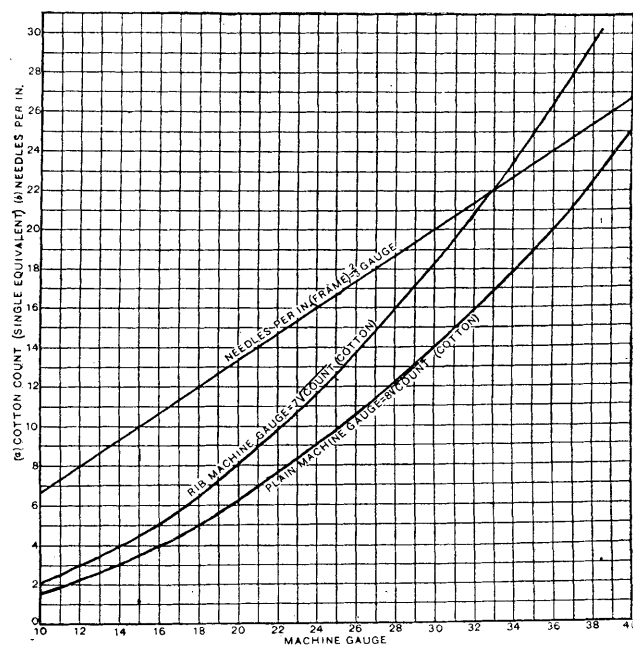


Fig. 16.

heel and toe pouches, must be capable of reversing the direction of motion in order to produce flat as well as tubular knitting. Formerly many hand-operated machines were used which consisted of a fixed bedplate carrying the driving gear, a fixed needle cylinder, and a cam cylinder to which the cams were attached. The cam cylinder could be rotated or oscillated at the will of the operator, so that both flat and tubular work could be produced. These machines are still used in the factories for special classes of work, and are employed to a much greater degree as a domestic machine.

The bulk of seamless hosiery goods are now made on automatic seamless hosiery machines, plain and ribbed, whereby all the changes previously controlled by hand are performed automatically, so that the machine produces hosiery in string formation, the operator simply cutting them off as they reach a convenient position. In the manufacture of plain half-hose, especially in the case of fine goods, the rib-top is made on another machine known as the rib-top machine, and each top must be transferred to the knitting machine. In this way, although the tops are made in string formation, each complete half-hose is cast off the knitting machine after the completion of the linking course. Ribbed hose and half-hose made on machines which have stitch-

changing mechanism are knit complete in string formation, but owing to the fact that this class of machine is much slower, and also on account of the fact that these machines cannot be built in very fine gauges, the fine plain half-hose are usually made as stated.

SEAMLESS HOSIERY PLANT

For the manufacture of plain hose and half-hose the following machines are required—viz.: (1) Yarn winding machines; (2) rib-top machines; (3) automatic knitting machines; (4) linking machines; (5) overlock welting machines. Recently a knitting machine has been evolved which makes its own welt, and hence welting machines are not required. This machine, however, does not reduce the cost of making, but turns an efficient welt of a loose character, and ensures the lengths of all the hose to be of the same dimensions.

A girl operator can attend to six or eight automatic knitting machines when making hose, but assuming the operator to transfer the rib top, can look after only two machines when making half-hose or socks, although if another auxiliary worker assists in the running-on operation, four machines can be kept at work without loss of running time. The rib-top machines require but little attention, and if worked by a separate operator, up to ten machines can be run in an efficient manner. In many cases, however, when the automatic knitting machines are employed solely on the manufacture of plain half-hose or socks, a rib-top machine is placed along with a set of four or six machines, and attended by the knitting machine operators. The winding, linking, and welting machines require individual attention.—*The Textile Manufacturer, Manchester, England.*

LATCH-OPENER FOR KNITTING MACHINES.

The latch-opener shown in the illustration is an American invention, which has recently been patented. Fig. 1 is a side elevation of a machine provided with the device; Fig. 2, the cams operating with the latch-opener; Fig. 3, section of

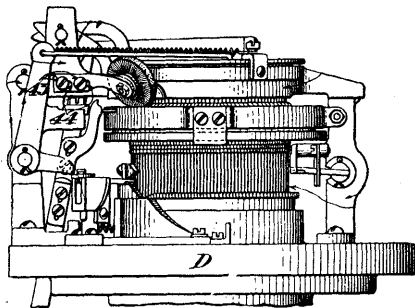


Fig. 1.

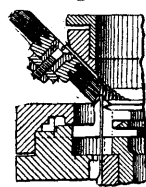


Fig. 3.



Fig. 4.

latch ring and needle cylinder; Fig. 4, a needle and part of one of the brush tufts. To insure the opening of all of the needle latches whenever a needle without a previous loop is advanced to take yarn, say after or during the two or three revolutions of the machine which may occur between the end of one stocking and the beginning of the next, at which time the needles of the machine are bare and move idly. A rotary brush latch-opener is provided in a position where it will encounter needles rising along the advancing slope 5 forming a part of the needle-cams 6, 7, 8 and 9.

As shown in Fig. 3, the latch opener comprises a thin brush wheel having radial tufts mounted for rotation on a screw projecting at a relatively acute angle to the vertical axis, from a threaded bore in an arm in which it is locked by a jam nut. The latch guard-ring is cut away to permit the brush in contact with needles at a point immediately above the upper part of their rise due to the incline 5 of the needle cams in the direction for rotary work. The cut out portion of the latch ring may be an enlargement of the cut

usually made at this point to give the opening latches room to swing in.

The position of the latch opener is such as to cause it to co-operate with a needle advancing up the incline 5 to present a few of the ends, and then the sides of other of the bristles at one end of a tuft, against the inside of the spoon of the vertically movable latch needle, thus insuring the operation of some of the bristles to open the latch whether the bristle points have or have not penetrated between the

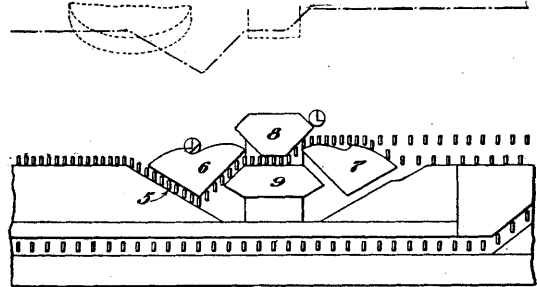


Fig. 2.

latch and the hook, as shown in Fig. 4. This effect is due to the fact that the latch is as usual equipped with a spoon wider than the material of the needle hook, and which when closed projects at the point of the latch upon each side of the needle hook. The overhanging spoon upon the penetration of the hook proper into the inclined series of bristles, the sides of which present virtual cam inclines, is strongly influenced outwardly to open.

AN ANTI-RAVELING KNIT FABRIC.

The illustrations show the construction of an improved anti-run-back course to prevent a line of stitches from raveling beyond this course in case of the breaking of the fabric. Figs. 1 and 2 show modifications of the improved construction.

Fig. 1.

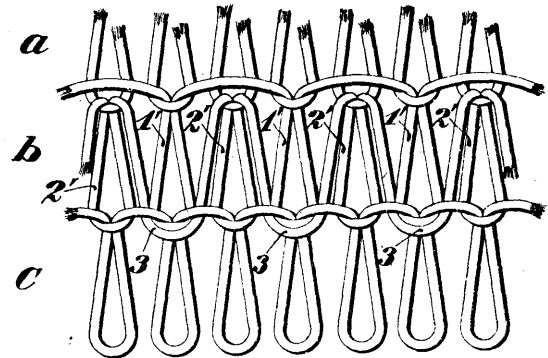
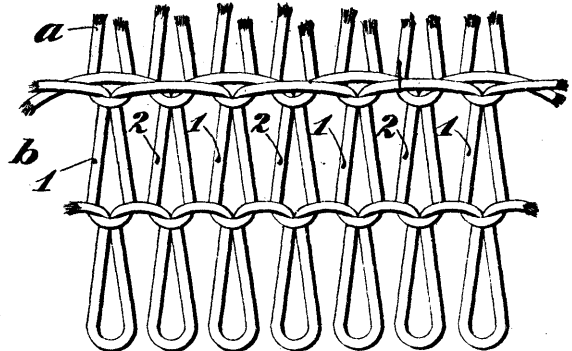


Fig. 2.

In producing the fabric shown at Fig. 1 a plain web is knit in the usual manner by drawing courses of stitches on all the needles of the series, for example, on all the needles of a circular independent needle machine such as is used in knitting seamless stockings. When the point is reached at

which the anti-run-back course is to be formed, a series of loops 1 are drawn by alternate needles only, so that these loops engage the stitches of the preceding course *a* in alternate wales only. A second series of loops 2 are then drawn on the intermediate needles only, so that they engage the stitches of the preceding course *a* in the intermediate wales only. This completes the course *b* so that it includes stitches in each wale which are of equal length and are preferably of the same length as the stitches drawn in the regular knitting. After the course *b* is thus completed the regular knitting of the plain fabric is continued by drawing loops on all the needles in knitting the course *c* and the succeeding courses.

Fig. 2 shows a modified form of the construction which is better adapted for use in the legs of ladies' stockings because of the greater elasticity of the anti-run-back course. In this case the loops 1' are drawn in the same manner as the loops 1 of Fig. 1 and engage the stitches of the preceding course *a* in alternate wales only. In completing the course *b*, however, the loops 2' are drawn on the intermediate needles, and the yarn is tucked on the alternate needles which are holding the loops 1', so that the tuck stitches 3 are formed when the loops of the succeeding course *c* are drawn on all the needles.

In both forms illustrated the course of stitches *b* comprises a plurality of series of loops which aggregate a stitch in each wale, and each series of which engages the stitches of the preceding course *a* in some of the wales only. A course of this character will prevent the further running back or raveling of the stitches, in case of the breaking or severing of a stitch in the web. The stitches of the course, being of uniform length, and of substantially the same length as the stitches in the main body of the fabric, do not appreciably modify the appearance of the fabric, and may be formed at any desired intervals.

**TRANSFERRING FOR HOSIERY.**

This construction, recently patented, is intended to facilitate the transfer of the stitches from the needles after the completion of a toe pocket or other fashioned web. Fig. 1 shows the toe end of a stocking blank before the stitches have been united. Fig. 2 shows by the full lines the stitches around the mouth of the toe pocket as made in the ordinary way; the dotted lines showing the addition by the improved method.

In knitting seamless stockings the needles around one-half of the cylinder of the machine are, upon the completion of the foot web, put out of action but permitted to retain their stitches and the toe pocket is formed by reciprocating knitting upon the needles around the other half of the machine needle after needle, first at one end and then at the opposite end of the set being successively put out of action but permitted to retain its stitch until the web has been narrowed to the desired extent, and these needles being then successively restored to action in reverse order so as to widen the web again, and unite the stitches at the edges of the widened web to those at the edges of the narrowed web.

Where the direction of travel of the knitting yarn is reversed in reciprocating knitting, however, it forms a selvage stitch at the end of said course, with the result that when the final course is completed such selvage stitch is carried by the needle at one end of the semi-circular set upon which the toe pocket was knitted. In Fig. 2 of the drawing, 1 represents this selvage stitch of the final course; 2, the stitches at the front end of the sole portion of the foot web, in continuation of which the toe pocket was knitted; and 3, the stitches at the front end of the instep portion of the foot web.

Both of the sinker wales of the selvage stitch 1 of the final course are drawn in the same direction through the engaging loop of the previous course, consequently, when this stitch is produced, both sides of it cling closely to the needle which produces it and, as a result, the stitch hugs the needle so tightly that it is difficult if not impossible to introduce a transfer point into the stitch for the purpose of removing it from the needle.

After the completion of the toe pocket upon the needles around one half of the machine the needles are put into action around the other half of the machine, which carry the stitches 3 around the front end of the instep portion of the foot web and then form one or more complete courses of full

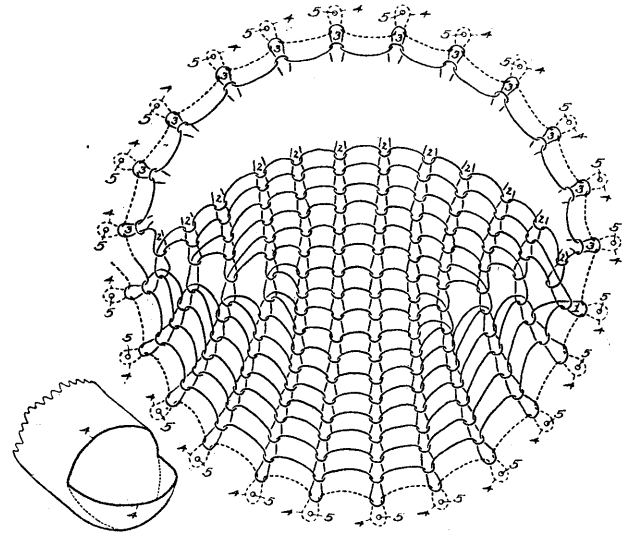


Fig. 1.

Fig. 2.

Transferring for Hosiery.

stitches, as distinguished from selvage stitches, upon all of the needles of the machine. In Fig. 2 one such course of full stitches is shown at 4. The stitches upon all of the needles are alike and no difficulty will be experienced in inserting the transfer points 5 into any of the stitches.

After one half of the stitches 4 have, by means of the transfer points, been doubled with the remaining half of the same, the stitches may be united as usual by means of a separately produced course of stitches, so as to close the toe of the stocking.

**DEGUMMING SILK IN A FOAM BATH.**

A Swiss process for degumming silk in a foam bath has recently been patented in this country. It is known, the discoverer of the process says, that the degumming of silk and silk wastes in all forms, as raw goods, spuns or tissues, has heretofore been obtained by holding the goods for a certain time in boiling soap or in lather bath produced by heating soap water or soap water containing chrysalids.

An even cheaper process for producing a foam or froth bath for ungumming silk and silk wastes consists in heating to the boiling point a weak solution of alkali containing only sericin as the foam producing substance.

Such a bath can be prepared by adding a little alkali to the sericin water obtained by washing silk previously treated with soap lather bath, so that an alkaline bath is obtained, containing, for example, 100,000 parts by weight of water, 25 parts sodium carbonate and 200 parts sericin. This bath constitutes, when transformed into froth or foam without addition of soap, a very effective and extraordinarily cheap degumming bath wherein the sericin froth or foam carries the alkali.

# Dyeing, Bleaching and Finishing

## THE PROCESS OF CARBONIZING.

BY A. GANSWINDT.

### PIECE GOODS MACHINE

The carbonizing ovens for piece goods do not vary in form as widely as the ovens used for raw stock. In order to avoid damaging the cloth it is necessary to have the fabric held open in a certain position and passed at a uniform speed through the oven. This makes it necessary to change the construction of the piece goods ovens as shown by the machines to be described.

Fig. 20 shows a piece goods carbonizing machine and is built by the firm that builds the raw stock carbonizing machine described in a previous article and illustrated at Fig. 5. There is a slit in the front and also in the back of the oven

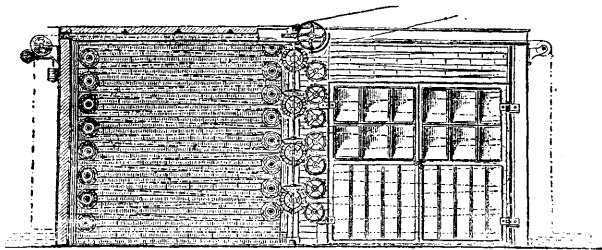


Fig. 20.

for the cloth to enter and pass from the machine. There is also a slit in the partition separating the two sections of the machine and just above the bottom of the chamber. In each of these chambers there are a number of strong guide-rolls 8 in. in diameter and covered with a wood composition, half of them being driven.

The process of carbonizing pieces is similar to that of carbonizing raw wool; the cloth previously soaked in acid or a solution of chloride of aluminium and whizzed is passed through the slit into the first chamber and then carried back and forth over the guide rolls, passing from the top of the machine to the bottom and then through the slit in the partition into the second chamber. The cloth now passes horizontally back and forth over the guide rolls and from the bottom of the second chamber to the top as shown in Fig. 20, being finally drawn from the machine by the press rolls.

The air inlet and outlet in the first chamber are left open so that the fan forces a constant current of hot air through the chamber, which dries the cloth at a temperature of 120° to 150° F. The air laden with moisture and acid vapor escapes through the outlet at the top of the machine. The cloth is thoroughly dried in the first chamber, as the speed is so regulated that there is no moisture remaining in the goods when they pass into the second chamber. There is no ventilation in the second chamber, which is hermetically sealed so that the air is kept at a temperature of 185° to 212° F., which is sufficient to carbonize completely all vegetable matter. The principal advantages of this carbonizing oven are:

1. The cloth is carbonized at a lower temperature and in a very short time. The wool fiber is not affected in the least degree but retains all of its natural elasticity.
2. The colors are affected very little, undyed wool retaining its natural color.
3. The cloth is dried and carbonized only by hot air and does not come in contact with hot metallic surfaces which are liable to injure the goods.
4. The workroom is completely free from acid fumes.

## BLEACHING AND FINISHING COTTON GOODS.

BY BEJAMIN BLANCHIR.

The preceding articles described the lime and soda bleach and the caustic bleach for the general run of white piece goods. Piece goods with colored headings cannot be treated in the same way, because the colors will not stand the bleaching

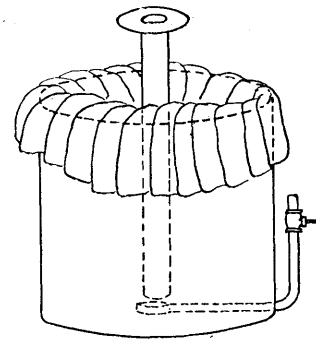


Fig. 7. Headings Thrown Out of Kier.

process. Some goods are made with green and blue headings, nainsooks with red and gold headings, also black and gold, jaconets with orange and blue headings, towels with Turkey red headings and fringes, also Egyptian lawns with a four-inch red heading. These goods must be handled with care. Orange and blue are the most difficult to handle, then come the black and gold, red and green in about the same class. Most of these colors will not resist the lime nor the caustic bleach, neither can a very high pressure be used in the kiers. The old style low pressure or open kiers are well suited for these cloths.

After the pieces are sewn up in the grey room

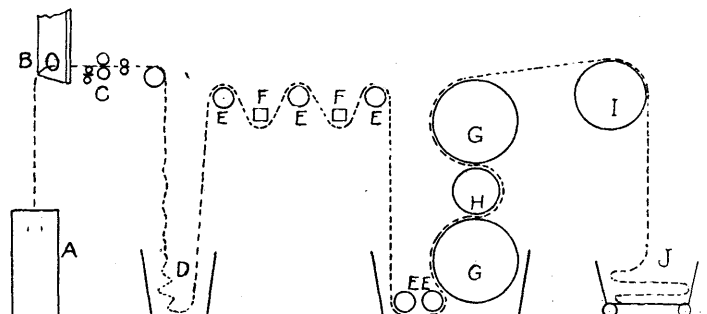


Fig. 8. Handling Flannellets at Scutcher and Mangle.

they are wet out in a large washing machine, then run into the open kier and boiled for 9 hours in a 1 per cent. solution of soda ash, washed out of the kier and given a chemic bath of 1/2° Tw. Let them lie for 4 to 6 hours, keeping a close watch on the colors. Those exposed to the air on the top of the batch will start first. If the treatment is too severe the colors will fade rapidly. If the colors are safe in the chemic bath for about four hours the pieces can be left a little longer, otherwise wash immedi-

ately to save the colors. Wash thoroughly so that no trace of chlorine is left in the goods.

Run back into the kiers, give another  $1\frac{1}{2}$  to 2 per cent. of soda ash and boil for 8 or 9 hours in the open kier. After boiling wash out of the kier and give another  $\frac{1}{4}^{\circ}$  or  $\frac{1}{2}^{\circ}$  solution of chlorine and let the pieces lie until white. This treatment should answer for a medium line of cloths. If the goods are not white enough and the headings are resisting the bleach, run them back into the kier and give them another boil, then wash out and treat in a weaker chemic bath, say  $\frac{1}{4}^{\circ}$  Tw. These delicate colors should be handled carefully. If experience shows it is safe, the treatment can be strengthened to increase the production if the results warrant it, giving more time in the boil or using a stronger chlorine bath after boiling. The strength of the chlorine liquor to give the maximum of production can be determined only from experience.

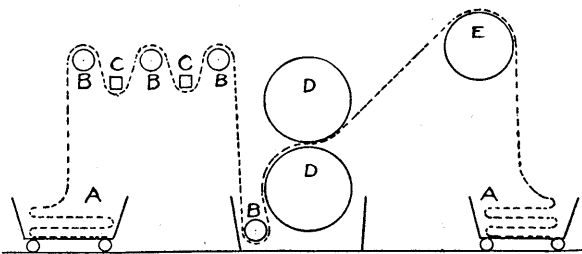


Fig. 9. Wood-Bowl Mangle for Oiling Flannelettes.

Whether the colors in the class of goods will resist acid can be determined by testing in an acid bath. This bath helps to clear some of the colors, but the goods with colors should not be treated in an acid bath without testing them in advance. At one plant where goods with Egyptian, 4-inch red headings were bleached the headings were thrown out of the kier. When the kier was full the headings were thrown back on the top of the kier until the boiling process was finished. If the headings began to bleed or run while in the boil they were pulled off and left hanging over the side, as shown at Fig. 7, until the boiling was finished.

Scoured goods are used for coating with rubber, also for shoe lining, bandages, etc. The goods are scoured to remove the gums, waxes and size. After the pieces are sewn together in kier lots they are passed through a solution of lime water, the lime being  $1\frac{1}{2}$  to 2 per cent. of the weight of the cloth. The lime must be thoroughly slacked, otherwise it will burn holes in the cloth. The goods are passed through the lime solution into the kier and boiled for 8 or 9 hours at a pressure of 15 to 20 pounds. After boiling the desired length of time the pieces are washed out of the kier, given a bath of hydrochloric acid at  $2^{\circ}$  Tw. and left to age for about four hours. On no account must the goods come in contact with the chlorine or there will be trouble with white spots. They are next washed well to remove all traces of acid, then mangled out and given the necessary process in finishing. They are passed over a stenter frame and finished to the width required. If a specified luster is required

the pieces are given necessary runs at the calender.

The bleaching of cotton flannelettes also varies from the ordinary bleaching of white goods. Flannelettes are napped either on one or both sides, being woven specially for this finish. They are used for children's socks and bootees and lining for winter clothing and rubber boots. These goods, after being napped, are treated in a bath of hydrochloric acid, are left to age for three to five hours, washed into the kier, and boiled for eight to ten hours, according to quality, at a pressure of 15 to 40 pounds in a solution of 1 per cent. soda ash and 1 per cent. caustic soda based on the weight of the cloth. When boiled the pieces are washed out, given a chlorine bath of  $1^{\circ}$  to  $2^{\circ}$  Tw. and left to age from four to eight hours. When white enough the goods are given a sulphuric acid bath of  $1^{\circ}$  to  $2^{\circ}$  Tw. and left to age for three or four hours, after which they are washed thoroughly for the finishing process.

In finishing these goods there is always the question of keeping them soft, as they have to be napped again. Fig. 8 shows the method of handling flannelettes at the scutcher and mangle. A is the white pit or bin for cloth; B, pot-eye; C, scutcher; D, slack-box for receiving cloth delivered by scutcher; E, rollers; F, stationary bars; G, wood rolls; H, brass roll; I, drag-reel or drum; J, cloth-truck. After washing, the pieces are mangled into trucks, as shown at Fig. 8, and given a run through another 2 or 3 bowl mangle in the following solution: To 100 gallons of water add 30 pounds of tallow soap, 8 quarts of soluble oil, 3 quarts of glycerine substitute and enough blue to make the goods snow white. Warm this mixture in the starch tub, but do not bring to a boil, otherwise the soap may separate and cause trouble with floating particles of greast.

Fig. 9 shows a mangle for oiling flannelettes. A is the cloth truck; B, guide rolls; C, stationary bars; D, wood rolls in mangle; E, drag-reel or drum. The rollers next to the tension-bars, Figs. 8 and 9, are to relieve the drag on the cloth. The nap causes the pieces to drag heavily in the wet state. When passed through this solution let the pieces lie for a few hours to give the cotton time to absorb the oils and greases, then dry for the napping machines. After the required number of runs on the nappers they are ready for the making-up room.

In the handling of colored headings do not forget that speed and quickness in the handling will help the process. Do not give severe treatment and take an extra run rather than use strong solutions. Wash the goods thoroughly between processes. Keep scoured goods away from the chemic. The object of scouring is to remove the fats and sizes, leaving the goods in the grey. See that flannelette cloths do not slip on account of the goods being raised or napped. Be sure to let them age long enough to allow the oils to penetrate the yarn, otherwise there will be trouble in napping and the cloth will be harsh and scroopy to the feel.

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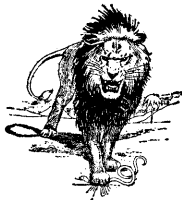
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### INVISIBLE FABRICS.

An English process for making fabrics invisible when looked at from a distance has recently been patented in this country. It consists in padding the fabric with a solution of a coloring matter capable of producing at least two colors by development with metallic salts, and the development and fixing with one metallic salt of a uniform ground color upon which the other colors are developed in promiscuous patches by the application of other metallic salts by hand or otherwise.

In one application of the process the fabric is padded in a cold solution of suitable dyewood extracts such as fustic, cutch and sumac. It is then passed through a bath of a boiling aluminium salt, by which the ground color, such as fustic, is developed and fixed.

Other developers or metallic salts, such as potassium bichromate, and suitable salts of iron, are applied by hand or otherwise to produce promiscuous color patches. The fabric is then folded and allowed to stand so that the colors may spread and blend with the ground color and also so that the metallic salts on contacting parts of the material may print off or transfer from one to the other. The fabric is then dried at a high temperature in order to further develop and fix the colors.

The aluminium salt employed in the developing and fixing of the ground color acts as a retarder upon the subsequent metallic salts so that the colors produced are less pronounced and bend with or shade off into the ground better than they otherwise would.

In another application of the process a suitable mordant, such as aluminium acetate or tin chlorid, is fixed upon the fabric, which is then passed through a dye solution of fustic, cutch and sumac for producing a plurality of colors, the ground color being developed by the mordant and the remaining colors being ready for subsequent development in promiscuous patches in a manner substantially as in connection with the previously described application.

### COLOR MATCHING.

Careful, accurate workmanship is probably more essential in textile production than in any other line of manufacture. A slight error in color matching, a little slip in process or a mechanical fault that goes unnoticed for even a few minutes, and the damage is done! The result—goods that cannot pass inspection—products that must be sold as "seconds" or even thrown away.

Better light is the answer to many of these difficulties. A bright workroom means greater accuracy, fewer errors and accidents and happier workers. Waste and spoilage are reduced to a minimum, and production is speeded up to surprising degree. That has been the experience of many textile mills that have adopted, successfully and profitably, the policy of increasing light by decreasing lighting expense.

Better light is generally obtainable in a simple, inexpensive way. Painting the interior of the mill with a gloss white paint of high luster, the ingredients of which are chosen with particular attention to their light-reflecting qualities, produces a maximum of light diffusion. It is effective in producing the desired result when applied on wood, iron, plaster, concrete, cement, or brick.

### FRED GILLEY'S CHANGE.

Fred R. Gilley, for several years connected with the yarn department of the American Woolen Co., has opened offices in the Citizens National Bank Building, 179 Summer St., Boston, as a yarn merchant. Mr. Gilley has many friends in the trade, and they feel sure he will be highly successful. Mr. Gilley is a graduate of the Lowell Textile School and is thoroughly familiar with the manufacture of woolen and worsted yarns. He is making a specialty of supplying weaving and knitting mills with woolen and worsted yarns.



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## THE CHEMICAL EXPOSITION.

The program for the Fifth National Exposition of Chemical Industries, to be held at the Coliseum and First Regiment Armory, Chicago, Sept. 22-27, has been fully arranged. The exposition opens at noon, following which a meeting of the American Institute of Mining and Metallurgical Engineers at Congress Hotel. At 8 P. M. Governor Lowden of Illinois and others will deliver addresses at the exposition. At 2 o'clock Tuesday, in the Exposition Auditorium, addresses on chemistry will be delivered, one of them being on "Dyestuffs" by J. Merritt Matthews, editor of the Color Trade Journal. Various important meetings of the chemical societies are to be held right through the exposition. Thursday noon Sears, Roebuck & Co. are to entertain the visitors, this to be followed by a visit to a paper mill. At 2 o'clock Tuesday at a meeting at the auditorium H. E. Howe of the Division of Industrial Research, National Research Council, Washington, and others will discuss the subject of industrial research. The motion pictures to be shown during the week cover many branches of chemical work. A few of the pictures are "The Making of Matches," "The Manufacture of Zinc Oxide," "Manufacturing Rubber Hose," "The Silk Industry," "The Steel Industry," "Continuous Motion Conveying, Stocking, Elevating, Loading and Unloading by Brown Portable," "Handling Machines." The latter picture is shown by courtesy of the Brown Portable Machinery Co., while "The Manufacture of Zinc Oxide" picture is provided by the New Jersey Zinc Co. Some of the films have been prepared expressly for the Chemical Exposition.

## NEWPORT CHEMICAL WORKS.

The Newport Chemical Works, Inc., is to make a novel exhibit at the coming Chemical Exhibition in Chicago. This company will occupy booths 193 and 194, the exhibit to be in charge of John W. Koff, Western representative of the Newport dyestuff products, and Giles Low, assistant chief chemist of the company's service laboratory. The exhibit will consist of an ocular demonstration of the recent "Coal to Dyestuffs" advertisement of the company. It shows the various steps involved in making dyes, starting with the basis material and going through to the finished product. Quite a display of dyed fabrics will also be shown.

## NEW PUBLICATIONS.

**The Law of Government Contracts:** by R. Preston Shealey, LL.M.; 282 pages, 5½x8½; The Roland Press Co.; Price \$4.00.

This is a book written by a lawyer for the guidance and instruction of all having to deal with the Government in connection with contracts. It has been written and arranged, not only for the needs of the trained lawyer, but also for the business man. There are over one hundred thousand firms contracting on public works and supplies and the complexity of the resulting problems make such a work essential to safe transaction of business with the Government. The contents are arranged under the following heads: Government and Individual Contracts Compared and Distinguished; Contracts Classified; When a Government Contract is Valid; When a Contract Will Be Implied; When a Contract Will Be Implied (Continued); The Implied Contracts to Pay for Use of Patents; The Implied Contract to Pay for Goods Commandeered; Assignment or Transfer of Contract; Alterations and Modifications; Contracts for Uncertain Quantities or Involving Unknown Conditions; Tender of Performance; Construction or Interpretation of Contracts; Approval of Performance by Officer or Board of Survey; Disputes and Compromises; Statutory Protection of Material, Men and Laborers; What Constitutes Breach; Cancellation or Abandonment of Contracts; Damages; Bonds and Sureties; Statutory Requirements for Advertisement; Bids; Reformation for Mistake in Bid; Approval of Superior Officer; Formal Written Contracts; Procedure to Secure Payment.

**Silk Processes Winding, Warping and Quilling.** By Samuel Kline; 134 pages; 5x8; John Wiley & Sons, New York. Price \$2.

The author of this book, who has had a thoroughly practical experience in the warping and winding departments of silk mills, gives an explanation of the various processes, and points out the difficulties that are likely to arise and the best methods of remedying them. The various machines are illustrated and described. It is a very useful handbook for the overseer, second-hand or ambitious workmen in the winding, warping and fulling departments of a silk mill.

(Continued on page 43)

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**KENT MILLS ANNUAL OUTING.**

The Kent Manufacturing Company of Clifton Heights, Pa., manufacturers of woolen goods and French spun worsted yarns, held its first annual outing and field day at Swarthmore College Campus on Saturday, Aug. 9. Nearly every employee of the different Kent mills attended, and the day was one which employees will long remember. The company paid all the expenses of the outing.

Everett L. Kent, president of the Kent Manufacturing Company, took a leading part in the day's diversions and he saw to it that everyone had a good time.

A number of games were played, gold and bronze medals being awarded to the various athletic winners.

The committee which arranged the outing was composed of members of the firm, heads of departments and employees, and they deserve great credit for the able manner in which the affair was conducted. The committee included the following men: Alan Keay, chairman; F. E. Brazel, W. Arnold, E. R. Townsend, August Keeler, Peter Yeager, Thomas Loftus, Elmo Saunders, Lewis A. Daniels, James Dawson, William C. Barnard, John Gormley, James B. Scanlan, Albert Berridge, John Brophy, George Bevers, John Lee, James Holstein, Thomas Paulley, Bert McCartney and S. K. Lewis.

**WOOLEN AND WORSTED.**

The Norwich (Conn.) Woolen Co. is planning to erect another addition.

The Cyril Johnson Woolen Co., of Stafford Springs, Ct., who are erecting an addition to their plant, will install 2000 spindles and thirty looms.

The Bernon Worsted Mills, of Woonsocket, R. I., have just completed their new mill, also part of the machinery has been installed in the spinning department.

The Aetna Mills, manufacturers of woolen and worsted goods and men's wear, of Watertown, Mass., have been awarded a contract for the erection of an addition to their plant.

The Barnai Worsted Co., of Woonsocket, R. I., will in the near future erect a dyehouse.

The Norwich (Conn.) Woolen Co. will erect a three-story mill addition to their plant.

The Huntington (Mass.) Manufacturing Company, manufacturers of fine fancy worsteds, will in the near future erect an addition to their plant.

The Grant S. Kelley Woolen Mills, of Monson, Mass., which leased a building last fall, to be used as an annex, have installed fifteen looms.

**BLEACHERS!**

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The common sense way of increasing our income is to make more money for the boss.

If you turn out better bleached goods--with Peroxide--they will draw more trade and your value will have increased.

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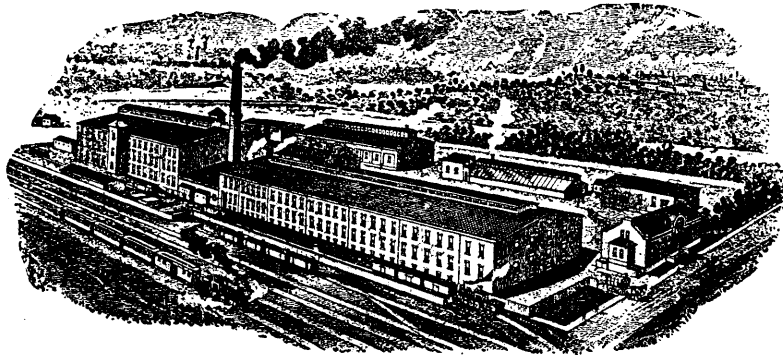
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MADE ESPECIALLY FOR KNITTING AND HOSIERY

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*55000 Standard F 42 gauge needles*  
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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.

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**AN INVALUABLE BOOK FOR WOOLEN AND WORSTED MANUFACTURERS**

What the "Textile Mercury," Manchester, England, says:

"Cost Finding in Woolen and Worsted Mills" is packed full of ideas. In particular, the method of costing based upon standard yards of so many picks per inch is explained. This is a method that is now followed by many of the best weaving concerns in this country, and certainly seems to be the most reasonable. The principles outlined are illustrated with actual productive figures of several American mills. Not only do we recommend this book to woolen and worsted manufacturers, but also to others whose productions are of a varied nature, and who wish to obtain ideas for the development and improvement of their own costing methods.

**"COST FINDING IN WOOLEN AND WORSTED MILLS"**

By **SAMUEL S. DALE**

NO manufacturer of woolen and worsted goods can afford to be without a copy of this work.



The system of cost finding described in this book is adapted to all kinds of woolen and worsted mills, large and small, also spinning mills and weaving mills carrying on all the operations from raw materials to finished cloth.

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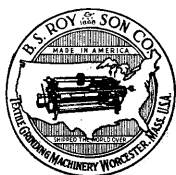
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**Superintendent or Overseer of Carding.** 35 years' experience as overseer and superintendent. Yarns and cloth. Age 50. Married. Address Box 243, TEXTILES, 79 Milk St., Boston, Mass.

**Overseer of Weaving.** 8 years' experience. Plain sheeting. Age 35. Married. Address Box 241, TEXTILES, 79 Milk St., Boston, Mass.

**Cotton Mill Superintendent.** 14 years' experience as overseer of spinning and assistant superintendent. Plain sheetings. Age 39. Married. Address Box 240, TEXTILES, 79 Milk St., Boston, Mass.

**Overseer Spinning and Twisting.** 2 years' experience as overseer and 8 years as second-hand. Age 32. Married. Address Box 304, TEXTILES, 79 Milk St., Boston, Mass.

**Cloth Room Overseer.** 10 years' experience. Plain weave cotton goods.

Age 36. Married. Address Box 244, TEXTILES, 79 Milk St., Boston, Mass.

**Boss Dyer in Large Mill.** 15 years' experience on raw stock yarn and piece dyes. Unions, cassimeres, worsted and uniform cloth. Age 34. Married. Address Box 232, TEXTILES, 79 Milk St., Boston, Mass.

**Bleacher.** Twelve years' experience. Cotton underwear. Age 45. Married. Address Box 280, TEXTILES, 79 Milk St., Boston, Mass.

**Overseer of Dyeing.** Twelve years' experience. Cotton Indigo blue. Age 45. Married. Address Box 282, TEXTILES, 79 Milk St., Boston, Mass.

**Cotton Mill Superintendent.** Fourteen years' experience as overseer and assistant superintendent. Yarns and cloth. Age 40. Married. Address Box 209, TEXTILES, 79 Milk St., Boston, Mass.

**Overseer of the Cloth Room.** 12 years' experience. White, plain and fancies. Age 29. Married. Address Box 298, TEXTILES, 79 Milk St., Boston, Mass.

**Superintendent.** 15 years' experience. Various kinds of worsted and cotton goods, both fancy and plain. Age 48. Married. Address Box 277, TEXTILES, 79 Milk St., Boston, Mass.

**Overseer of Weaving.** 20 years' experience. Drills and sheetings. Age 47. Married. Address Box 250, TEXTILES, 79 Milk St., Boston, Mass.

**Overseer of Weaving.** 18 years' experience. Plain and drills. Age 47. Married. Address Box 262, TEXTILES, 79 Milk St., Boston, Mass.

**Cotton Mill Superintendent.** Eight years' experience as carder and spinner and one year's experience as superintendent. Age 34. Married. Address Box 292, TEXTILES, 79 Milk St., Boston, Mass.

**Hosiery Mill Superintendent.** 13 years' experience. Hosiery and Hard Yarns. Age 45. Married. Address Box 225, TEXTILES, 79 Milk St., Boston, Mass.

**Boss Dyer or Assistant Dyer.** 10 years' experience. Piece dyes, yarn, warps, stock and hosiery. Age 27. Married. Address Box 306, TEXTILES, 79 Milk St., Boston, Mass.

**Woolen Carder or Superintendent of Yarn Mill.** 20 years' experience. Satinets, ladies' dress goods, meltons, etc. Age 40. Married. Address Box 307, TEXTILES, 79 Milk St., Boston, Mass.

**Overseer of Dyeing.** 3 years' experience. Denims. Age 32. Married. Address Box 275, TEXTILES, 79 Milk St., Boston, Mass.

**Overseer of Dyeing.** 30 years' experience. Fancy dress goods and denims and gingham. Age 58. Married. Address Box 276, TEXTILES, 79 Milk St., Boston, Mass.

**Overseer of Weaving.** Four years' experience as second-hand and 18 months as overseer. Sheetings and heavy twill goods. Age 35. Married. Address Box 278, TEXTILES, 79 Milk St., Boston, Mass.

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Established 1891

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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.

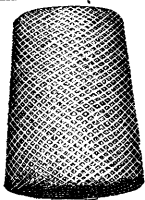
Our lines consist of—

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

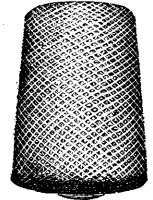
There is no requirement in popular priced underwear that we cannot supply to the wholesale and export trade.

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

## KNIT UNDERWEAR—SWEATER COATS



**HARRY C. WERNICK**  
COTTON, WOOLEN and WORSTED YARNS



*We specialize in these yarns*  
**FOR IMMEDIATE DELIVERY**

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Incorporated 1890

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Main Office, Citizens' Trust Co. Building,  
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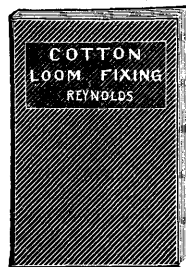
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Of every description for all branches of  
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## Hosiery Dye A Specialty

### WORKS:

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is the latest, best and most completely illustrated book on this subject.

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

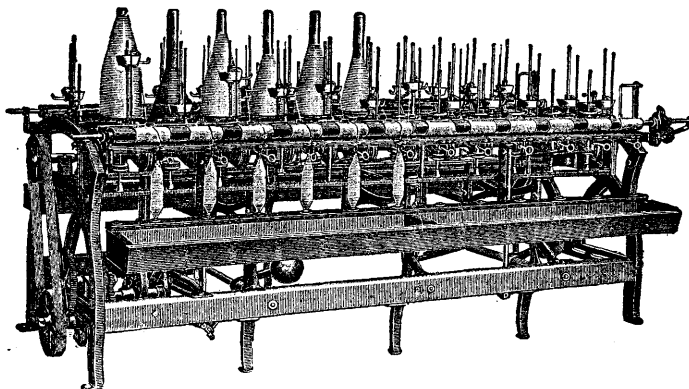
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Ring Dresser, Spooler and Reel Spindles, Cop Skewers, Warp, Spool, Spooler Guides, Bolsters, and Stops Made and Repaired at Short Notice.

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**SPECIAL MACHINES FOR ANILINE, SULPHUR, INDIGO, AND OTHER VAT COLORS**

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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.

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Four-year degree courses in

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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.

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## SILK.

Franck & Mark is the name of a new firm which has been established to erect a mill of 200-loom capacity in Paterson, N. J.

The Atlas Silk Hosiery Co. of Paterson, N. J., will have an equipment of seventy-five knitting machines when it moves into the new quarters.

The Century Silk Co. of New York will in the near future erect a new silk mill.

The Kelly Silk Co., Lackawanna and Wyoming Aves., Scranton, Pa., have purchased the Alexander Grass estate building, 430 Penn Avenue, and will remodel the structure into a silk mill.

The Robins Silk Manufacturing Co. of New York will erect a two-story silk mill, about 50x100 feet.

The Berfelden Silk Co. of Bethel, Ct., have just opened an addition to their plant which has been recently completed.

The Tuscan Silk Mills, recently incorporated at Allentown, Pa., will start the production of broad silks in October with fifty looms.

Lederer Bros. are establishing a silk mill at Pottstown, Pa., which is to have an initial equipment of sixty looms. The machinery is now being installed.

The L. A. W. Silk Company, Inc., are erecting a mill at East Stroudsburg, Pa., and expects to have it ready for operation by November. They will install thirty to forty looms for weaving broad silk.

The Canisteo Silk Co., of Canisteo, N. Y., will erect a branch plant at Nunda. They will install therein 5,000 spindles for silk throwing.

The American Silk Mills, of Paterson, N. J., are planning to erect an addition to their plant.

The Glendana Silk Mills of Pawtucket, R. I., will erect a new structure on Washington St.

## KNITTING.

The Kool Fit Manufacturing Company, a new underwear enterprise, of Bethel, Ct., has commenced operations.

The Virginia Hosiery Mills, of Norfolk, Va., have started the manufacture of ladies' and men's hose, in mercerized and silk seamless goods. They have twenty-eight knitting machines.

The Dophia Hosiery Company, Toledo, O., will in the near future erect a building in which they will install machinery.

The Middlesborough (Ky.) Towns & Land Company will install fifty knitting machines for the manufacture of hosiery.

The Globe Cotton Mills of Gaffney, S. C., will erect an addition to their plant, in which they will install spindles with accompanying looms.

The Tuscarora Cotton Mills, of Mount Pleasant, N. C., will add spindles to their equipment.

The Coosa Manufacturing Company of Piedmont, Ala., will construct a two-story addition to their plant, in which they will install 18,000 additional spindles.

Its equipment will consist of 6,000 spindles and electric power drive.



**PERSONALS.**

Henry G. Fietze, formerly with the Daniels Mfg. Co., East Brookfield, Mass., has accepted the position of boss spinner for Rock River Woolen Mills, Janesville, Wis.

Archibald Ormiston, formerly employed at the Malden (Mass.) Knitting Mills, has accepted the position of overseer of dyeing for the Devonshire Mills, Goffs Falls, N. H.

James Toas has taken the position of superintendent of the Quinapoxet (Mass.) Manufacturing Co.

John Heaton, formerly with the Merrimack Woolen Mills, Lowell, Mass., has been appointed overseer of finishing for the Devonshire Mills, Goffs Falls, N. H.

Jake Ashler, formerly of Webster, Mass., has accepted the position of overseer of carding for the Puritan Mills, American Woolen Co., Plymouth, Mass.

J. V. Nannie has been promoted to overseer of the cloth room of the F. W. Poe Manufacturing Co., Greenville, S. C.

George Pethybridge, who comes from Fitchburg, Mass., has taken the position of overseer of dyeing for the Wakefield (R. I.) Manufacturing Co.

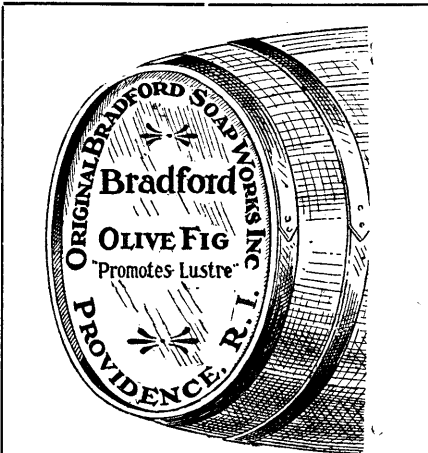
Wallace Reed, formerly of the Rochdale Mills, American Woolen Co., Rochdale, Mass., has accepted the position of superintendent of the West Bend (Wis.) Woolen Mills.

R. L. McLaren has been appointed superintendent of the woolen department of the William E. Tillotson Company, Pittsfield, Mass. He comes from Germantown, Philadelphia, Pa.

J. Lawrence Ivers, formerly overseer of spinning at the Pemberton Co., Lawrence, Mass., has accepted the position of superintendent of the Maple Grove Mill of the Renfrew Manufacturing Co., Adams, Mass.

Edward Elsner, who comes from the Quinapoxet (Mass.) Manufacturing Co., has accepted the position of superintendent of the Olney Woolen Mills, Cherry Valley, Mass.

J. F. Rigney, formerly of Manton, R. I., has accepted the position of overseer of finishing at the Franklin Knitting Mills, New York City.



*Specializing in Silk Soaps  
also High Grade Fulling and  
Scouring Soaps*

**SAVES SOAP**

**SAMPLE FREE**

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

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following lots of Sea Island cotton yarn plain twist 24/4 and 20/4. Also cabled 20/6-24/6-33/6-36/6. Price will interest you. Samples and particulars upon application.

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Solidly founded syndicate desires business with leading manufacturing firms. Take any quantities of downproof bedticking, figured and plain sateen and cambric, strong ticking for mattresses, also other cotton and linen fabrics for bedding.

Particulars, samples and prices address to  
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"We would be very glad to have you refer anyone to us if you desire to do so, for we cannot say enough in praise of the work accomplished for us."—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

**WANTED**

Buy and sell all kinds of textile pickers. Cards, woolen or worsted, garnetts, any condition. Card cylinders, frames, arches, feeds, condensers or parts of any kind used on cards. Mules, any gauge. Boblins, spools, used belting and card clothing. Weaving, dyeing, and finishing machinery. Will pay for information as to where any of above may be for sale. Send me list.

**JOHN J. HEALY**  
NEWTONVILLE MASS.  
Rag, mixing, burr and feathering machinery.

**FOR SALE**

1—36" Bramwell Burr Picker.  
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3—30" Dodge Shoddy Pickers.  
2 extra cylinders for Dodge Picker.

These machines are equipped with ball bearings and in good condition.

1—110" American Blower Steel Plate Fan, belt driven.  
1 lot Pulleys and Hangers.

The American Pad & Textile Co.  
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**SECOND-HAND TEXTILE MACHINERY**

For cotton, woolen and worsted  
246 Chestnut St. Philadelphia, Pa

**WANTED**

Spinners for night shift, forty-eight hours per week of five nights. Good price list. Write to the  
**OREGON CITY MFG. CO.,**  
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**WANTED**

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

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Send us today sample of your Automatic Loom Shuttle and get our price and delivery.

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Woonsocket, R. I.

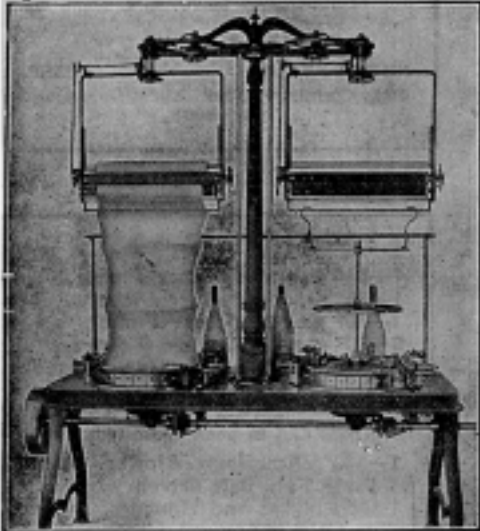
ESTABLISHED 1870  
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# CRANE

## SPRING AND LATCH NEEDLE KNITTING MACHINES

Will Enable Any User To Improve His Business



### Spring Needle Underwear Machine

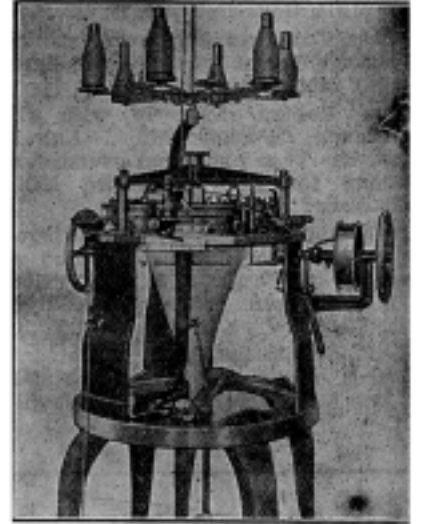
A splendid machine for balbriggan underwear, stockingettes, eiderdowns and all kinds of fleeced fabrics.

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.

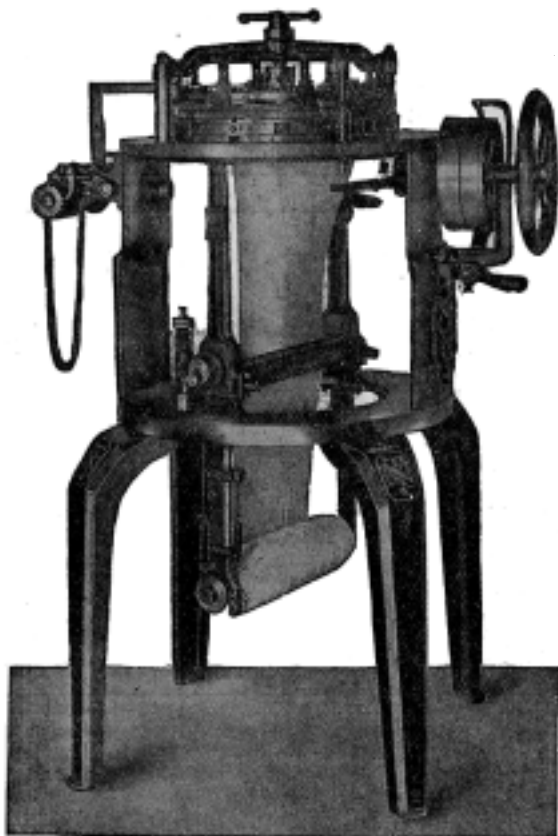


Improved Spring Needle Underwear Machine

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.

NEW PUBLICATIONS.

(Continued from page 34.)

**Bleaching and Finishing of Cotton;** by S. R. Trotman, M.A., and E. L. Thorp, A.C.G.I.; 341 pages 6x8 $\frac{3}{4}$ , illust.; Price, \$—

The second edition of this work has recently come from the press. The book has been carefully revised to bring it up to date, the contents being arranged under the following heads:

Introduction-Structure of Cotton Fiber; The Constituents of Cotton; Cotton Testing; The Carbohydrates; Water; Bacteria in Bleaching; Cotton Piece Goods—Introductory; Steeping; Transmission, Impregnation, and Plaiting of Cloth; Alkali Boiling—General Considerations; Materials Used in Lye Boiling; Soap; Soap Making; Organic Solvents; Kiers; Washing Machines; Bleaching and Bleaching Powder; Chemicing and Souring Apparatus; Sodium Hypochlorite and Electrolytic Bleaching Solutions; Other Bleaching Agents; Souring or Treatment with Acids; Processes; Colored Goods; Stains and Discolorations; Finishing and the Materials Used in Finishing; Mangling, Drying, Conditioning; Stiffening; Auxiliary Machines and Processes; Stenters; Beetling; Calendering; Combined Finishing Processes.

BUSINESS LITERATURE.

**"Enthusiasm and Other Things."** The Metropolitan Sewing Machine Corporation, Nyack, N. Y.

This is an interview with a knit goods manufacturer by an enthusiastic salesman, the manufacturer at first being skeptical regarding the Weiss Automatic Design Cutting and Sewing Machine, but later becoming as enthusiastic as the salesman, being satisfied that he could effect a material saving in cloth by the use of the machine. The book is handsomely printed and bound and exceedingly well illustrated.

COTTON.

The Berkshire Cotton Mills, of Adams, Mass., have awarded a contract to F. T. Ley Co., of Springfield, Mass., for the erection of an addition to their plant.

The Opelika (Ala.) Cotton Mills, manufacturers of fine yarns, will erect a building. The first floors will be used for very coarse yarn. The other two stories will operate on the same line as the present mill. The basement will have about 2,500 spindles on coarse yarn.

The Ridge Mills, of Gastonia, N. C., will soon install an equipment of 6,500 spindles with electric drive.

The Cannon Manufacturing Co., of Kannapolis, N. C., manufacturers of sheetings, towelings, crashes, etc., will erect two mills and four warehouses. The plant at present has 100,000 spindles and 3,000 looms in operation.

The Mason Cotton Mills Co., Kings Mountain, N. C., manufacturers of single and ply yarns, is erecting an addition to their plant to be used as a carding room. It will be operated day and night to supply the spindles which will be installed in the space now occupied by the card room. The company is adding 6048 producing spindles and other equipment. This additional machinery will give 11,344 producing and 5,000 twister spindles.

The Prince Cotton Mill Company, of Laurinburg, N. C., will in near future build a 12,000 spindle mill.

The Efrd Manufacturing Co., of Albemarle, N. C., will in the near future erect a cotton mill, to be known as the No. 5. The machinery for this mill has already been ordered.

The Alexander City (Ala.) Cotton Mills will increase their equipment from 3,500 to 13,500 spindles, continuing the same production.

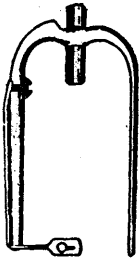
WITH ATLANTIC DYESTUFF CO.

Mr. C. C. Burt, of Newark, N. J., has joined the sales force of the Atlantic Dyestuff Company as assistant to G. R. Stoettner, Vice-President, in charge of its New York office. Mr. Burt has had a number of years' experience in the sale of dyestuffs, and will represent the Atlantic Company in New York City and the outlying territory.

Mr. Chester Hartley has joined the sales force of the Atlantic Dyestuff Company, and will make his headquarters at their Boston office. Mr. Hartley is of the third generation of a family intimately connected with the sale and use of dyestuffs in New England, and makes a valuable addition to the sales force of the Atlantic Company.

KEEP THE STAIRWAYS CLEAN.

One of the chief hiding places for dirt in factory buildings is in the corners of stairways. It is very hard for a person sweeping with a broom or mop to remove all the dirt in the corners and the accumulation of dirt provides a breeding place for bacteria. Corners are usually dark and more or less shaded and it is sometimes impossible to see whether or not there is dirt there. One step that is sometimes taken to aid in keeping these corners free of dirt is to paint the corners in white. This at once shown up the presence of any foreign matter and it is much easier for the sweeper to see that the corner is clean. It costs very little in labor and paint to produce this sanitary improvement. Dirt then has little chance to hide.



**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, Overhulers and Repairers of Cotton Mill Machinery

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

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

ALSO, IMPULSE WATER WHEELS.

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ROME, GEORGIA

**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, Baking, Packing Hoses, etc. Cast every day. One hundred machines and good men ready to do your work quick.

**E. L. & Fred Sheridan**  
**CONTRACTORS**  
Overhauling, Spinning, Twisting and Fly Frames  
**WINDER, GEORGIA**

The Spindale (N. C.) Mills, manufacturers of fine yarns, are erecting a 100-foot addition to their plant. They are adding about 1,160 spindles to their equipment.

# TEXTILES

## COTTON CLOTHS.

(Reported by Louis Lowinson, cotton goods broker, 72 Leonard Street, New York.)

80/80 39" 4.00 plain cloths	24
72/76 39 4.25 "	20
68/72 39 4.75 "	19
64/64 38½ 5.15 "	15½
64/60 38½ 5.35 "	14¾
64/56 38½ 5.50 "	14¾
60/52 38½ 6.00 "	13½
60/48 38½ 6.25 "	13
64/60 27 7.60 "	10
48/48 37" 4.00 Sheetings	16
56/60 36 4.00 "	17½
48/40 36 5.50 "	12
48/48 40 2.85 "	22
30" 3.25 Drills	21
30 3.00 "	22
37 3.50 "	19
37 3.95 "	17½
88/80 40" 8.50 plain comb.	27
76/82 40 9.00 "	20
96/92 40 7.50 "	29
64/112 39 4.00 sateens	27
64/104 39 4.20 "	26

## RAW COTTON.

Middling, August 28 ..... 32.10

## COTTON YARNS.

### EASTERN COMBED PEELER

10s	79-81
16s	81-82
20s	86-88
30s	1.03
40s	1.15-1.25

### CARDED PEELER

10s	65-66
16s	68
20s	70
26s	75-76
30s	78
40s	1.03-1.05

### MERCERIZED

2/40s	1.05-1.08
2/50s	1.20-1.40
2/60s	1.28-1.30
2/70s	1.50-1.52

### SOUTHERN HOSIERY FRAME

10s	60
14s	61

### A Tape Belt for Universal Winders

We have perfected a cotton tape belt for driving Universal Winders. Also one for Camless Winders. We urge all users of these machines to write us for samples. We offer this with our full endorsement because exhaustive tests have satisfied us of its real merit.

BARBER MFG. CO

Spinning Tape Specialists,  
LOWELL, MASS.

## DANA WARP MILLS

Westbrook, Me.

## Cotton Yarns and Warps

WHITE and COLORED

## HOSIERY BOARDS

QUALITY AND SERVICE

JOS. T. PEARSON

1825 E. Boston Ave., Philadelphia, Pa.

20s	66-67
24s	68-69
30s	72-75
2/20s	41-43
2/10s	45-46

## WARPS

2/10s	62-63
2/20s	73-75
2/24s	80-82
2/30s	92-95

## DOMESTIC WOOL

Ohio and Pennsylvania Fleeces

Delaine washed	88-90
Fine unmerchantable delaine	86-87
XX	71-72
Delaine unwashed	82-86
Fine unwashed	68-70
½ blood combing	80-81
¾ blood combing	70
¼ blood combing	68-69
½, ¾, ¼, blood clothing	59-69
Common and braid	45-47

## Southern Fleeces

Lake mediums	60-62
Georgia mediums	62-64
Virginia, Kentucky and Similar	

½ blood unwashed	81-82
¾ blood unwashed	73-75
¼ blood unwashed	70-72
Common and braid	45-46

## SCOURED BASIS

Texas

Fine 12 months	1.65-1.75
Fine 8 months	1.38-1.40
Fine fall	1.15-1.20

California

Northern	1.60-1.65
Middle County	1.40-1.50
Southern	1.30-1.35
Fall free	1.10-1.15
Fall defective	1.00-1.05

Oregon

Eastern No. 1 staple	1.80-1.85
Eastern clothing	1.50-1.55
Valley No. 1	1.65-1.70
Valley No. 2	1.35
Valley No. 3	1.05-1.15

Territory

Fine staple	1.85-1.90
½ blood combing	1.75-1.80
¾ blood combing	1.35-1.40
¼ blood combing	1.10-1.15
Common and braid	70-75
Fine clothing	1.50-1.60
Fine medium clothing	1.40-1.50

Pulled

AA	1.65-1.70
Extra	1.75-1.80

A supers	1.55-1.60
B supers	1.20-1.30
C supers	85-95
Fine combing	1.40-1.45
Medium combing	1.30-1.35
Coarse combing	1.00-1.05
California, finest	1.35-1.40
California, second	1.10-1.15

## FOREIGN WOOL

### SCOURED BASIS

Australian

Classes I and II

Sydney 80s clothing	2.30-2.40
Sydney 70s average	2.25-2.30
Sydney 64s average	2.00-2.10
Geelong 74s	2.30-2.40
Geelong 64s	2.10-2.20
Geelong 60s	1.95-2.00

### SCOURED BASIS

Cape

12 months	1.65-1.70
Short combing	1.40-1.50
Clothing	1.25-1.30

### SCOURED BASIS

\*New Zealand

Crossbreds

36s to 40s	75-80
40s to 44s	85-90
46s	1.00-1.05
46s to 48s	1.05
50s	1.10
56s	1.25-1.30
58s	1.70-1.75

## WORSTED YARNS

### BRADFORD SPUN

2/20s ¼ blood	2.20
2/30s ¼ blood	2.00
2/32s ¾ blood	2.10-2.20
2/36s ¾ blood	2.85-3.10
2/40s ½ blood	3.75

### FRENCH SPUN

1/20s ¼ blood	2.05-2.15
1/20s ¾ blood	2.25-2.30
1/30s ¾ blood	3.30-3.50
1/30s ½ blood	3.00
1/50s-64s	Nominal
2/40s ½ blood	Nominal

J. R. Tolar  
J. H. Hart

J. R. Tolar, Jr.  
P. G. Hart

## TOLAR & HART

### Cotton Yarn and Cotton

Members of New York Cotton Exchange

322 Chestnut Street, PHILADELPHIA, PA.  
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## WILLIAM WHITMAN CO., INC.

### YARNS

A wide and complete range suitable for all requirements

Boston New York Phila. Chicago

## J. B. Jamieson

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### COTTON YARNS

of all descriptions  
Correspondence Solicited

## United States Conditioning & Testing Co.

340 Hudson Street 220 Edison Street  
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Cotton, Wool and Silk Conditioning,  
Fabric Testing and Chemical Analysis

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Cotton Waste, Cotton Cloth, Cotton Yarns

Cheese Cloth Remnants  
New Mill Ends

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## Fred Sternberg & Co.

530 BROADWAY, NEW YORK

MERCERIZED } COTTON YARNS  
GASSED }  
HARNES TWINES

## HUGHES FAWCETT

115 and 117 Franklin St., New York  
Linen Weaving and Knitting Yarns  
Linen Jacquard Harness Twines  
And Linen Yarns and Threads for  
Every Purpose

### Turkey Red Yarns

Large Stock Prompt Deliveries

2/50s 1/2 blood .....	Nominal
2/70s Australian .....	Nominal
FRENCH SPUN MERINO	
2/40s 1/2 blood .....	3.10-3.15
1/40-50-50 .....	1.90-2.00
1/40-70-30 .....	2.20-2.40
1/40-80-20 .....	2.35-2.45

**OLD WOOLEN RAGS.**  
**GOVERNMENT MAXIMUM**

Merinos	
Fine	35-36
Coarse light	20-21
Fine dark	20-21
Coarse dark	14-14 1/2
Fine black	18-19
Serges	
Light	28-30
Brown	42-46
Blue	42-46
Black	42-46
Red	42-46
Green	42-46
Flannels	
White (Fine)	55-60
Red	37-38
Blue	38-40
Knit	
White	48-49
Blue	23-24
Black trimmed	33-34
Red	24-25
Brown	30-32
Light gray	17-18
Light hoods	36-37
Mixed hoods	18-19
Silver gray	32-34
Skirted worsteds	
Light	20-21
Black	26-27
Blue	23-24
Dark	16-16 1/2
Brown	19-19 1/2
Skirted cloth	
Fine light	14-16
Light	20-21
Blue	8-8 1/2
Dark	6 1/2-7
Plain black	7 1/2-8 1/2
Skirted, tan cloth	24-25

The Cleveland (Ohio) Worsted Mill Co. are making extensive addition to their various plants.

The Renfrew (Ont., Canada) Woolen Mills have been awarded a contract for the erection of an addition to their plant, which is to be used for an office, a warehouse and a lunch room for operatives.

The Guelph (Ont., Canada) Carpet & Worsted Spinning Mills are about to start the erection of a mill and dye-house.

The New England Woolen Yarn Company of Clinton, Mass., have recently increased its production by installing additional mules and winders.

The firm of Bernsterin Brothers, New York, which recently bought the Mayo Woolen Company Mills at Branmanville, is planning an addition to the Mayo plant.

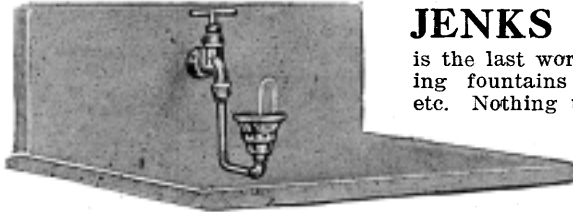
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**New Woolen and Cotton Clippings**  
AND ALL KINDS OF REMNANTS

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New Cotton Department, 757-759 W. Taylor St. } **CHICAGO, ILL.**

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Established 1870 Incorporated 1911

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ALL SIZES FOR ALL PURPOSES  
LARGEST LINE BUILT IN U.S.A.  
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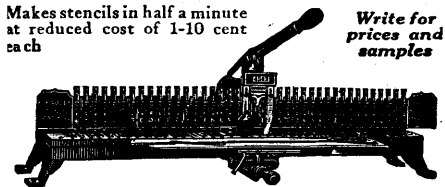
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Mich.  
Philadelphia Drying Machinery  
Co., Philadelphia, Pa.  
Smith & Furbush Machine Co.,  
Philadelphia, Pa.

## Ball Winding Machinery

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idence, R. I.

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Pawtucket, R. I.

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Philadelphia Drying Machinery  
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Pittston, Pa.

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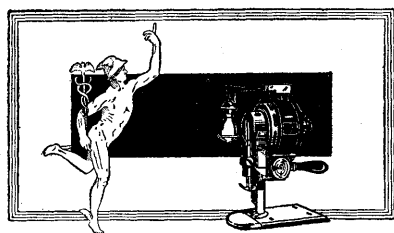
Litchfield Shuttle Co., South-  
bridge, Mass.

## Shuttles

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bridge, Mass.

Shambow Shuttle Co., Woon-  
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(Continued on following page)



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Ancient and Modern

## Speed and Endurance

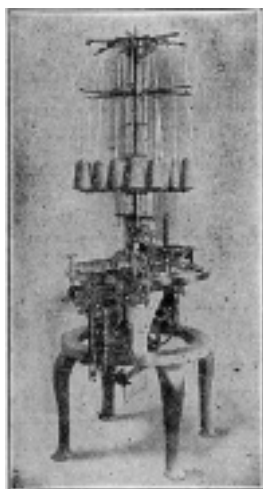
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NEW ORLEANS, Godchaux Bldg.	HAMILTON, ONTARIO, 5 Sun Life Bldg.	



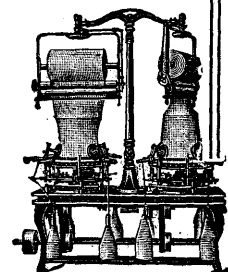
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Fleece-Lined Fabrics	Sweaters with rack stitch, stripes and selvage edge
Jersey Cloth	

**TOMPKINS BROS. CO.,** 583 South Clinton St.  
ESTABLISHED 1846 SYRACUSE, N. Y.



Spring Needle Machine

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Fawcett, Hughes, New York.

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

**Singeing Machines**  
Philadelphia Drying Machinery  
Co., Philadelphia.

**Soaps**  
Chemical Research Co., Den-  
ver, Col.  
Electric Smelting and Alumi-  
num Co., Lockport, N. Y.  
Original Bradford Soap Works,  
Providence, R. I.  
Warren Soap Mfg. Co., The,  
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.

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

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

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

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

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

**Testing Apparatus**  
Scott, Henry L. & Co., Prov-  
idence, R. I.

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

**Woolen and Worsted Machinery**  
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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.**  
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Mindlin & Rosenman, New  
York.

**Cotton Yarn**  
Dana Warp Mills, Westbrook,  
Me.  
Jamieson, James B., Boston.  
Mindlin & Rosenman, New  
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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  
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**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**  
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Mindlin & Rosenman, New  
York.  
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York.

**Worsted Yarns**  
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York.  
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In Writing Advertisers Kindly Mention "Textiles"



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