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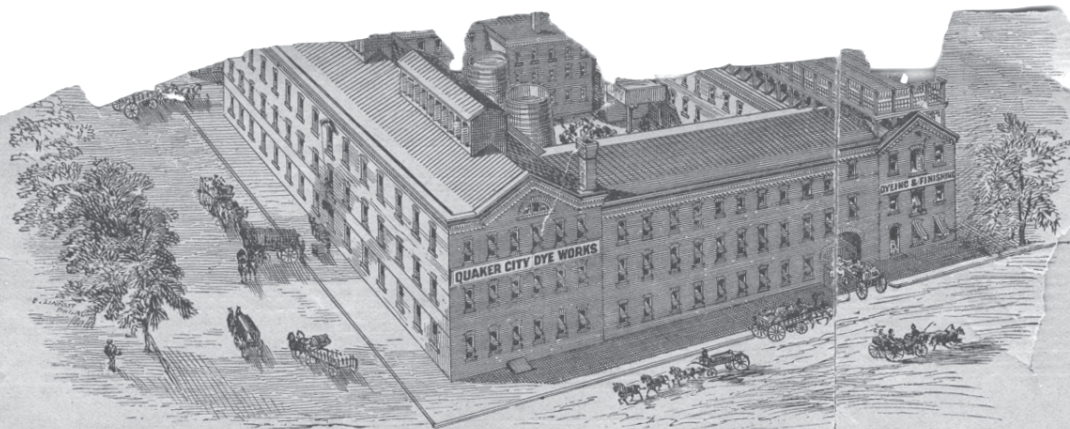
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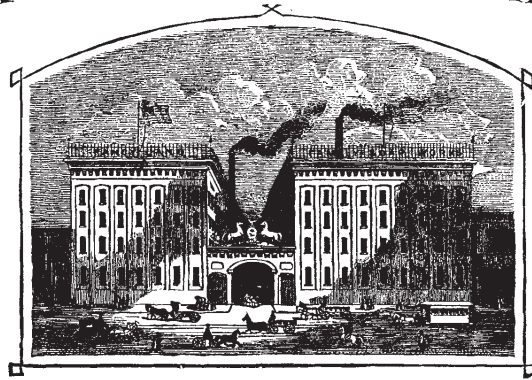
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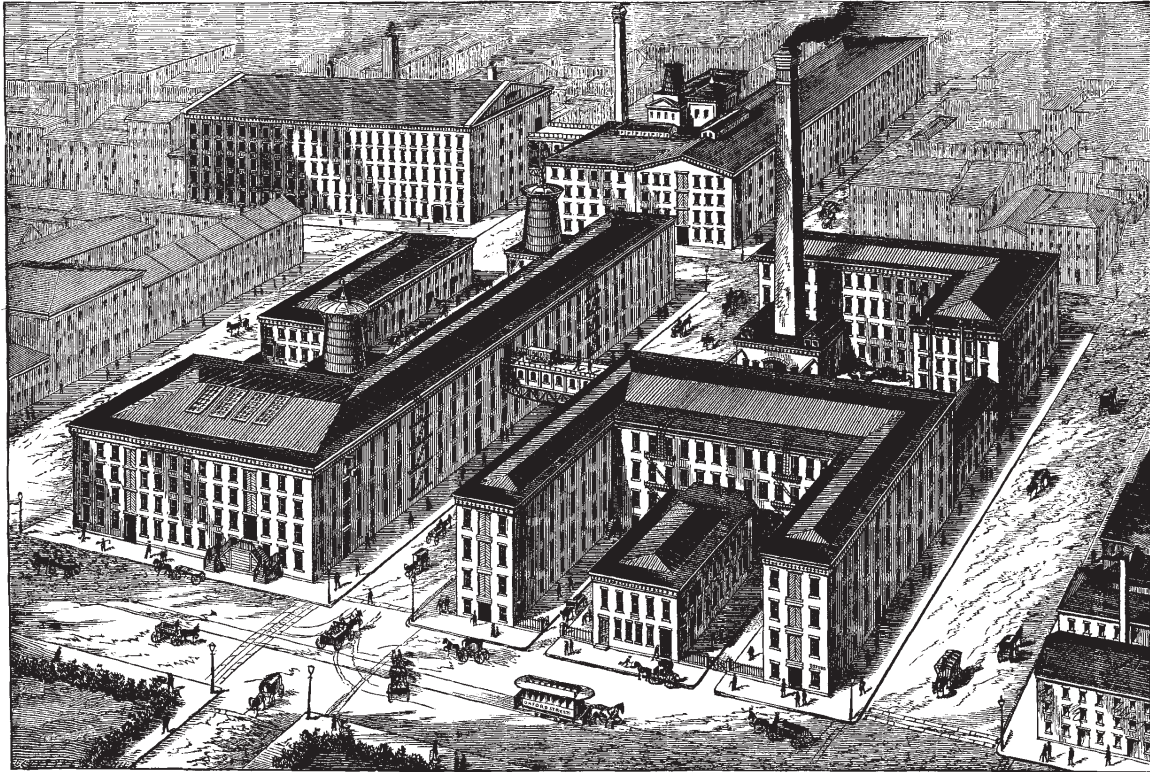
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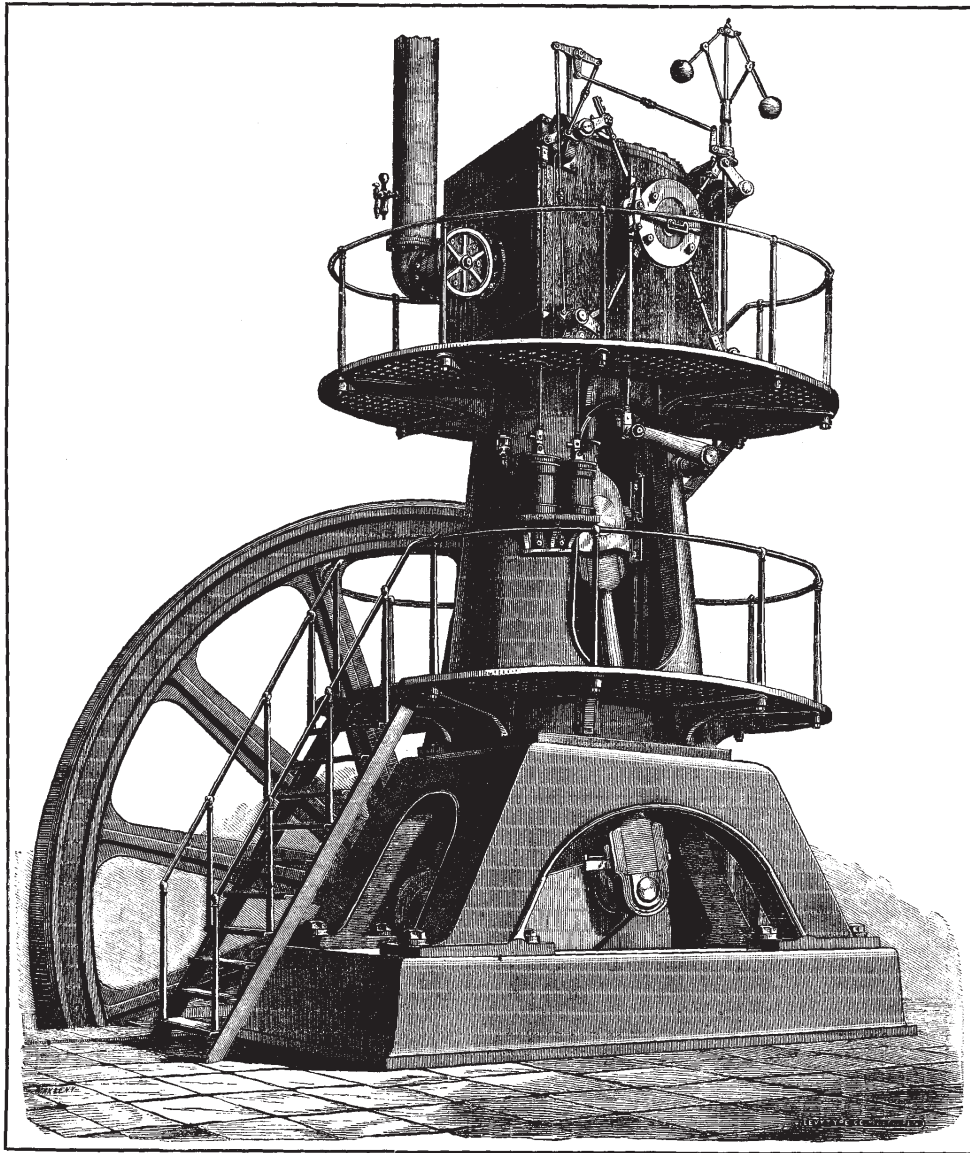
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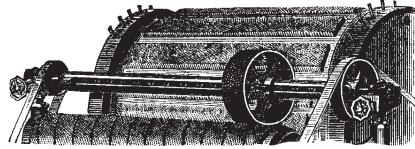
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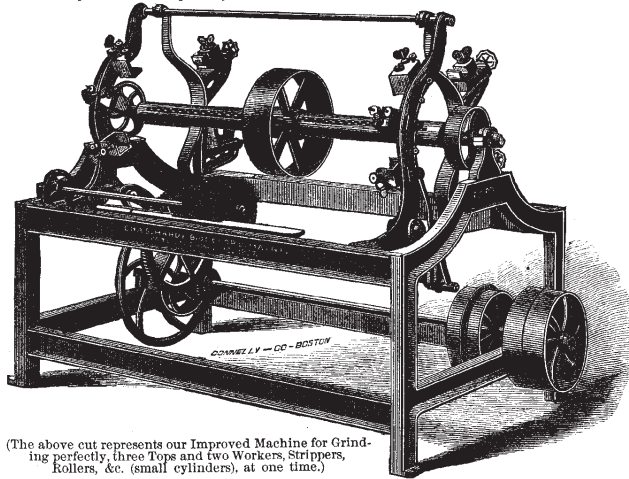
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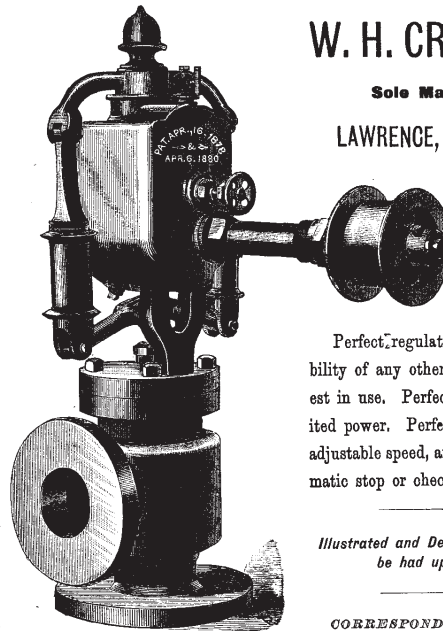
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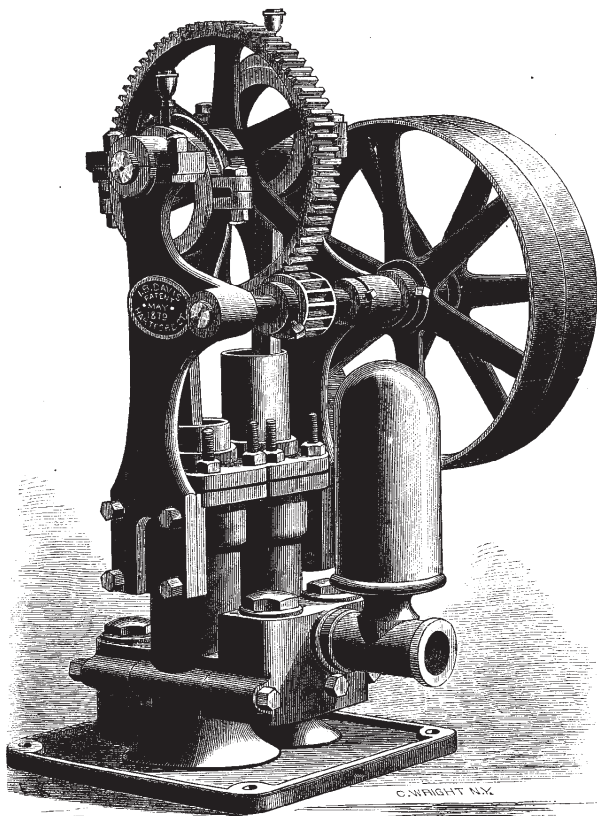
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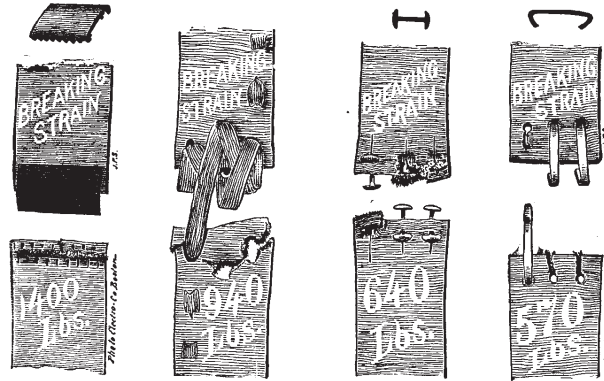
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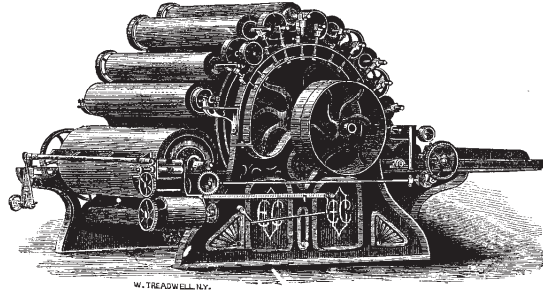
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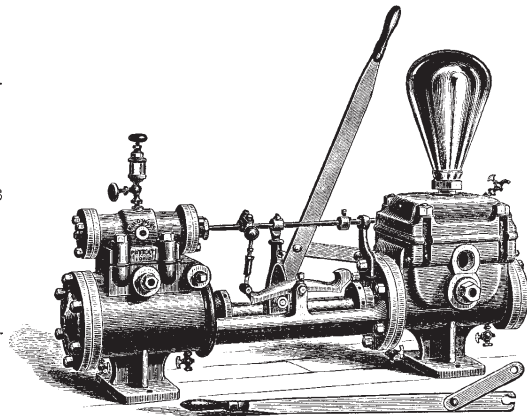
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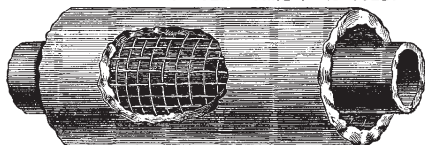
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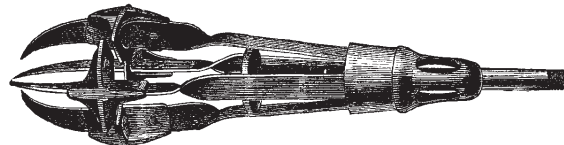
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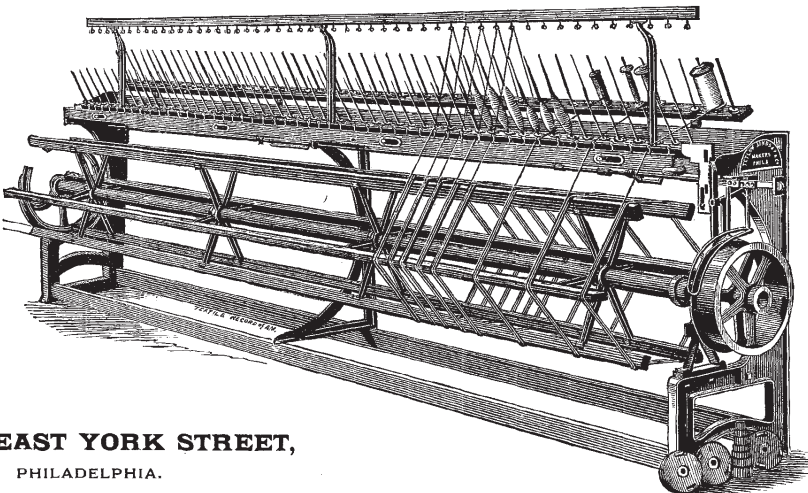


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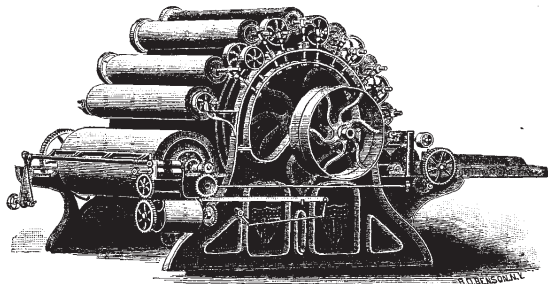
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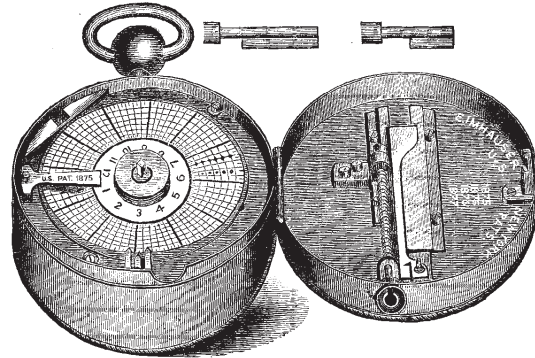
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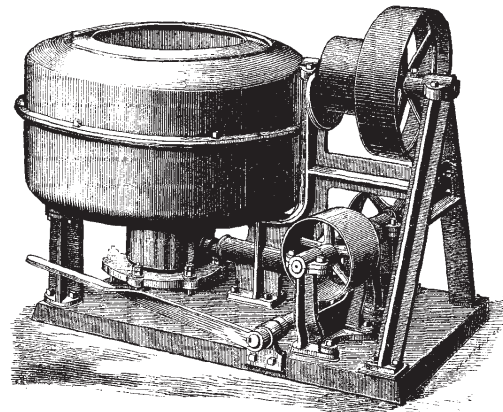
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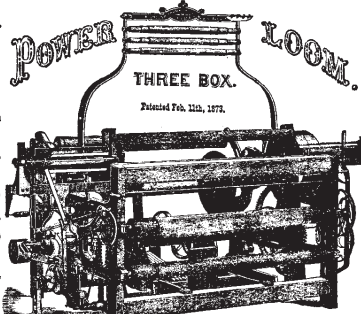
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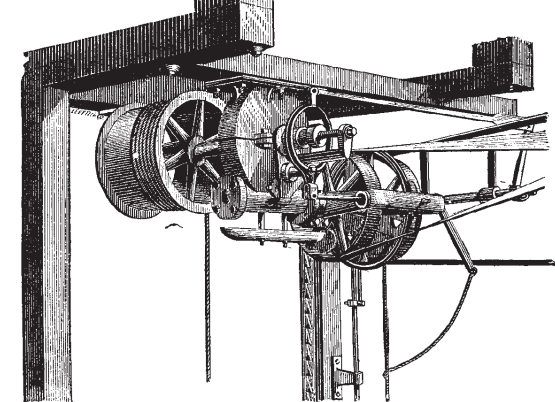
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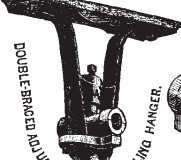
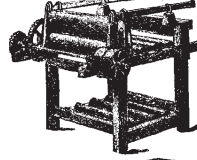
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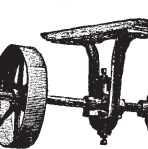
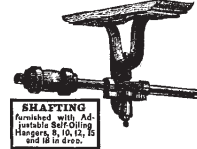
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Adjustable Self-Oiling Foot Hanger, 6 inches from post to center of shaft.



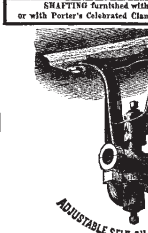
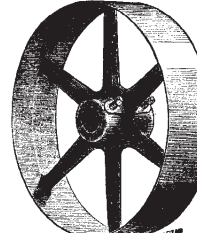
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SHAFTING furnished with Adjustable Self-Oiling Hangers, 8, 10, 12, 15 and 18 in. drop.

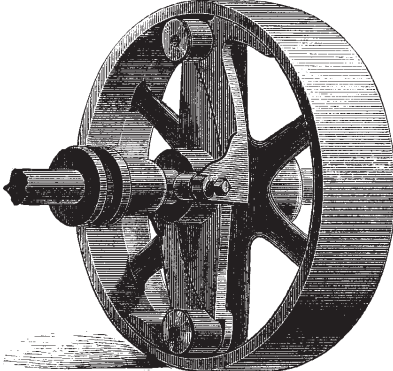
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WARPING MILLS,
16, 18, and 20 yards circumference, with improved Hecks of any number of eyes required.

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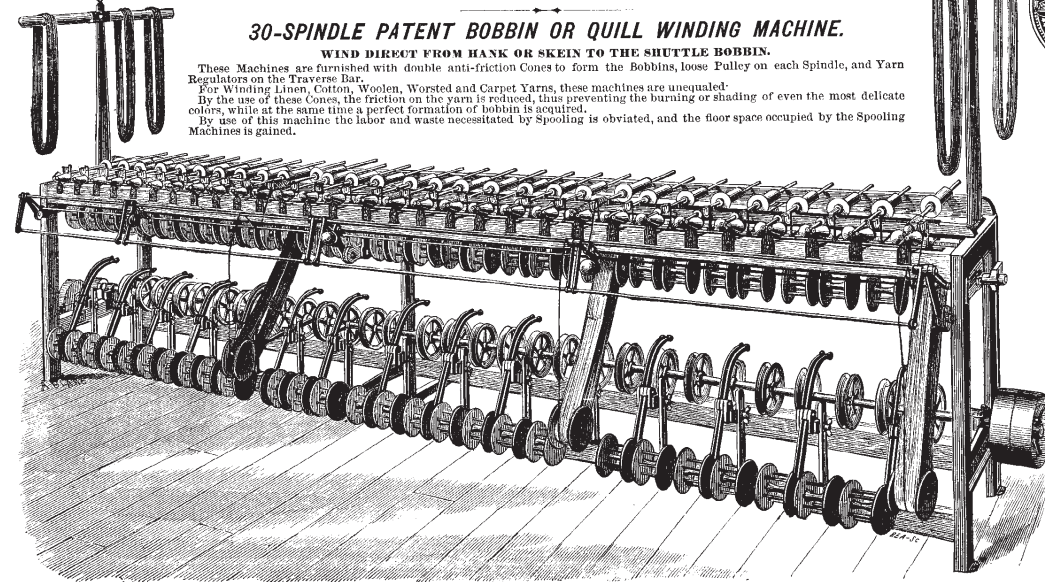
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WIND DIRECT FROM HANK OR SKEIN TO THE SHUTTLE BOBBIN.

These Machines are furnished with double anti-friction Cones to form the Bobbins, loose Pulley on each Spindle, and Yarn Regulators on the Traverser Bar.
For Winding Linen, Cotton, Woolen, Worsted and Carpet Yarns, these machines are unequalled. By the use of these Cones, the friction on the yarn is reduced, thus preventing the burning or shading of even the most delicate colors, while at the same time a perfect formation of bobbin is acquired.
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EXHIBITED, THOS. WOOD, PHILADELPHIA, PA., U. S. A.
The undersigned, having examined the product herein specified, respectively, and in view of the numerous awards granted to the United States Centennial Commission for articles, for the following reasons, viz.:—
For excellent construction, numerous features of novelty, simplicity, and utility, facility for working, economy of material, and the superior quality of the goods produced.
A true copy of the record, signed and attested by me.
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WILLIAM A. HILL, Secy.
Given by authority of the United States Centennial Commission.
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MANUFACTURING COMPANY,

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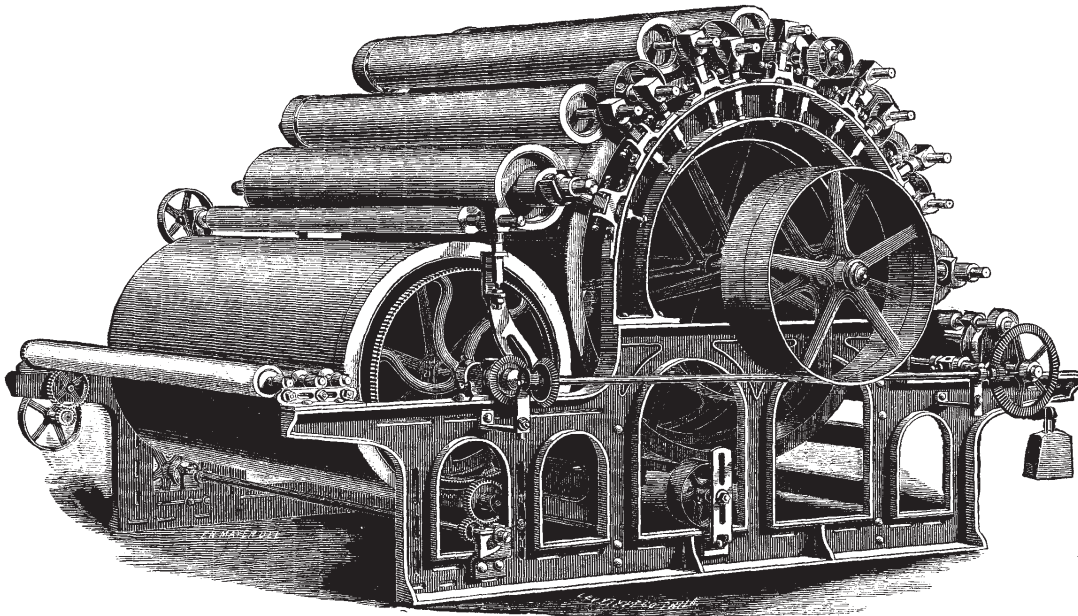
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MAKERS OF TEXTILE MACHINERY,

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Class F.—Drum Spool Winder with patent stop motion for winding 2 or more ply for medium or fine counts—all fibres. Each bobbin stops whenever an end breaks or fails, leaving 18 in. off bobbin for piecing.

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Class G.—Cop Winder—winds solid cops for weaving or for other purposes. Why use Pirns for heavy yarns, when 3 to 4 times as much yarn can be got into the shuttle in Cop form?

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Class I.—Drum Spool Winder—two tiers Drums and four tiers Bobbin-Holders for single winding, clearing, &c., from Cop or Bobbin. Why use

upright Spindle Winders which only wind at maximum speed when Bobbins are full?

Class K.—Gassing Machine. Improved construction.

Class L.—Stop Motion Twisting Frame with patent stop motion, to wind and twist in one operation any number of strands on to Bobbins 6 in. by 3½ in. or 5 in. by 3 in., with 8 twists to any higher number per yard. Each spindle and feed-roller stops instantly when any end of a set breaks or fails. Saves waste and bunch-knots.

Class M.—Drum Winder to wind on to parallel Pins or Paper Tubes—conical at both ends.

Class N.—Stop Motion Reel, made to do all sorts of reeling from Cops or Bobbins, to stop when any end breaks or fails, and also when the swift has made any required number of revolutions from 4 or 5 to 1600.

Class O.—Stop Motion Twisting Frame, more suitable for very light work than class L.—with new Spindle Detector—no Detector eyes to thread—stops individual feed-roller or feed-roller and spindle when any end breaks or fails.

Class P.—Patent Automatic Balling Machine, positive in all its motions, for Silk, Wool, Cotton, Linen, and Twines.

Also Centre Selvage Motion for weaving two pieces in one width. Thousands of these in use.

Adjustable Clearers, simple and reliable, for removing imperfections in yarn.

Compensator, an apparatus for holding Bobbins to be unwound at high speeds. Works with the least possible tension on yarns and at same time prevents overrunning.

Trap for Twist Frames.

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The Boyd Patent Machines referred to in this Catalogue are the subjects of various letters patent granted to J. & T. Boyd, Glasgow, Scotland, for Great Britain, the United States of America, France, Germany, and other countries.

These Machines (at present being rapidly adopted by many of the largest mill proprietors in the United States) are in daily use in upwards of 500 Factories in Great Britain and elsewhere. They are each designed in the minutest points with the greatest care and further perfected after years of practical work; are made of the very best materials, finished by special tools of the most modern kind, insuring the greatest accuracy. They are

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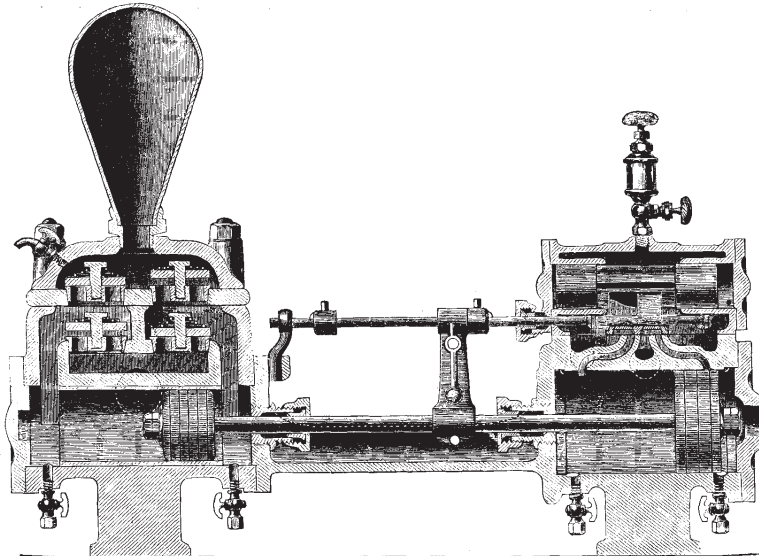
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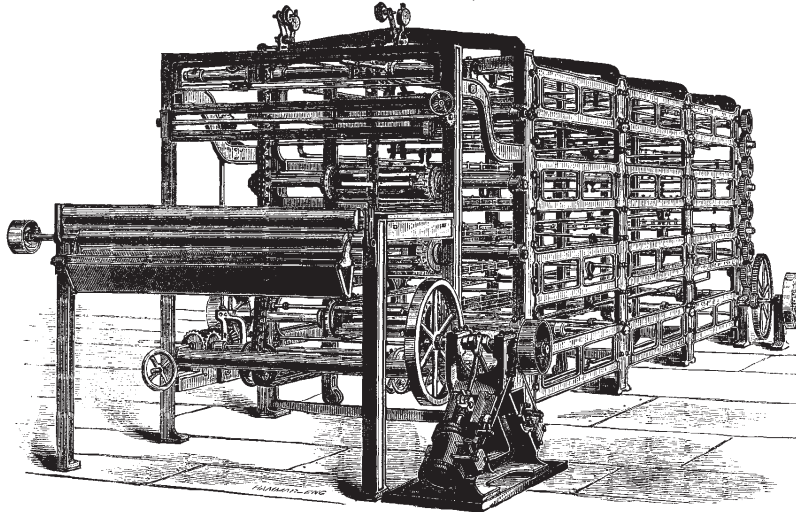
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which are objection-
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THE COTTON

OF AMERICA

Devoted to the Manufacture and Distribution of all Woven Fabrics: Cotton, Wool, Silk, and Flax Culture, &c.

VOL. I.

PHILADELPHIA, DECEMBER, 1880.

No. 4.

MANIPULATION OF THE COTTON FIBRE.

THE MODEL COTTON MILL.

(First Article.)

EVERY language has its alphabet, every science its first principles, every study its primer lessons. The student must begin at the beginning if a thorough mastery of any subject is contemplated. If "there is no royal road to learning," there is none through the difficult preliminary departments of any science, trade, or occupation. Trite as these remarks may seem, it is a necessity that they be again and again pressed upon the mind's attention. Day after day the pitiful sight is presented of failure and distress resulting from not heeding these simple truths.

We commend these texts to the studious attention of our Southern brethren, for whose benefit this article is presented. The natural home of the cotton plant being in the South, and there being a growing interest in that section as to its manipulation and manufacture into yarns and the coarser textiles, some gen-

when the cotton is ready baled for market. This is what may now be termed the *old process*.

To convert baled cotton into yarn and thence into goods requires the use of certain machines which are calculated to operate upon the fibre in such a manner that each successive stage shall most directly tend to this object. These machines are known by various names, bear a certain fixed relation to each other as

"mixing" is simply a judicious hand assortment and combination of different grades as to quality of staple. After the "mixing," the cotton fibre so "mixed" is ready for the machinery.

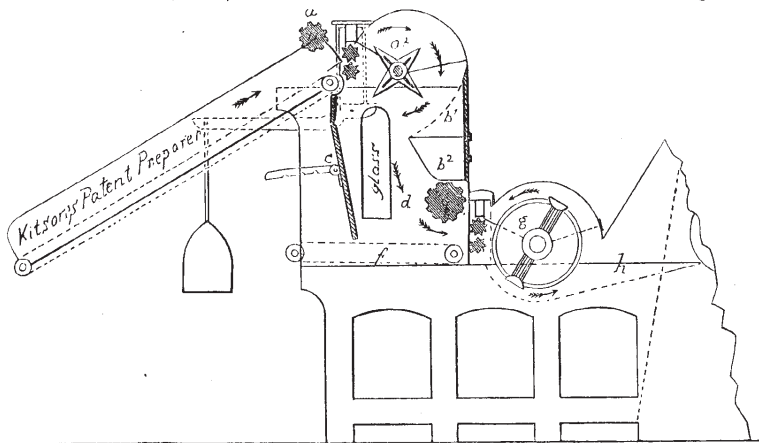
Without attempting to advocate or condemn any of the mechanisms used for the purpose, we content ourselves with naming a number of the more prominent machines in general use and briefly describing their operation.

The cotton opener as built by the Bridesburg Manufacturing Company, Philadelphia, with trough or trunk for conveying the lint to the lint room, is a machine with a feed-board, feed-rolls, and cylinder, the design of which is to open the cotton, clean the fibre, and convey the lint to a distant room called the lint-room, or direct to the machine designed for the next operation.

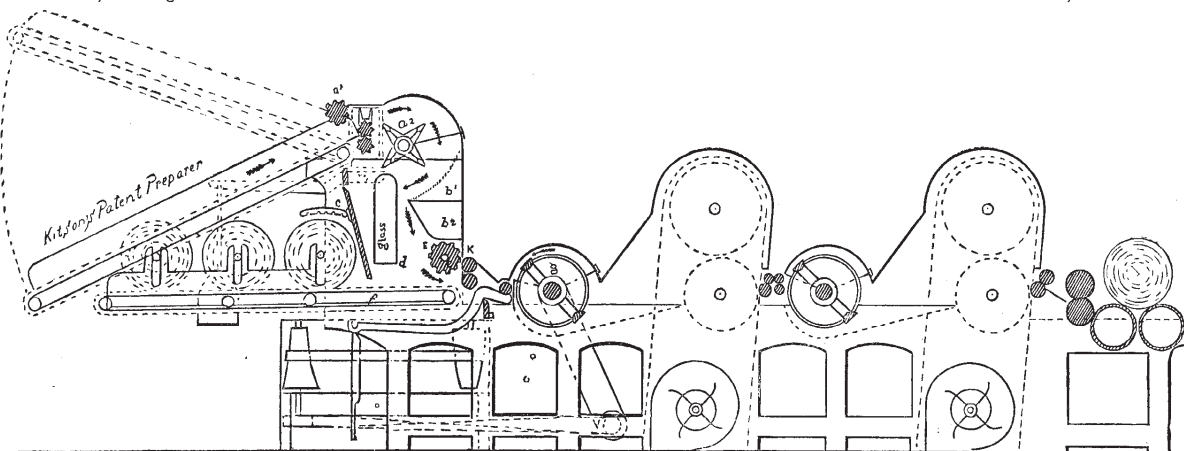
The Kitson opener, built by the Kitson Machine Company, of Lowell, Mass.

The Kitson preparer.

The Whitehead & Atherton compound opener, lapper, or simple opener, built by Messrs. Whitehead & Atherton, also of Lowell, Mass.



THE KITSON OPENER.



THE FINISHER LAPPER.

eralizations in the way of primer lessons will, we feel sure, meet with favor at the hands of those who are in need of such.

Leaving untouched the subjects of planting, growing, harvesting, and ginning the cotton crop, with all of which the average Southerner is generally familiar, we will treat at once with the operations beginning

to capacity, and are more or less qualified to perform their several duties.

PICKER-HOUSE MACHINERY.

The first stage in manufacturing cotton yarn is the "opening" or "pickering." After the bales are opened in the picker-house a "mixing" is made. This

The Crighton opener, an English machine, and the English willow, are some of the means used for the purpose above mentioned.

The capacity of these machines varies from one thousand to three thousand pounds of cotton per day of ten hours.

The breaker lapper is a machine for still further

opening and cleaning the cotton and for the additional purpose of forming a roll or "lap." The cotton after passing through this machine, being thoroughly whipped or beaten by revolving blades, is delivered in a continuous sheet and rolled into a "lap" at the other end. These laps are made for convenience of handling and for the better adaptation for subsequent operations.

The finisher lapper is a machine designed for the purposes as above described and to properly "finish" the operation of picking.

The Kitson, the Whitehead & Atherton, the Whitin, the Lowell, the Lord, and a number of English machines, are widely in use for this purpose.

The second stage is the "carding."

CARD-ROOM MACHINERY.

The carding engine is a machine designed to "card" or comb out the fibre, still further clean the staple of leaf-trash, and deliver a clean, clear, regular, and thin film of "sliver."

For this purpose a variety of carding engines are in use and must be selected with careful judgment for work they are intended to perform. These machines are called "roller" or "flat" cards as they are built with revolving cylinders called "workers" and "strippers," or with parallel bars of wood or iron to which the card wire is attached and called "flats."

"Roller carding" has been termed the English system, while "flat carding" is called the American system. According to New England ideas the roller card is not adapted to do good work for fine numbers or where very clean carding is a necessity. The production in pounds per day of the roller card is, however, greatly in excess of the flat card, and for coarse yarns, this card is still used to a very large extent.

The ordinary Wellman top flat card, with the self-stripping device, is probably more generally used than any other style, but the recent introduction of what is known as the Foss & Pevey under-flat card has to some extent displaced the top flat. Besides those above mentioned, there is what is known as a combination card, in which the principles of the roller and flat are combined; there is also an English card known as the revolving flat card. The productive capacity of these several cards varies greatly, for the same weight of "sliver"; that of the Wellman top flat being the smallest, and that of the full English roller card being the greatest. The floor space required by the various engines differs for each style, and frequently for the same style built by different manufacturers. Following the English custom, some of the above cards deliver the carded cotton directly into cans at the "doffer" end of the machines; others deliver into a "railway trough" or "box." These "troughs" or "boxes" are sometimes made double for one-half the number of cards in a "section." A "section" may consist of any number of cards standing side by side; the number varying as to the coarse-

ness or fineness of the "numbers" of yarn to be spun. The ordinary number is from ten to fifteen. The usual plan where a "trough" is used is to convey the sliver by means of an endless belt to a machine known as the "railway head," but where a double trough is used two of these "heads" must be employed.

ready for the next operation. It is furnished with a delicate evening device to equalize or even the "sliver" as to bulk and weight.

The Bridesburg Manufacturing Company, who have kindly furnished the cuts accompanying this article, build the "Keystone" or English card, the "Clipper" or ordinary roller card, the thirty-six-inch iron cylinder and iron worker and stripper card covered in with an iron casing and known as the "Hopper" card, the ordinary Wellman top flat card, and the Foss & Pevey card. They also build a very complete and efficient railway head.

The third stage is the drawing and roving.

INTERMEDIATE MACHINERY.

The "sliver" must next undergo the process of "doubling" and "drawing." For this purpose the cans from the railway head are "put up" to a drawing frame and two or more "ends" are passed through proper guides to the drawing rolls and there attenuated, in accordance with certain rules well known among manufacturers, and again delivered into cans.

Drawing frames are built with or without "coilers." A coiler is a device for coiling or packing the "sliver" into the cans. They also are furnished with front and back stop motions.

The next step is to still further reduce the "sliver," which is accomplished by "putting-up" the cans from the drawing frame to what is called a "slubber." Two, three, or more ends are here delivered and drawn as before, and the "sliver," now called "slabbing," slightly twisted, is wound upon spools called "slubbing bobbins."

Still another step for the purpose as above is reached by placing these bobbins in the "creel" of what is known as a "fly frame." Where fine numbers are to be spun one or more machines are used, and these are then called "intermediates" and the machine used for the last process is then called a "roving" or "jack" frame.

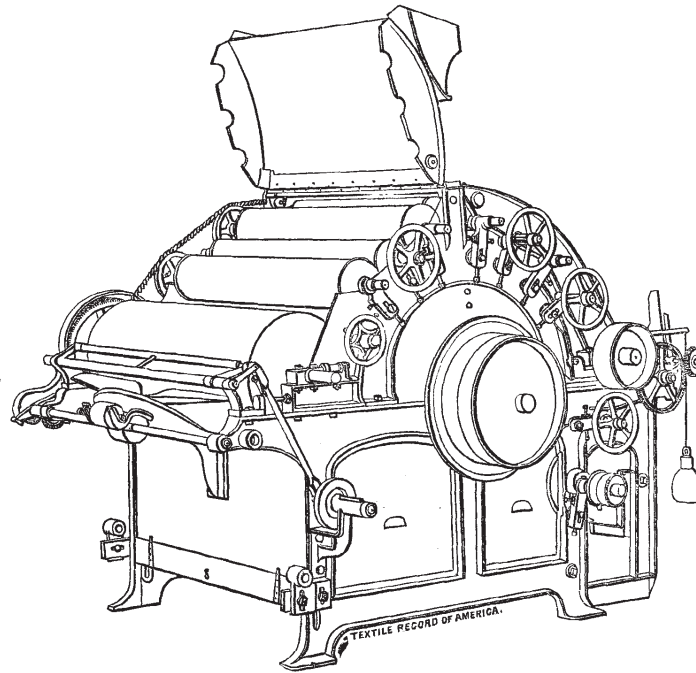
The "roving" is now ready to be spun into yarn, which is the fourth stage.

THE SPINNING-ROOM MACHINERY.

There are three methods in general use for converting "roving" into thread or yarn. One is by the use of the "self-acting cotton mule," another of the "flyer" or "throstle" frame, and a third of the "ring" frame. The "ring" frame as now built has so many advantages over the other methods that it seems destined to supersede them entirely.

There are a number of mules more or less favorably known to manufacturers. Among them we name the following:—The Pan, Curtis, the Platt, and the Tatham, of English manufacture, and the Mason mule, of America.

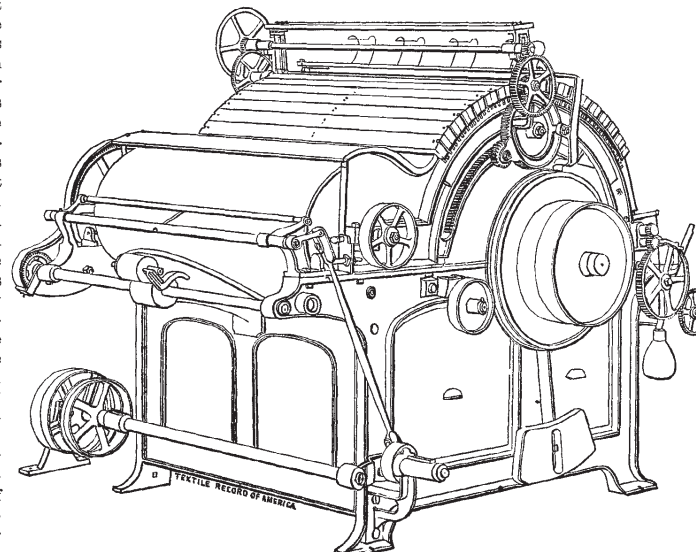
The flyer-frames are now almost obsolete, and we believe no new ones are being built. The reason for this lies not in the inefficiency of the mechanism but in the expense of its operation. The use of



THE CARDING ENGINE.

For fine numbers of yarn two sections of cards are used before passing to the railway head. This is called "double-carding." The lap from the first or breaker card is put up to the second or finisher card. The object of this is to give cleaner cotton.

The railway head is a machine designed to condense the card "sliver" and deliver it into a can



THE TOP FLAT CARD.

the flyer requiring a two-headed bobbin necessitated re-winding, which added to the expense of manufacture. This is now dispensed with by spinning upon ring frames and direct upon filling or warp bobbins as the traverse used may be arranged.

The American ring spinning frame, as at present built, is a triumph of skill, and its various motions and the necessities of the art have stimulated invention to a large extent, and almost every point of excellence or assumed excellence is covered by letters patent. In spindles alone we find the "Garsed" or "Excelsior," which is the invention of one of Philadelphia's prominent men and manufacturers, and is built exclusively by the Bridesburg Manufacturing Company, one of the largest shops in the country manufacturing textile machinery. Then we have the Sawyer, the Pearl, the Rabboth, the Birkenhead, the Carroll, the Pusey, the Perry, and the Mason.

From this counter full of goods must the purchaser make his selection, and the motto, "No trouble to show goods," holds as well with the machine-builders as it does with the sellers of the product of the loom.

The roving from the fly frame is, in this next process, set up in the creel of the spinning frame, and here the final operation of spinning is performed. The principles of draught and twist which have entered into the spinner's computations here culminate by drawing between the rolls in certain ratios proportionate to the numbers to be spun and putting in the twist required. If the yarn spun is for "filling" or "weft," and has been spun on a "filling" bobbin, this is the last process before weaving, if the goods are to be white, such as muslins, sheetings, shirtings, and the like; but if the yarn is to be sold in the hank or in the warp, other operations are necessary, which will be treated of in a subsequent article.

COTTON MANUFACTURE.

ADVANTAGES OF NEW ORLEANS FOR THE MANUFACTURE OF COTTON GOODS.

EDWARD ATKINSON'S expressed opinion that the South could not successfully engage in the manufacture of cotton goods, led to the appointment, by the New Orleans Chamber of Commerce, of a special committee "to inquire into and report upon the capacities of New Orleans for the manufacture of cotton goods." The committee consisted of W. M. Burwell, Adam Thompson, C. E. Girardey, Adolph Schreiber, and H. Dudley Coleman, who have reported at length. Regarding the industrial employment of all the inhabitants of a city as essential to its prosperity, they say:—

1. That the retardation of progress which has befallen New Orleans, in common with all other cities chiefly dependent on the factorage of annual crops, with the resale of commodities produced elsewhere, is due to changes in the modes of conducting internal and foreign commerce.

2. That, to recover her former rate of progress, it will be necessary for New Orleans to encourage the mixed industries of commerce and manufactures.

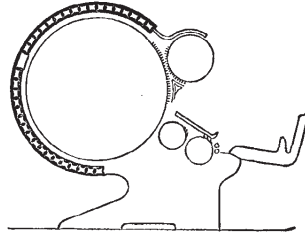
3. That, in adopting these mixed industries, New Orleans possesses peculiar advantages for manufacturing into cloths and yarns the great staple of cotton, of which she is admitted to be the principal market in the world.

In summarizing the advantages of New Orleans as a cotton manufacturing city, the gentlemen claim:—

1. That the staple of cotton offered in this market or in that of Texas, will grade thirty-four per cent. better for strength, length, and weight than any other cottons

for the manufacture of sheetings, shirtings, and yarns suitable for the warp of home-made cotton cloths.

2. That the stock of this cotton on hand in New Orleans is sufficient to enable the spinner to supply his wants for the greater part of the year without the cost of insurance and interest, the variation of price, or the speculation of futures.

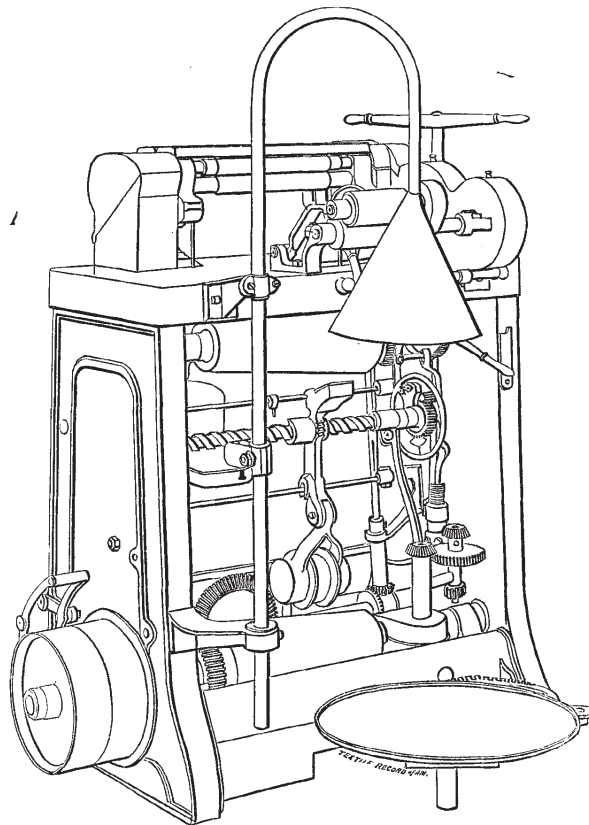


THE FOSS & PEVEY CARD.

3. That the average climatic temperature is perfectly adapted to the manufacture of textile goods.

4. That the elements of food, clothing, and rents, which constitute the cost of operative labor, are or may be furnished on as moderate terms as in any other part of the United States.

5. That operative labor capable of rapid instruction in cotton-spinning abounds in this city, and can be relied upon to work all the year round.



THE RAILWAY HEAD.

6. That motive-power can be supplied from coal at less than the average price paid by Eastern mills off the line of water delivery, and at rates that will justify the investment of capital in milling property.

7. That real estate convenient to water delivery of stock and fuel abounds in this city, in the midst of an operative population and at moderate prices.

8. That the revenue tax imposed by the United States upon imported cotton manufactures, with the exemption from State taxation upon buildings and machinery employed in the manufacture of cotton, tends to encourage such an investment.

9. That our machine-shops, with complete and modern machinery, demonstrate the ability of New Orleans to repair any part of a cotton mill, while the facilities of intercourse with the North will enable the cotton-spinner to renew or replace any disabled part of his machinery.

10. That the amount of tonnage employed in the exportation of our cotton will be greatly reduced by the compression of the raw cotton into yarns and cloths.

It is known that the industry of manufactures may be more readily adopted at present than formerly, owing to the fact that all fabrics are in great part the production of machine labor, the possession of which reduces the long time formerly required to educate a people to handwork productions. On the other hand, it must not be forgotten that the successful manufacture of cotton requires large capital and judicious management. Under the most favorable circumstances, a knowledge of stock and process, with the immediate adoption of all improvements which diminish the cost or improve the quality of the product. Cases are given where, in the most favored locations at the North, large sums have been sunk in cotton manufacture, while the occasional strikes and suspensions prove that this industry, even under the most favorable conditions, is not exempt from the obligations which attend all human enterprises. If, however, the same amount of energy and ability which produces 5,750,000 bales of cotton, and which conducts the sale and shipment, be applied to its manufacture, we may anticipate success. Confining ourselves, however, simply to the specific object of inquiry stated, your committee has respectfully to submit for the consideration of the chamber the following resolutions:—

WHEREAS, Changes in the channels of internal and international communication and the reduction of the legitimate profits upon trade in transit and merchandise on sale renders the subsistence of large aggregations of city population by these means slow and precarious: therefore,

Resolved, That the city of New Orleans should add to her resources of the factorage, purchase and sale of commodities, the manufacture of raw materials.

Resolved, That the inducements to the manufacture of cotton on the spot appears to this chamber sufficient to justify investment therein by any capitalist desiring safe and satisfactory returns, or by any property owner seeking the advancement of his own interest or the prosperity of the city.—*Boston Herald.*

WOOL AND ITS MANUFACTURE.

SINCE the foundation of the Australian and other colonial sheep husbandries, in 1791, the growth of the wool trade has been so great that it is almost impossible to keep pace with its statistics. The large wool produce of Europe has long been superseded by that of Australia and New Zealand, and other of the colonies, and yet the demand is increasing. England still stands at the head of the wool-manufacturing countries of the world, and her exports and imports of the raw material are far more than those of any other country, and from the very first the fluctuations of the wool trade have depended on her markets. The immense growth of this staple industry is shown in the fact that while the first importation of wool by England from Australia and New Zealand in

1814 was 33,000 lbs., in 1833 it was 7,837,000 lbs.; in 1869, 158,478,000 lbs., and in 1879 it had reached the enormous amount of 297,757,934 lbs. In the year 1870-71 England manufactured 330,000,000 lbs. of wool of all descriptions, while in 1878 the amount retained for manufacture was 428,000,000 lbs.

The census of 1871 showed that in England alone there were 227,840 persons of both sexes employed on the raw material, of whom 128,464 were engaged in the manufacture of woollen cloth, and 94,766 upon the manufacture of worsted. The remainder of these work-people were: wool staplers, 1964; dyers, 2606; dealers in wool and worsted, 400. Of the whole number of employees, 117,533 were women.

The following table will indicate the progress of the English woollen industry:—

	Imports, lbs.	Home grown, lbs.	Exports, Alpacas, &c., lbs.	Imported, lbs.
1841,	56,180,000	No report.	11,025,000	
1851,	83,311,000	"	22,303,000	5,400,000
1861,	144,067,000	"	70,040,000	6,441,000
1866,	235,741,000	"	78,201,000	8,010,000
1867,	230,224,000	"	99,692,000	6,127,000
1868,	250,829,000	165,549,735	114,577,000	8,882,000
1869,	255,161,000	155,591,696	128,099,000	9,786,000
1870,	425,254,706	149,576,973	131,784,000	
1879,		153,000,000	239,013,462	

The consumption of wool in England was—

1870,	{ 138,193,997 lbs. of British, 145,988,001 " Foreign and Colonial, 8,083,749 " Mohair,	} 292,955,057 lbs.
1879,	{ 137,058,244 " British, 181,941,244 " Foreign and Colonial, (including Mohair.)	

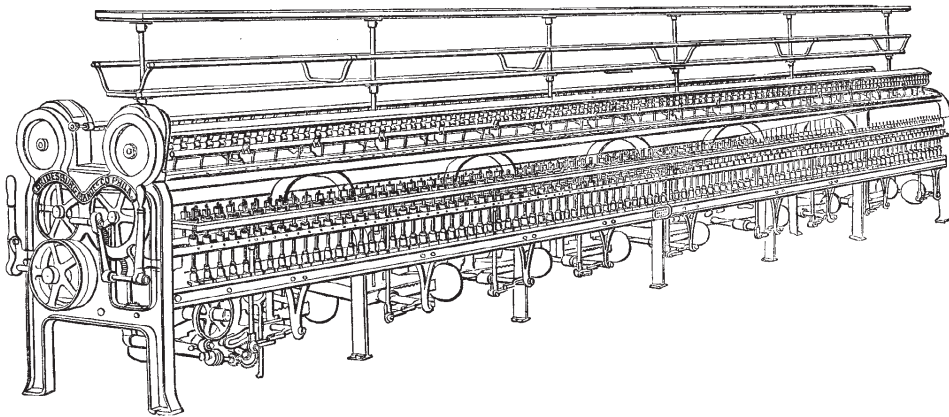
Hampshire in the Downs, and Staffordshire and Shropshire in the half-bred class. Previous to the year 1848 the long wool was of the least value, while short wool brought the most money in the market. But when the manufacture of worsted stuffs began, and wool was mixed with cotton, as now in the Bradford trade, long wool was found more suitable for the purpose. Short English wools were also diminished in value by the introduction of the softer Australian fleeces, better adapted to the manufacture of fine cloths. Fashion in worsted goods also inclined to the bright and lustrous wools, and it is owing to this that the Lincoln, Leicester, &c., have so greatly increased in value.

The following table shows the number of sheep and lambs in each country named for three years:—

	1877.	1878.	1879.
United Kingdom,	32,223,977	32,571,018	32,237,958
Queensland,	7,315,074	6,272,766	5,564,465
New South Wales,	24,503,388	20,962,244	24,967,053
Victoria,	11,278,893	10,111,267	9,379,276
South Australia,	6,133,291	6,098,369	6,377,812
New Zealand,	12,806,000	13,069,308	13,069,838
Western Australia,	893,494	797,156	869,325
Tasmania,	1,768,785	1,818,125	1,838,831

Other countries stand in the following order: 1. Russia. 2. The United States. 3. France. 4. Germany. 5. Spain.—*Condensed from British Trade Journal for October, 1880.*

he has met in this part of the country. It is not to him exactly comfortable, but by all means acceptable, to see that business men in Boston who own no cotton-fields, who have perhaps never seen one and deal but little in the crop, are actually doing more progressive work for that important interest and making more money than many leading men in the South. The reason is apparent: the largest proportion of improved machinery is made in the North and East, and almost invariably the heavy investments of capital come from the same localities. Mr. Morehead was satisfied that more frequent visits of business men to the South would be one of the results of Mr. Edward Atkinson's successful trip and of the establishment of the International Cotton Exposition by the publishers of the *TEXTILE RECORD*. The influence of their advice, whether given privately or in public addresses, upon the important question of savings banks, would be particularly welcome. Mr. Morehead is enthusiastic and entirely in earnest in that matter. He says that, at present, without the convenience and security of well-established and trustworthy savings institutions, the people of the South are unable to reserve their small accumulations of money without some risk, and consequently it is much more difficult for any one, however ambitious, to extend and improve his property much more than present necessities may demand. The introduction of savings banks, in which the people could have con-



THE RING SPINNING FRAME.

The number of sheep in England, at midsummer, 1879, was returned as 32,237,958, showing a slight decrease as compared with the previous year; but the domestic clip of wool on the other hand is estimated at 153,000,000 lbs., being 1,000,000 lbs. more than in 1878. In Australasia, the number of sheep in 1879 was 61,066,100, as compared with 64,698,928 in 1877, thus showing the disastrous effects of the summer of 1877, but at the same time being a larger return than any other country of the world can boast.

Wool is divided into three principal classes, the Leicester, or long-wool class; the Down, or short-wool class, and the half-bred, which is a cross between the two. The best combing wools, or wools used in the manufacture of worsted stuff goods, are those of the long-wool and half-bred classes; and for woollen goods, the short-wool class. What are called the pure lustre wools are the Lincoln, East Riding, and Nottingham breeds; those known as demi-lustre are the Leicester, Warwick, Kent, Huntingdon, Rutland, Hereford, Worcester, North of Ireland, Northampton, Gloucester, Devon, Cornwall, and Somerset. The Down or Short wools are produced in Essex, Surrey, Sussex, Wols, Hunts, Norfolk, Suffolk, Middlesex, Dorset, &c., in England, also in Australia and New Zealand, and used partly in the making of fine worsteds. The last class is the Norfolk half-bred, produced in Bedford, Berks, Hertford, Norfolk, Suffolk, and Shropshire. In their relation to the Bradford trade, the most valuable are the Yorkshire and the Lincoln, in the long-wool class;

VIEW OF A PROMINENT SOUTHERNER.

(From our New England Correspondent.)

Boston, December 13th, 1880.

A GREAT deal of interest was shown in the brief visit of Mr. F. C. Morehead, president of the Mississippi Valley Cotton Planters' Association, to this city. His position and influence among the progressive cotton-raisers of that valley were well known to be eminent; and those who are interested in Southern prosperity, either through their business connections or otherwise, made good the opportunity of learning through an able representative what they could not better acquire, except by a visit to the South. The Middlesex Club of this city, one of the leading clubs of successful business men, which meets on Saturdays for the discussion of new projects and interchange of suggestions, made their regular meeting the occasion of an address by Mr. Morehead, in which he spoke most freely, enthusiastically, and frankly on the conditions, prospects, and expectations of the business men among whom he lives. The address was fully reported here, and attracted attention among thinking people. It was very evident that Mr. Morehead had drawn but lightly upon his themes; and with the expectation of being able to secure additional information, however brief, the representative of the *TEXTILE RECORD* called upon him for an interview.

Mr. Morehead expressed himself as greatly astonished at the activity, energy, and contented persistency which he says are manifested by all the business men

confidence, would immediately exert an influence towards securing the prosperity of the common people that can be anticipated from no other source. Among those who have never been in the habit of making bank-deposits, large or small, the practice of private saving is continually assailed by daily necessities, and affords very little protection for future investments. A good system of banks for small savings would be, in Mr. Morehead's opinion, not only a most practical and valuable encouragement to the people, for whose interests he was at work, but would also prove a paying investment. The result of his agitation of the subject among capitalists here is likely to be heard from soon. Your correspondent has satisfied himself that the suggestion has already been acted upon here.

In regard to the cotton crop, Mr. Morehead said that fully two-thirds was raised by white labor, and that the increase of the crop comes from Texas mainly, and from new lands in the old States. The older lands are deteriorating very much from vicious cultivation, and will require a great deal of fertilizing to restore them. This, of course, is expensive. The Atlantic States are using fertilizers to a great extent, and are making more to the acre on poor land in consequence than others in the West on lands considered very rich. Sheep-growing is increasing steadily all through Mississippi, Alabama, Upper Louisiana, and Arkansas—a fact which the association presided over by Mr. Morehead was anxious to have known as indicating a prosperity in which it claims an interest.

J. B. M.

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36 BROMFIELD STREET, ROOM 16, BOSTON, MASS., J. F. RIDAY, General manager, to whom all business communications in the New England States should be addressed to secure prompt attention.

NOTE.—Manufacturers are requested to forward their catalogues, circulars, and price-lists so that they may be appropriately reviewed.

All requests for descriptive and other notices should be addressed to J. B. MILLET, New England correspondent, 21 Exchange Place.

ANNOUNCEMENT.

In order to further the interests of many of our patrons, both at home and abroad, we announce that all advertisers who desire any deposit at the office of THE TEXTILE RECORD their price-lists, catalogues, circulars, reports, particulars of works for sale, &c., but not samples. These lists, &c., will be shown to applicants, as may be desired, with whatever explanation the case may call for. Foreign advertisers may state this fact in their advertisements; but it is intended that the privilege will be continued only so long as the advertisements are appearing. We will further forward replies to advertisements and inquiries for machinery, &c., as promptly as possible. Those who have not branch offices located in Philadelphia will doubtless take advantage of this arrangement, and will, we think, find it an excellent means of keeping before our manufacturers.

OUR EXPORT EDITION.

SIMULTANEOUSLY with the distribution of THE TEXTILE RECORD throughout the United States, a large edition is sent to the leading manufacturers of textiles and the principal establishments in all analogous interests in England and France. We have also found it desirable to reach a numerous class in Mexico. We call the special attention of our patrons to this fact, as it secures a valuable recognition of American products in foreign markets. Being the representative journal of the textile interests of America, it places the buyer in direct contact with the manufacturer.

Philadelphia, December, 1880.

THE STATE OF TRADE IN TEXTILES.

It is remarkable that the general condition of the textile trades in this month of December almost exactly reproduces the conditions prevailing during the same month of 1879. Cotton goods of every description are active and advancing in price, with an increase already of 15 to 20 per cent. upon the lowest prices prevailing two months ago. The best grades of brown and bleached goods have advanced most, and next the better grades of dress fabrics, lawns, piques, jeans, and similar fabrics, and generally the entire body of prints and colored cottons of every grade. Much of the inquiry is speculative, but it is all based on the steady advance of raw cotton, beginning as the practical deficiency of the current crop was disclosed, and continuing as a legitimate increase of values. It has been a habit with some, but not with this journal, to estimate the cotton crop of the United States at a high figure,—6,000,000 bales or over,—and to depress the market for cotton fabrics as well as for the staple, by anticipating a surfeit and consequent lower prices. This policy has led to heavy losses on prints, and has kept the hosiery makers in fear of overstocking the market, from which the buyers were needlessly holding off. Now, all may see that it was safe to spin yarns and even to make up goods in anticipation of the business now forced on their attention, and for which they are not as well prepared as they should have been. And again, the deficiency of cotton-spinning machinery

in the immediate circle of Philadelphia industries is decidedly apparent.

In wool and woolen goods there has been less of positive movement, yet a marked advance has taken place in wool of all grades, and in most classes of woollens. The increased price of wool is not immediately represented in woolen goods unless coming when cloths and heavy clothing woollens are moving freely, which is not the case at this season. Again, the former rise in prices was too extreme, affecting not only the manufacturers of heavy goods, but still more the consumers who got more on their hands than they could at the time dispose of, considerable losses being the result.

The best prices have been realized for fine knit goods, Germantown wool yarns, and some descriptions of worsted goods and worsted yarns, in which a large business has been done for Philadelphia manufacturers. In the standard wool-mixed goods of this vicinity the market was never more constant nor the machinery better employed. It has been all along apparent that no accumulation of goods of this class existed in the hands of distributors, whether here or in the interior, and that all buying was for immediate consumption.

The consequences are likely to be that a winter nearly as busy as that of last year is to follow with the manufacturers of all classes of woollens made here, but with prices more moderate and better for all classes concerned. All the machinery of the cities and towns of this business circle will be fully employed, and the year, as a whole, will be more than usually prosperous.

Comparing this season with the last, on general terms, it is apparent that there should never have been the extreme decline of prices occurring in July and August last, nor would so much decline have taken place but for persistent assertions that there was too much machinery in operation and a general over-production. As it is now, the suppressed production and hand-to-mouth buying of two or three months past now leaves the market so bare that it is at the mercy of speculators again, as it should not have been. But the lesson of last year is not likely to be lost altogether, and a firm resistance to "booming" processes may avert much of the possible difficulty.

THE INDUSTRIAL CENSUS.

The census of industries, as well as that of population, should be simply an executive act, limited to the least possible number of facts, and simplified both as to form and to execution. The number of persons employed, the wages paid, and approximately the value of the goods produced, are the real points of inquiry. It is open to grave doubt whether the value of the materials used, or any other facts showing the profit of the manufacturer, have any rightful place in the statistics, and it is certain that the justifiable instinct of the proprietor, in four cases out of five, defeats the attempt to get at his profits. The right of the proprietor is before all other rights, and he should be treated with the utmost delicacy and consideration in attempting for public and general purposes to obtain the true measure of the great industrial interests.

But the present methods of the census are extreme in their disregard of the reserves every business man believes to be his right. They call for an elaborate statement of all the conditions of his business, and also what would be a complete exposure of the machinery, the style of fabrics, the constituent materials, and the precise difference between the cost of his fabrics and the price he sells them for. And on the face of each one of these inquisitorial forms is printed the law, with the fines and imprisonment which he would be subjected to if he were to refuse the information demanded. To nearly every manufacturer these blanks were sent without a word of explanation other than a demand to fill them up without delay, and if by accident they were misdirected in the mails, the proprietor would receive a threat of prosecution from the census office before he had seen the menacing form at all.

This was the first great error in the methods of the

census; the next was to appoint special agents to do what some judicious supervisor should have done when the census of population was taken. At first the census was to be divided into a large number of specialties, each specialist taking all of his class for the whole country,—an impossibility as regards the original returns, though possibly useful in aiding the census office to classify the final returns. Great confusion in the original collection of information has resulted from this attempt at division, and a large percentage of omissions has occurred because there was no complete and systematic canvass possible. It is reported by the supervisor of the counties adjacent to Philadelphia that a large share of the mixed cotton and woolen manufactures are omitted, because they were neither "wool" nor "cotton;" also, that in iron manufactures other than pig and rolled iron, only a small share have been taken, the enumerators being instructed to leave all such to the special agent for iron. The extent of these omissions can not be known until it is too late to correct them.

Finally, after a hasty and unrevised canvass of the population, necessarily short by three to five per cent., because of the haste with which it was taken at the hands of wholly unpractised persons, themselves without a word of instruction as to the manner of discharging their difficult duty, comes an equally hasty attempt to canvass the industries. In the city of Philadelphia there are 850,000 inhabitants—more than in Manchester, Leeds, and Bradford combined; and of these more than 500,000 are engaged in some way, directly or indirectly, in productive manufacturing industry. It is almost a nation of itself, covering 130 square miles of area, and in number of mills and factories, as well as of dwellings of workmen, has no equal in any city of the world. An imperfect and still incomplete census of its industries in 1870 gave \$338,000,000 in value as the industrial aggregate at that time, and most parts of the city have doubled in the number of establishments, and in the evident and open proofs of the extent of these industries. Ample preparation on the part of at least thirty or fifty special enumerators should have been made for this report, and the whole should have been directed by an agent of the amplest and most diversified knowledge, and the most complete experience of the difficulties to be encountered. It is easy for such a person to detect the accidental or other errors of both the canvasser and the proprietors, and to cause their correction at the moment of their occurrence. It would be easy to keep to the main facts, and to sacrifice the intermediate and unimportant if anything had to be sacrificed. But for this purpose the agent should not only be entirely disinterested, but forewarned as to all the evasions dictated by fear of exposure, and prepared to correct them either with or without the proprietor's consent. If entire good faith is always shown to the proprietors, every essential point of the inquiries can be answered, and the less formality and fulness of details the better for the accuracy of the main facts.

In short, the conditions essential to the accuracy of a return of the manufactures of a great city, such as Philadelphia is, should have been as nearly as possible the very opposite of those actually applied. Instead of haste there should have been leisure; instead of ten men, each with a vast area to go over, there should have been five times as many, each carefully forewarned as to the obstacles he would meet. And the special agent, who must supervise these returns, should not be a competitor in business with those whose business he examines; if he is, they will not make correct reports for his eye to criticize. The agent should not be interested in any way in the business of these manufacturers, and he should himself be able and willing to examine and verify the work of his assistants on any point whatever. None of these requisites were met in the actual census of industries just taken, and the consequence is that the work is full of incongruities, omissions, and errors: the chief error being the omission of establishments in the denser districts, and the next being the incompleteness of returns where a partial return is made, the value of the

product being short by a greater or less proportion in all cases.

The census law of 1850, under which three general censuses were taken, was never adequate to the requirements of a correct industrial census, and no correct census was ever taken under it; those of 1860 and 1870 were amended or supplemented after an imperfect fashion, but they were still deficient. The much-hoped-for law of 1879 proves as bad as that of 1850, since it does not provide a supervisor any better than the former marshal; in fact, it does not provide a supervisor at all. Just when a supervisor is needed none is furnished. No one can tell whether the enumerators or canvassing agents have done their duty or not. No one can tell whether the forms required are correctly filled or not, and no one instructed either the canvasser or the manufacturer as to the mode of making returns. The unfortunate manufacturer was pounced upon from all sides, and overwhelmed with voluminous forms, in most cases wholly unsuited to his business, conscious that the census office had no right to put him upon the rack of torture as to the minutest details of a business in which seclusion was his only safety. He was in doubt whether to go to prison or make a return. The whole body of industries naturally ran to cover, therefore, and the public interests suffer.

The productive capacity of persons employed in manufactures will now range from \$750 for the lowest to \$5000 or more for the highest in value of goods manufactured. The use of steam-power is so general, and frequency of very large values, as in sugar refining, oil refining, heavy iron works, woolen mills of the best machinery, &c., has so much increased the capacity of manual labor, that an average of \$2000 in value of articles produced for each person employed at wages is not in excess. There are in Philadelphia over 200,000 persons regularly employed at wages in these industries—the present very defective census gives 197,000—and the value of the products can not be less than \$400,000,000; it is, in fact, much nearer \$450,000,000. With all allowances for the diminished prices of many articles since 1870, the gain is at least one-third upon the total values for that year. If the prices had remained the same the gain would have been sixty per cent. at least; the gain in quantity is fully sixty per cent.

We repeat that the precise necessity promised to be met by the present law, that of supervision, has not been met at all. There has been no supervision at all, either of the work of the agents in the field, to know whether they made a complete canvass, or of the returns themselves, to see whether they were correct. Any one who does not know that supervision is absolutely necessary in both cases should never take a census. Public attention being sharply directed to the textile industries, they have been better taken than the rest, and within this city alone the values they produce reach the vast sum of \$75,000,000. This is twice their value as reported in 1870, yet it is at least \$10,000,000 short of a full return for this census year. The growth of all the greater industries is similar, and their true proportions are of the most imposing character. An agent should have been assigned to the duty of supervising these returns who had some knowledge of their growth, and some interest in results of such deep significance.

Some of the facts worth noting in this connection are, that even by this return the number of persons employed in manufactures is 70,000 greater than in 1870; that there have been 1500 mills and factories built within the ten years; that more new machinery has been put in in that time than in 30 years previous; that at least 30 square miles have been added to the built-up area of the city in the ten years, the additions being almost wholly on the manufacturing borders; and that an extreme concentration of new and diversified industries has taken place in the Sixth Ward, and other central districts, employing many thousands of persons more than were so employed in 1870 in those localities. And as the city has gained 200,000 inhabitants, chiefly in the new and manufacturing wards, it is not easy to see how a faithful census should omit so much and get so little.

THE BENEFITS OF BUSINESS ENTERPRISE IN THE SOUTH.

The convention of business men, which was held at Atlanta on the second day of this month, possessed more significance and importance than its special character as a common civil organization would at first indicate. It means a sweeping away of dead issues and disagreements, an end to sectional differences, in so far as these tend to produce rancor and strife, and the beginning of an era of good feeling, which, having its inception in the natural desire for human fellowship, grows in the union of those who have a common country and a common interest. As a result of this, we shall see the Southern States and the cotton trade making material progress, and all sections and every branch of business receiving the reflex influence from it.

It is a cause for thankfulness and congratulation that the storm-clouds which so long enveloped us have been dispersed, we hope never to gather again, and that henceforth it can be seen that Peace has her victories as well as war. Business rivalry, as an outgrowth of enterprise, will spread over the land, stimulating our energies, and rapidly developing our resources to such an extent that we will soon become the leading nation of the earth in all respects. The coming years seem big with national blessings; no disturbing element threatens to mar our peace; abundant crops are likely to follow in due succession; busy workshops swarm with contented operatives, and idleness and want need find no place among us.

The Southern States will feel this quickening of business life in a marked degree, and her products, which already bring in millions of dollars, will, under increased tillage, enormously increase. On many noble streams will there arise factories to give employment to the surrounding inhabitants, and forges and furnaces will puff and glow by day and by night in districts hitherto a wilderness. Then our South and North, our West and East, will be tied together by a mutual interest, which will defy alike the machinations of foes without or within to break asunder.

THE CARPET MANUFACTURE.

The carpet manufactures of Philadelphia are more nearly correct in the preliminary census returns than any other class, fully sustaining what has been heretofore claimed for them. The fact that some of the smaller establishments, which occasionally work on orders from the larger ones, have been merged or omitted by the canvassers, does not much affect the result; the number is reduced too low by some 40, however; these being of the class who work 8 to 10 looms in back-buildings to their own houses. But as it stands, the results now reported for Philadelphia alone are nearly equal to those of the whole United States for 1870:—

CARPETS.	No. Est.	Hands.	Capital.	Wages.	Raw Material.	Production.
U. States, 1870, . . .	215	12,098	\$12,540,750	\$4,681,718	\$13,577,999	\$21,761,573
Philad'a, 1880, . . .	169	13,590	11,994,883	3,009,131	8,971,700	20,304,826

The less cost of wages and raw materials relatively to the values produced in 1880, is due to the introduction of superior machinery, and to the very general spinning of their own yarns by carpet manufacturers. All carpet materials were cheap, also, during the first half of the census year, and when the always well provided proprietors contracted for their supplies.

A large addition to the year's product in carpets has been in the form of Turkish and Smyrna rugs, so called, made mostly in the heavy and more valuable forms, though ranging through all the lighter grades. They took the market at a favorable time and continue to occupy a leading position. A great increase of Brussels carpets was also made, and still greater provided for in mills and machinery coming into operation since the close of the census year. Altogether the varieties and qualities of carpets made now in Philadelphia are quite as complete as the demands of the most exacting general market can call for, and almost the entire

American supply is furnished by the mills here with the addition of those in New York and New England.

The official report of the list of mills on textile fabrics, carpets included, made by the writer in April last, gave a total for Philadelphia of 216 establishments, 1346 power looms, 4132 hand looms, and producing of all classes 2,756,400 yards of carpets monthly. Making the usual allowance for interruptions, the total product for the year was taken at 33,076,800 yards, which is sustained by the present report. The average value is thus made about 62 cents per yard, which is too low, although on one occasion each in 1879 and 1880 the price was very low for all classes of carpets.

Correcting the inevitable errors of omission incident to every form of official census taking, and counting in the small establishments which the dull canvassers could not find, would add 7 to 10 per cent. to the figures reported as before given, but with the well-known evasiveness and resistance always shown to business inquiries, by whatever authority made, it is only surprising that a report so nearly correct as this, giving 13,590 hands, \$11,994,883 capital, and \$20,304,826 as the value of carpets produced, should be made at all by official hands.

There is still an immense quantity of the hand-loom manufacture of ingrain and other carpets, but the looms are better, having Jacquard attachments in all cases and weaving the finest fabrics in style and in quality, if furnished with fine materials. Any hand-loom weaver can employ four, six, or eight of these looms on his own premises, and work either for himself exclusively, or for another manufacturer who supplies him with yarn. The production of each loom is 500 yards per month, which, at the lowest value, is \$2500 per year. So that a single carpet-loom owner and worker on his own account is entitled to be classed as a manufacturing establishment under the census law.

THE CENSUS OF THE TEXTILE INDUSTRIES.

The preliminary report of the industrial census of Philadelphia, just made public, sustains to a great extent the estimates heretofore made of the marvelous growth of this industry during the last ten years. Even by this imperfect and incomplete account, it is twice as large as any other group of industries. The following are the figures:—

	No. Est.	Capital.	Hands.	Wages.	Raw Materials.	Value of Products.
Cotton, Wool, and Mixed Goods, including print works, . . .	257	\$21,190,905	21,493	\$7,750,092	\$27,982,501	\$39,465,398
Carpets and rugs, . . .	169	11,994,883	13,590	3,009,131	8,971,700	20,304,826
Rag carpets, . . .	59	66,375	182	50,034	97,619	197,260
Hosiery and knit goods, . . .	136	3,968,540	10,538	2,571,247	5,728,903	9,090,017
"Silk,"	31	1,561,900	3,246	614,620	1,609,885	3,006,342
Dye-works, . . .	56	1,298,800	1,366	580,518	1,338,868	2,651,123
Total,	708	\$39,575,903	50,415	\$14,584,642	\$47,345,366	\$74,714,936

These are very remarkable figures, and show this industry to have a growth without precedent in this city. It is, however, full of obvious discrepancies. Nothing is said of silk-mixed goods, and we are unable to say whether they are omitted or counted in cotton and woolen goods. There are 20 mills on silk-mixed or silk-faced upholstery goods, no part of the production of which appears to be included in the line of "silk." There is also a very short return of hosiery and knit goods, which, in the shape of Shetland shawls, knit fancies, &c., amount to \$5,000,000 at least, in addition to the \$8,000,000 of hosiery here reported. There is a large production of Germantown yarn, finished in other than cotton and woolen mills; it amounts to \$3,000,000 in value, and is probably only in very small part included in these values. Still more important is the almost universal return of the cost of the goods instead of the value when sold, which lessens the largest item above, several millions below what it should be.

But we here only intend to call attention to the remarkable magnitude of figures representing these

industries within the limits of a single city. The capital, as is usual, is reported very low, and generally no more than the active capital in money employed in business. The actual capital is at least a half greater when the value of land and building is included. But this is no more than the rule with statistics of this class.

THE COTTON EXPOSITION OF 1881.

THE proposition for a great Cotton Exhibition at some central point in the South, made first by Mr. Atkinson, and earnestly advocated by this journal from its first issue, has been finally brought into definite form and a complete organization effected at Atlanta, Georgia, on the second of the present month. The publishers of this journal decided to take an active part in a plan of such vast value to the textile interests of the country, and for that purpose visited Atlanta and presented the subject in its broadest and most liberal aspects to the leading citizens. They were cordially received, and the purpose of their visit becoming generally known, a public meeting was called on December 1st, at which the preliminaries were considered, a more general meeting following on December 2d (the proceedings of which will be found in another column), definitely adopting the proposed plan, and rendering the success of this great measure certain.

This Exhibition is intended to represent everything that concerns the growth of the plant, the fertilization and treatment of the crop, the handling of the staple in every form, and the commercial disposal of all raw cotton; and also its manufacture in every form, especially in the Southern States; the forms of mills and machinery for such purposes, and all that the most recent invention may afford for the improvement of these processes. There can scarcely be a subject of wider interest than this in a country producing almost 6,000,000 bales of cotton, two-thirds or more of which now leaves the country in a raw state, worth only the minimum rate per pound, as raw staple, of perhaps 10 cents on an average. The planting States should realize, and may realize, much more than this from their favorite crop. The opportunities for improvement are many; the quantity grown may, in the first place, be greatly increased, and next the staple may be greatly improved. It is now well known that varieties of cotton may be as much improved as varieties of wheat. Good cultivation originates good varieties, and proper care in extending the planting of superior seed will give to the uplands of the South a better staple of cotton and a much larger crop, maintaining them in the lead they have so long held as producers of a staple the whole world must use.

Machinery of all the classes demanded in cultivation first, and next in ginning, baling, packing, and compressing raw cotton, belongs to the first division of machinery exhibits. This is itself already a vast interest, better developed, perhaps, than any other, and would alone make an attractive exhibit. The abundant crop of the Eastern cotton States the present year has stimulated business to great activity, and brought out many valuable devices and improvements.

The machinery requisite for the manufacture of cotton, with the best form of mills, the most economical applications of power, and all the details of subsequent manufacture, constitute a great department with which the cotton interest in Georgia and the adjacent States is already quite familiar. The development of manufactures in Georgia is already great, and at Atlanta, Augusta, Columbus, and other cities there are many fine mills. The simple announcement of the proposed Exhibition will stimulate this industry, and undoubtedly find it prepared to take 15 or 20 per cent. more of the next crop than it has taken of that for the current year.

The city of Atlanta has a great future before it, which it appears to have the enterprise and good judgment to cultivate in a broad and liberal manner, worthy of the future of a metropolitan city. It will be an immeasurable blessing to the entire South, also, to stretch its hands out in the liberal course now opened up to it, becoming prosperous in its own right through a liberal development of its own resources.

SUPERIORITY OF AMERICAN MACHINERY.

READERS of this journal can not fail to have received new and forcible impressions as to the intrinsic superiority of American machinery, as illustrated in the record of facts which have come regularly in our way, and have received no more than their due prominence as such. The entire field of manufacturing enterprise is full of illustrations of remarkably effective machinery, new either in principle or in the application of principles previously known. We are not ashamed of the record so far made, and have no fear that the future will fall behind the past, in sustaining the reputation already secured by our manufacturers.

The field covered by the textile industries in the United States is far greater now than our English and continental competitors are aware. Mr. Brocklehurst, a silk manufacturer of England, is surprised to find the silk mills of Paterson using steam-power, with broad looms carrying a dozen webs each, on the narrow silk goods still woven by hand in England; and in Philadelphia he might have seen even more effective power-looms on the most delicate silk and mixed fabrics, each doing the work of ten or twelve hand-looms, and doing it in the most superior manner. The improvements recently in the simplest processes, and especially in carding cotton, are of the most remarkable character, as our recent report of the New England Cotton Manufacturers' Convention showed. A saving of even three to five per cent. in quantity utilized, and in strength of the thread-spin effected by an improvement of the carding process alone, is so much added to the value of the cotton crop as a whole.

The most casual observer can not fail to be struck with the energy and success of American manufacturers of textile machinery; and the manufacturers were never so active as now in replacing old and ineffective machinery with the best cards, the best spinning-frames, and the best looms to be had in each case. The revolution in this respect which began three or four years ago only, is now at its height, and it would well repay others than the Macclesfield silk manufacturer above referred to, to visit American machine-shops and see how much can be saved by using the best inventions of American skill. And our progress in inventions is so rapid that before the foreign manufacturer can get the power-machinery of to-day in use in place of his out-of-date hand processes, we shall have something enough better to still maintain ascendancy.

WOOL AND COTTON FIBRES.

So little is practically known of the exact character of the fibres used in all textile fabrics, that we propose to give exact microscopic illustrations of these fibres, engraving the figures precisely as shown by microscopic glasses of high power in the hands of one of the ablest of microscopists in this country. It is singular that no technical work extant is brought reasonably near to the present state of science in this respect. The Editor of this journal has had frequent occasion to observe the worthlessness of the illustrations given in the only works containing them, and especially as to wool fibres, to find that a good microscope discloses what is of great practical value, yet almost wholly unknown to the producers or consumers of wool. True wool is a highly animalized and vitalized fibre, round, soft porous, and absorbent, enduring almost every condition of exposure or wear, if properly treated in the beginning. Under the microscope it differs as much from all hair or false fibres as a living form differs from a dead one.

The cotton fibre, also, has never been properly described in microscopic relations. It is superior among vegetable fibres, as wool is among animal fibres. Its capacities are wonderful, and, if not killed by ill-treatment, it can be made up into fabrics strikingly resembling the finer wools.

We propose to show the extreme difference between living and dead fibres, in both these cases—an extremely interesting and practically valuable illustration, which, as before remarked, has been neglected in a most inexcusable degree in technical works.

THE COTTON CROP OF 1880.

THE most recent advices confirm the views heretofore expressed in this journal, that the cotton crop of the current year will not reach the very large figures at one time claimed for it, and that all the cotton available for export will be called for at fair prices. The market, both in the United States and Liverpool, has been quite active in consequence, and the following statement of the crop, stock, and expected receipts made at Liverpool, November 20th, shows that comparison is made of the last with the present year:—

	1879-80.	1880-81.
Crop, bales,	5,757,000	6,000,000
Less taken in United States, Canada and Mexico,	1,852,000	1,950,000
Left for Europe,	3,905,000	4,050,000
Shipped for Europe to November 12th,	903,000	950,000
Yet to be shipped,	3,002,000	3,100,000
Afloat for Europe, November 12th,	460,000	530,000
Stock in Liverpool, November 12th,	171,000	301,000
Stock on Continent,	41,000	76,000

Supply for consumption, November 12th, 1880, to September 30th, 1881, 3,744,000 3,937,000

This shows an excess the present year of 193,000 bales, but the opinion is now general that the inferior character of much of the crop, especially of the South-western States, will be fully equivalent to this excess. The Egyptian crop is reported short, and much American cotton arrives in a damaged condition, due to being wet at baling and packing.

In fact, the crop itself is short of the estimated 6,000,000 bales by at least 200,000 bales, and the early gathering and forwarding of the fine cotton of the Atlantic States has misled all parties as to the extent of the crop.

REPORT OF THE BOSTON MANUFACTURERS' MUTUAL INSURANCE COMPANY.

A VERY remarkable report has been made by this well-known company, of which Mr. Edward Atkinson is president, on the general subject of dangers by fire and the most economical methods of management generally. The method of heating by overhead pipes; the best kind of hose to be used, lubricating oils, and the saving of wool oils, are the leading topics. Spontaneous combustion from oils, coal, and dyed goods or dyes, is also thoroughly examined.

The public already know that Mr. Atkinson earnestly recommends steam-heating from steam-pipes, both for economy and safety, and this report gives results from 37 mills, all favorable and confirmatory. As to the hose, he recommends linen saturated with paraffine wax for inside service, and thick rubber-lined cotton hose for outside service. The best and safest lubricating oils are claimed to be fine mineral oils; no vegetable oil is fit to be used as a lubricant, and castor oil is the worst of all, because the most viscous. "If used, it will surely set the mill on fire."

As to wool oils, Mr. Atkinson says that the wool used in this country will yield 45,000,000 lbs. of grease that is now worse than wasted, and is washed away into ponds and streams dangerous to the public health. All this grease can be extracted more perfectly by the use of naphtha than by any alkalis, because it does not readily saponify, and can only be perfectly removed after it is in some degree oxydized by the lapse of time; hence the best foreign fabrics are those made from wool a year or more old. On the other hand, the freshest clip of wool is at once cleansed by naphtha. The grease saved by this process will more than pay the cost of scouring, which requires no heat when the naphtha is used, and only tepid water with a little ammonia for final scouring. Even the fleece may be cleansed without breaking it up, thus leaving the fibres all in their natural position. A portion of this native oil of the wool may be mixed with a small portion of mineral oil, making an emulsion absolutely free from any tendency to spontaneous combustion, and in very slight degree inflammable—precisely what is wanted as a preparation for carding and spinning.

The fibre of the wool thus cleansed is claimed to be in a much better condition than when heated and

scoured with alkali, and the wool and cloth are in a much better condition for the reception of the dyes. This process, it is recommended, should be conducted in separate buildings, outside the mill yard, yet within reach by heating pipes of the small amount of heat required in the operations.

It appears that the heaviest losses sustained by this Mutual Company during the year have been caused by the spontaneous combustion of dyed cotton yarns of various colors; these losses amounting, in fact, to one-third of the total losses for the last three years. It is evident that this subject of combustion of silk and cotton dyed yarns needs an investigation.

ERRORS OF THE CENSUS OFFICE.

An interview with the Superintendent of the Census, reported in the Philadelphia Bulletin, contains an allusion to the Textile Record, which calls for a brief notice. The article generally is full of gross errors of fact, which it is not necessary to refute here. In an article on the silk manufactures of the United States in the October number of this journal, the official statistics of the importation of raw silk were cited, 1,889,786 pounds, value \$8,376,035, in 1878-9, and 2,566,236 pounds, value \$12,024,699, in 1879-80, and the reasonable inference was drawn that if the current reports of the Silk Association as to the value of silk goods made from \$8,376,035 in value of raw silk were correct, the product of the \$12,024,699 in value of raw silk would be at least \$45,000,000. This is reason and common sense. If the census fails to find that values approaching this aggregate were made, it fails to find the facts. It is probably not known at the census office that a very large amount of silk is now used in mills classified as cotton or woolen mills, and also that silk dress fringes, upholstery trimmings, and upholstery coverings are made in rapidly increasing quantities, and to the value of many millions of dollars outside of the recognized silk mills, which alone are taken to represent the manufacture of silk in the United States.

There is a studied purpose apparent in the census office to belittle and disparage the productive industries of the country, and the result will be a system of undervaluations most injurious to the public interests. No one can have any interest in exaggerating the production of these industries, and the editor of this journal has not exaggerated them in the slightest degree, nor published as a fact that which was not absolutely true. The loose falsification of persons who know nothing of the facts themselves is not worth answering in detail, nor will we be drawn into any personal controversy over the business of manufacturers whose right of privacy we are bound, first of all, to respect.

DESIGNS IN TEXTILE FABRICS.

The extent to which really effective designing is already introduced in the textile manufactures of Philadelphia is inadequately understood by the general public, and particularly in the countries from which all artistic designing is supposed to originate. In fact, it is here the most uniform and general practice to originate designs in carpets and upholstery coverings particularly, and only in dress goods are the patterns habitually taken from imported samples. There are ten or twelve independent establishments, employing several persons each, engaged in the preparation of original patterns in carpets and upholstery coverings, on the orders of the mills producing those goods. The patterns are first painted on suitable paper or cloth, prepared for adjustment to the number of threads of each color, and the Jacquard boards are then cut by proper machinery, the workman having the pattern before him. The pattern is then ready for the weaver by simply putting the Jacquard cards in his loom. Nothing of this is new, except that it is not understood as it should be that the hand-loom weaver of ingrain or stair carpets habitually uses all these patterns, and produces a degree of elegance in design and finish for the most ordinary carpet which certainly can not be excelled by any country.

Very few of the carpet looms in use now are without

the Jacquard attachment, and the real elegance of their work should be seen and studied by those who doubt the superiority of American carpets. It is this that gives them the control of every market they have ever reached, and has carried the aggregate of their production to really enormous figures.

Next, the Turkish, Smyrna, or Persian rugs, only recently introduced, represent a high degree of skill in designs and finish. Some of the leading carpet manufacturers, as the Bromleys, have gone very largely into these popular goods, making every grade, from the heaviest double-faced single-piece carpets, three to five yards square, to the lightest Chenille foot-rugs, and at prices with which no competition is possible in importation. The same freshness and facility in designs is shown in these, and in their associates, the Axminster carpets. The only error likely to be committed is the reduction in weight which the easily cheapened American market demands when any fabric becomes universally popular.

In upholstery coverings still greater refinement in designs and patterns has been introduced, and the manufacture of these goods now goes on in immense quantities. Broad iron looms, taking one and a half yards or more in width of fabric, are employed, with the most complicated Jacquard attachments, weaving exact reproductions of imported designs or new creations of the many skillful designers employed. The goods themselves are equal to the finest and most elaborate of the French, and as to material range from all wool and silk to all cotton, as the trade demands. The consumption of these goods has been very great for two or three years past, and not one-twentieth part of the supply has been imported.

It is only just to the rich and elaborate developments of taste, enterprise, and skill on the part of our own manufacturers, who employ the highest skill without stint, and fill the markets with the richest and most tasteful productions, to let these facts be known. There is no harm in getting everything new that can be got, and in educating the public taste up to the highest standard; but if there is taste to be studied or elegance of designs to be reproduced or created, the public may be sure that the American manufacturers of textile fabrics do not sleep over the opportunity, and that they can and do show in the open market fabrics superior in general taste and elegance to those of any market of Europe.

OUR IMPORTS AND EXPORTS OF TEXTILES IN THE NINE MONTHS.

From an official statement of the United States imports and exports for the first nine months of the calendar year 1880, prepared by Hon. Joseph Nummo, Jr., Chief of the Bureau of Statistics, at Washington, we extract the following figures, showing our imports of the manufactures of cotton, wool, and silk from all countries in that period, as compared with similar imports in the corresponding period of 1879:—

ARTICLES.	QUANTITIES.		VALUES.	
	1879.	1880.	1879.	1880.
Cotton, manufactures of:				
Bleached and unbleached square yards.	6,252,422	8,387,269	\$752,075	\$907,242
Printed, painted or colored square yards.	5,521,834	6,833,179	720,285	918,032
Hosiery, shirts and drawers.			4,649,352	7,265,785
Jeans, denims, &c., sq. yards.	1,055,325	7,732,078	142,983	1,334,306
Wool, manufactures of:				
Cloths and cassimeres.			6,014,097	11,631,993
Shawls.			1,016,151	1,383,407
Blankets.			685	2,841
Hosiery, shirts and drawers.			898,116	778,784
Carpets, square yards.	203,451	1,647,891	296,638	1,337,360
Dress Goods, sq. yds.	47,961,794	55,930,338	11,700,195	13,394,616
Other manufactures.			2,860,574	3,602,498
Silk, manufactures of:				
Dress and piece goods.			14,337,195	20,237,263
Hosiery.			161,826	337,911
Other manufactures.			6,982,979	9,647,026
Total.			\$61,859,234	\$89,106,689

From the above table it will be seen that the value

of the imports of the articles named increased from \$61,859,234 in the first nine months of 1879 to \$89,106,689 in the same period of 1880. In addition to the above-mentioned articles there were imported some raw materials to be manufactured in this country, principally into textile fabrics. Their quantities and values for the nine months may be seen from the following table:—

ARTICLES.	POUNDS.		VALUES.	
	1879.	1880.	1879.	1880.
Cotton, raw.	2,287,026	3,271,676	\$405,895	\$520,251
Wool, unmanufactured.	43,298,332	90,113,141	5,793,716	17,468,829
Woolen rags, shoddy, &c.	73,301	1,226,065	19,645	265,414
Silk, raw.	1,441,747	1,747,839	6,656,963	7,768,748
Total.	47,100,406	96,358,741	\$12,876,121	\$26,023,243

Adding the values in the second table to those given in the first table we have \$115,129,932 as the total value of the imports of textile fabrics and fibres in the first nine months of 1880, against \$74,735,355 in the corresponding period of 1879.

During the periods embraced in the above tables our exports of domestic cotton and wool and their manufactures may be seen from the following figures:—

ARTICLES.	QUANTITIES.		VALUES.	
	1879.	1880.	1879.	1880.
Cotton, manufact'r's of:				
Sea Island, lbs.	1,969,553	2,675,462	\$561,770	\$870,621
Other manufact'r's, lbs.	967,287,062	1,162,839,640	98,429,797	138,446,439
Colored, yards.	33,887,560	21,113,332	2,347,641	1,372,305
Uncolored, yards.	62,789,058	52,163,412	4,647,733	4,728,343
Other manufact'r's of.			972,769	1,001,486
Wool, manufactures of:				
Raw and fleeces, lbs.	154,471	70,341	53,988	18,915
Carpets, yards.	3,841	13,502	3,809	13,439
Other manufact'r's of.			175,832	141,924
Total.			\$107,193,339	\$147,192,132

In the first nine months of 1880 the value of the exports of domestic articles was \$147,192,132; and in the corresponding period of 1879 the value was \$107,193,339, an increase of nearly \$40,000,000.

A PROPER MOVE.

An enterprise is on foot in Philadelphia in which we sincerely hope there will be no dearth of public interest. We refer to the establishment of a School of Art in Weaving. In developing manufactures the technical school must have its place. The hand must be educated, or skilled workmen will be absent at the moment when they are most needed. Heretofore all our skilled artisans in the highest branches of the mechanic arts have come from the schools of other countries. It is time we sought independence in this as in all other things. Our ancient apprenticeship system has completely broken down, and tradesmen and mechanics seem to be too deeply concerned for their present and immediate interests to care for the education of their successors in the arts and trades by which they subsist. Our trades-unions persist in regulating the supply of labor, not by the standard of the number seeking skill in it, but on the principle that the fewer the persons are among whom the wage fund is divided, the greater will be each person's *pro rata* share. The effect of the operation of this principle, if it were not happily counteracted by other influences, would be to dry up many arts and trades at their source in the regular supply of skilled labor. Society owes it as a duty to itself to see that the mechanic arts are not only sustained, but advanced, and given progressiveness by the aid of a liberal technical education.

In all our manufacturing districts these schools should be established for thorough education in all branches. The hand must be taught as well as the mind, and the work should commence in the period of youth. It is a matter of observation that the boy of twelve or fourteen years learns telegraphy five times as rapidly and successfully as the man of twenty-five. So with the use of the needle, the sewing-machine, and

every other art depending upon the dexterity, cunning, and skill of the hand.

It must be understood that the education of the hand is an entirely different thing from the education of the mind. The State undertakes to supply a certain degree of the latter to every person, in order to enable them to perform their civic and political duties intelligently. But the State is purely a social and political organization. It is not a soup-house nor the head of a family. It does not owe subsistence nor the means of a livelihood to any except its immediate servants and employes during the period of their actual service. Hence the idea which has obtained some foothold in the minds of doctrinaires in this country, and has been here and there reduced to practice in Europe, of "the work-shop in the school," would seem to be altogether inadmissible. This, however, does not exclude the idea of "the school in the work-shop," which seems to embody the true conception of industrial and technical education. By this system the youth is trained for a trade by methods as nearly self-supporting as possible, while at the same time a measure of general education is incidentally bestowed upon him.

This system is the one most popular in Europe, and is undoubtedly the right one. These schools planted alongside of shops and institutes are meant to become auxiliary to them and to supply the youth the practical elements of the leading handicraft, industries, trades, and business occupations. There are a great many of these schools in Germany, Belgium, Switzerland, and France, some maintained by government, and the best of them supported by private enterprise. A boy when he leaves any of these establishments knows the general principles of handicraft, and every detail of the particular industry in which he has been specially trained. The graduate can take the raw materials in any case, and evolve from them a finished article. Such are the schools we now want in the manufacturing cities of America. Professors can easily be found to teach the various classes sustained in connection with the manual departments, and in the course of a few years every industry would be able to procure all the skilled labor which is necessary for its maintenance and development.

No department needs these schools more than the textile industry, and no city more than Philadelphia. The present movement towards the establishment of such a school here was inaugurated by the Philadelphia Association of Textile Manufacturers. It will undoubtedly be a success, and if this association never does anything else worthy of note, it at least deserves praise for attracting the public mind to this wise policy.

Letters to the Editor.

TO CORRESPONDENTS.

GIVE full name and post-office address. Do not expect anonymous letters to be answered. Write on one side of the paper only. Enclose stamp or postal-card for reply to questions of personal importance merely. We can not here answer inquiries that are not deemed of interest to a large circle of our readers.

CORINTH, MISS., December 4th, 1880.

Editor Textile Record:

DEAR SIR:—Thanks for a copy of your new, interesting, and well-gotten-up magazine. May the future numbers be as good and interesting, and have an extensive circulation over the entire South, for she greatly needs information on this, to her, all-important subject—*Cotton*—in all its stages, from the field to textile fabrics.

I believe her only hope of prosperity and independence is in diversifying the products of the farm, so as to produce all necessary food, developing her minerals and forests, utilizing her wasting water-power, and manufacturing every product of the soil, mine, and forest to their utmost value, before shipment from Southern ports, on Southern bottoms, directly to the consumer.

Our first great need is cotton factories, to give employment to our indigent white women and children, non-producers, because they are unwilling to take the field in company or competition with the negro.

Give us cotton factories. We have cheap land, food, fuel, building material, short and mild winters, reliable water-power, a full supply of undamaged seed cotton, and hundreds of thousands of women, boys, and girls idle for lack of such industries.

Give us cotton factories, and we will soon substitute bales of yarn for bales of cotton, and soon after, bales of textile fabrics for bales of yarns, and realize \$1,000,000,000 instead of \$300,000,000 for our cotton crops.

A few words about the Clement attachment. I thank you for its notice in your paper, and would be obliged if you would correct a typographical error made by the *Southern Planter and Farmer*, where the ginning and baling of a bale of cotton is stated to cost \$15.50, it should be \$5.50. My statements relative to the savings, performance, &c., of the attachment (although strictly true) are incredible enough without the 200 per cent. exaggeration.

I sincerely hope the great Atkinson cotton producing and manufacturing convention will be held at Atlanta, Georgia, and that our Southern people will learn that all the expenses, loss, waste, perquisites, city crops, &c., on cotton from the field to the distant factory, are anticipated, and allowance made for some in the price paid the producer; that the work of one operative in a cotton factory is as productive (profitable) as five hands in the cotton-field; that the capital necessary to produce 1000 bales of cotton is about the same required to manufacture it in the same length of time; that the South has all the facilities of, and many great advantages over, the North in manufacturing her indispensable staple; and that it does not pay to produce cotton only, but when grown as a surplus crop, and manufactured into textile fabrics before shipment from Southern ports, she will find it the key to prosperity and independence; and that our Northern manufacturers will learn (by seeing cotton in the boll, fresh from the field) that nature does not cut, knot, or tangle the staple; that it is done by the gin in preparing it for transportation; that each filament is a hollow tube, twisted on its own axis, resembling a succession of figures eight, with serrated edges and roots at the lower end, penetrating the hull of the seed, whence, by capillary attraction, the oil is taken from the kernel into the filaments, giving them elasticity, flexibility, and capability of great tractility and attenuation, all owing to its peculiar form, serrated edges, and lubricating oil, which causes a stronger thread and less waste in being worked up; that cotton freshly ginned is far superior for manufacturing to that that has been pressed and compressed (as Mr. Atkinson says) "to the density of elm wood," and another writer says "to the density of ebony," and remained in that tangled, compressed condition from one to twelve months; that the lint is not only damaged by thus standing, but the oil evaporates, causing a loss of from eighteen to twenty-two pounds on each bale, the filaments become dry, seasoned, and brittle, impairing the strength of the thread, and causing great waste in being worked up; that they will learn from Whitaker, and other writers in your RECORD, that "cotton is damaged by too much carding," "without being worked to death," &c., and that continued improvements are being made in the card, for man makes nothing perfect.

Now as carding is but the straightening of the filaments tangled by the gin, we claim that the Clement attachment, substituted for the lickerin and feed rollers of the card, will receive the seed cotton, remove all extraneous matter, and deliver four-fifths of the filaments, untangled, parallel to the card, leaving one-fifth only to be untangled by the card, or what is equivalent, causes the card to do five times as much and as good work as it did by the old process, using baled cotton after it had passed through six or more different machines; that the sliver rove and thread are stronger (the latter more sliver) than can be made of long-compressed cotton, and that one-half the usual waste is saved.

All these things can be easily verified by going to see one of the attachments in operation.

Respectfully, yours, &c.,

F. E. WHITFIELD, SR.

LANGLEY, S. C., November 27th, 1880.

Editor Textile Record:

I SEE in the November number of the TEXTILE RECORD that your Augusta, Ga., correspondent represents the "Langley Mills at a standstill, on account of an insufficient supply of water to run them." The statement is incorrect. These mills are, and have been, in full operation, and have not stopped a day for over five years for want of water to run, or any other cause. They have made full time, running 311 days every year, yielding a large production and always making good profits. The Langley Mills have been noted for their large production, and the earnings of the mill have been equal to the best in the country.

Yours, &c.,

M. F. FOSTER, Superintendent.

UNITED STATES CONSULATE,

CRELFELD, RHEINISH PRUSSIA, November 25th, 1880.

Editor Textile Record,

SIR:—Arrangements have been made to exhibit, in suitable apartments connected with this consulate, such sample articles as American export merchants, manufacturers, inventors, artists, and producers may desire to bring to the notice and favorable consideration of commercial communities, and the people generally, on the continent of Europe. Of course, only models or descriptions of bulky machinery can be received; neither is it desirable to send other than such articles, goods, and new inventions as are adapted to the practical uses and wants of the masses of the people and the popular industries of the country. These are too numerous to be referred to here.

A reading-room will also be provided, where all American export, commercial, trade, and scientific journals, and all such circulars, cards, and printed matter as explain the articles on exhibition, will be conveniently arranged for the use of merchants and others who may desire information concerning these and other American productions.

The consul and vice and deputy consul, when not officially engaged, or some one of their assistants, will be always present, during business hours, to give information relating to the objects named. Communications from remote points will also be answered, and such service as may be deemed useful in opening avenues of trade and extending the demand for American productions will be cheerfully given.

Those desiring to send to this consulate articles for the purposes named must deliver them free of charge to the consul.

Please forward one copy of THE TEXTILE RECORD.

Perhaps I may occasionally send you from this point something of interest regarding the silk and velvet manufactures of Germany, of which this place is the centre.

J. S. POTTER,
U. S. Consul at Crefeld.

WEIGHT OF COTTON BALES.—The average weight of American cotton bales the last season was 452 lbs. against 444 lbs. the previous season; of Brazilian, 181 lbs.; of Egyptian, 629 lbs.; of Smyrna, 350 lbs.; and West Indian, 160 lbs. for both seasons; of East Indian, 373 lbs. against 376 lbs. for Great Britain, and 365 lbs. against 360 lbs. for the Continent. Of all kinds the average for Great Britain is 444 lbs. last season against 436 lbs. the previous season, and for the Continent 423 lbs. against 418 lbs.—*The English Textile Manufacturer.*

The *Chattanooga Tradesman* says:—"The prime needs of a manufacturing district are cheap material, cheap transportation, and cheap food. So far, the South has beaten the North in producing cheap iron and cotton goods on her strength in the first two mentioned items. But our growth in manufacturing capital and variety of product will be dwarfed and destroyed if we go on importing food for man and beast from the section with which we must compete in the market for the wares we produce. The South must raise its own meat, bread, hay, horses, and mules, or finally cease building furnaces, rolling-mills, and cotton factories."

New Mills and Machinery.

The machinery is being ordered for the new Graylock Mills, North Adams, Mass.

THE GERMANIA MILLS, Holyoke, Mass., are putting in a lot of new machinery.

ARRANGEMENTS are being effected to construct an immense knitting mill at Schenectady, New York.

THE KEARSARGE MILLS, Portsmouth, New Hampshire, destroyed by fire on the 4th inst., are to be rebuilt immediately.

THE CHATTAHOOCHEE MANUFACTURING COMPANY'S mills, in Chambers county, Ala., and on the former river, are to be supplied with \$30,000 worth of new machinery.

TETLOW, LINDSAY & Co., at their new works on East York street, Philadelphia, are manufacturing textile machinery on English patterns, filling orders for Platt, Brothers & Co., of Oldham, England.

MARTIN LANDENBERGER MANUFACTURING COMPANY'S hosiery mill, Frankford road, Philadelphia, injured by fire on the 4th inst., is to be put to rights again at once, and stocked with new machinery.

MARYLAND is looking up as a cotton manufacturing State. Recent statistics show that she has twenty-one cotton mills, 125,014 spindles, 2,325 looms, and 4159 employes. Last year 46,379 bales of cotton were consumed.

THE BRUSSELS Carpet Works of Horner Bros., at Fourth street and Lehigh avenue, Philadelphia, have received their machinery, and will be in full operation by January 1st. Deinel, Eisenhardt & Co., have put in two new hydro-extractors of the greatest capacity.

A SPECIAL meeting of the stockholders of the Borden City Mills was held at Fall River on the 9th inst. It was voted to increase the capital stock from \$400,000 to \$600,000, and equip the new mill with machinery at a cost of about \$100,000. This will increase the capacity of the mill to 37,000 spindles and 804 broad looms.

THE COLUMBIA MANUFACTURING COMPANY, W. H. Watkins, agent, of Columbia Factory, N. C., are now receiving their new machinery for manufacturing cotton warps, and will have it in full operation in a short time. Having purchased the best appliances, they will be prepared to manufacture a superior article of goods.

THE BRIDESBURG MANUFACTURING COMPANY, Philadelphia, are filling the following orders for the Foss & Pevey Card—John Farnum & Co., Lancaster, Pa., 32; James Smyth, Philadelphia, 28; Naomi Mills, Randleman, N. C., 7. They have also furnished a number to the Ida Mills, Troy, N. Y., and to the Ettrick Mills, Petersburg, Va.

The "American Shuttle Association" was formed in Boston, last week, for the purpose of making a combined price. This new association will meet four times a year (quarterly), commencing with January. Officers: E. A. Thissell, president; J. M. Cheney, vice-president; Frederick Kelsey, secretary and treasurer; and auditor, D. T. Dudley.

G. H. BUSHNELL, of Worcester, has just sent off a big press to the Clinton Gingham Company. The press weighs 11 tons and its pressing capacity is 500 tons. Its steel screw is 4½ inches in diameter with 4-inch iron columns 13 feet long. Two small nuts on the press weigh 160 pounds each. The arms are driven by a chain wheel and double-gear counter-shaft.

THE WAMSUTTA MILLS, New Bedford, have taken out the old-style Whitin spindle and put in about 20,000 Rabbeth spindles, made by the Fales & Jenks Machine Company, Pawtucket, R. I. They have also put in 250 Whitin looms, and have put the Kilburn thread contractor on all their ring spinning. They run 153,000 spindles and employ about 2000 hands full time.

L. J. KNOWLES & Bro., Worcester, have just made the following shipments:—To the Middlesex Mills, Lowell, for their new mill, 50 looms; L. W. Faulkner & Son, Lowell, 48 looms; Thomas Dolan & Co., Philadelphia, 40 looms; Samuel K. Wilson, Trenton, N. J.; Harris Woolen Company, Woonsocket, R. I., 24 looms; Raritan Woolen Works, Raritan, N. J., 70 looms—these latter for the new mill just starting.

THE PEQUEA MILLS, only recently completed, now comprise six large buildings fronting on Spring Garden, Twenty-first, Twenty-second, and Hamilton streets. One, entirely new, six stories high, fronting 81 feet on Spring Garden street, by 103 feet on Twenty-second street; a stone weaving mill, 196 by 52 feet, two stories; a one-story mill, 100 by 96 feet attached; a brick weaving mill, 47 by 288 feet, six stories; a carding and spinning mill, 60 by 278 feet, five stories; a dyeing and finishing mill, 68 by 288 feet, six stories; all covering 7½ acres of floor surface, and over 3½ acres of ground. Eight hundred hands are employed, with 750 looms, consuming 3000 bales of cotton and 600,000 lbs. of wool annually.

RECENT FIRES.

ONE of the mills of the Martin Landenberger Company, at 1101 Frankford avenue, Philadelphia, was burned December 4th, with a loss of \$60,000; fully insured. This mill belonged to Jacob Berges, dyer, and was occupied with the spinning machinery of the original proprietors of the Landenberger mills, recently run by Ogden, late Lund & Ogden. The principal mill occupied by the looms and knitting machinery of the present Martin Landenberger Company was not injured.

THE KEARSARGE COTTON MILLS, at Portsmouth, N. H., were burned December 4th, the fire being communicated to cleaning waste by the carelessness of one of the cleaners. The *Boston Journal of Commerce* reports that the mill had "one of the best fire-extinguishing apparatuses in this country," and that two or three supposed successful attempts to extinguish it were defeated by the fire creeping along the ceiling sheathed over deep joists. The insurance was \$410,000 in Manufacturers' Mutual Companies, and of this, the actual loss is expected to reach \$350,000. "It only substantiates the position which has been taken by the Boston Manufacturers' Mutual, that mills which offer a premium for burning down should not be admitted to insurance with strictly first-class mills." Cleaning machinery by gas-light is also charged to be a very expensive indulgence on this and like occasions. The Kearsarge was a mill of 24,500 spindles and 510 looms, on cotton satinet, built in 1867. It is doubtful whether it will be rebuilt. The Boston Manufacturers' Mutual Company had \$135,234 at risk on these mills.

Machinery.

NOTE.—Improved processes of manufacture and new appliances of every nature will be treated under this heading. The Editor will be pleased to receive communications from inventors, machinists, and other practical men, accompanied by drawings, photographs, or engravings for illustration.

NOTES.

THE CLEVELAND MACHINE WORKS, Worcester, have just occupied an addition 60 x 40 feet, which is used for setting up machinery.

ROBERT WETHERILL & Co., Chester, are erecting an addition to their foundry, which will considerably increase the capacity of their works.

THE KITSON MACHINE COMPANY, of Lowell, Mass., are behind orders for their cotton openers, lappers, &c. The machinery of this company has taken a leading position.

We have received from Messrs. Davis & Furber, North Andover, Mass., a set of engravings of their wool and cotton machinery. The list represents many desirable improvements.

THE A. D. CLARK SHUTTLE COMPANY, of Woonsocket, R. I., are manufacturing power and hand-loom shuttles of every description, for cotton, woolen, silk, and worsted. Their facilities are unexcelled.

THE WHITIN CARD, made at the Whitin Machine Works, Whitinsville, Mass., is rapidly gaining favor with manufacturers. Improvements have recently been made which render it about as near perfection as possible.

MR. D. F. ROBINSON, of Lawrence, Mass., is rapidly extending his trade in card clothing, of which he manufactures every variety. He has been in the business forty years, has very extensive works, and has gained a wide reputation for the general excellence of his goods.

CROSBY'S Adjustable Pop Safety-valve is fast gaining favor on account of its simplicity and efficiency. They are pronounced perfect in accomplishing what is required of them. It is impossible to raise steam above the pressure at which they are adjusted to open, and steam pressure will go down only just as much as the operator desires.

MESSRS. E. JENCKES & Co., Pawtucket, R. I., have extended their facilities, and are prepared to furnish all kinds of factory supplies with dispatch. They make a specialty of Hicks' U. S. standard ring travelers, belt hooks, spinning rings, gimlet-pointed wire goods, cotton banding (made from fine yarns spun by themselves, from good middling cotton), and twines.

MR. JOSEPH E. WATTS, manufacturer and patentee, Lawrence, Mass., has sent us a circular of his Automatic Steam-pressure Regulator. These regulators have now been in use a number of years by some of the leading manufacturing companies in the United States, and have proved themselves to be durable and efficient: therefore, they are now no experiment, and only need to be known to be appreciated.

THE WOONSOCKET SPOOL AND BOBBIN COMPANY have issued the following important circular:—

To Whom it may Concern.—The Coburn Shuttle Company, of Lowell, Mass., have associated with them Mr. William Welch, formerly of the Clinton Manufacturing Company, Woonsocket, R. I., and purchased the Woonsocket Bobbin, Spool and Shuttle Works.

Thanking our patrons for past favors, we would cheerfully recommend our successors to your attention, from whom you may expect first-class work and prompt attention in the execution of your orders.

Very respectfully, B. HAWKINS, Treasurer.

MESSRS. C. E. RILEY & Co., importers of all kinds of textile machinery (formerly of Boston), have opened an extensive machinery depot at No. 236 Chestnut street, Philadelphia. They represent the leading English manufacturers, including Asa Lees & Co., Oldham; J. & T. Boyd, Glasgow; Howard & Bullock, Accrington; John Tatham, Rochdale; Taylor, Wordsworth & Co., Leeds; Lord Brothers, Tomdorden; J. Walton & Sons, Manchester; R. & C. Goldthorpe, Cleckheaton; J. Petrie, Jr., Rochdale; and have exceptional facilities for furnishing the best machinery with dispatch. They have an interest in the Coloco (New York) Iron Foundry, where they keep patterns of all machinery they import, so that in case of breakage any part can be replaced at once.

THE Deane Steam Pump Company began business just about a year ago, the pumps having previously been made by the Holyoke Machine Company, and now they find that their business has increased one-half more than they planned for. Their plant has been greatly added to, and the quarters, which they supposed would be ample for some time, have proved so inadequate that they have had to greatly enlarge them. That part of their main building which was only one story high has been raised another story, making a new room 40 by 40 feet in size. Just back of this a brick building has been erected, 45 by 80 feet large and two stories high, for the assembling and painting rooms and blacksmith shop. A new boiler-house has also been added, and a boiler put in to furnish steam for testing the pumps and heating. Pumps of many kinds are made, varying in price from \$85 to \$7000. The company's most formidable and almost the only real competitor is the Blake Company of Boston, the makers of the Blake and Knowles pumps. A great many pumps go out of the country, especially to South America and Mexico. To show the wide range of the field covered by the company's products, it is interesting to note that the orders for two days recently were for pumps to go to Connecticut, New Mexico, California, and Amsterdam, Holland. One of the company's pumps, used in the dye-house of a silk mill in Paterson, N. J., has run for ten years, at 180 strokes a minute, twenty-four hours a day.

FOREIGN NOTES.

RECENT IMPROVEMENTS IN MACHINERY FOR SPINNING COTTON.—Extracts from a valuable paper by Eli Spencer, of Oldham, England, read before the Institution of Mechanical Engineers at Manchester, October 29th, are given in the last issue of the *Textile Manufacturer*, from which we copy the following. This paper is especially intended to describe the improvements introduced in cotton-spinning machinery made since 1866, an account then being given to the same institution by Mr. John Platt.

"OPENING AND CLEANING MACHINES.—Machines for opening, cleaning, scutching, and forming cotton into laps, to be fed up to the carding engines, have undergone very little change in design since 1866; but changes have been made to economize labor by shortening operations; e. g., the use of nine angle instead of double machines, and a better dispersion and arrangement of machines in the mills.

"THE SELF-ACTING MULE.—In its general arrangement the self-acting mule remains as described in 1866, but many very important additions and improvements have been introduced. The self-acting mule of 1866, although covering the principal operations, left a number of minor ones to the skill of the operative spinner or 'minder,' and it performed some of its duties in a very imperfect manner." These improvements are detailed at great length—the governor motion, the backing-off motion, the backing-off chain-tightening motion, and the automatic moving motion, are fully described, all being devices to perfect the winding of the thread on the cap or spindle.

"CARDING ENGINES.—The principal change under this head has been the supplanting of the finisher carding engine by the combing machine. For carding cotton for coarse numbers or counts, the roller and cleaner engine is preferred; but for medium and fine counts, the self-stripping flat-card is much more extensively used. This is now made with a great perfection of accuracy, and supersedes, to a large extent, that class of labor in the cotton mill which is the most difficult to control. Steel instead of iron wire is now more generally used for card teeth. Its advantages over iron are that it can

be drawn finer, and will thus give more points in a given surface; it also admits of being hardened, and carries a finer point, while as the hard points keep their sharpness for a longer period, less grinding is required, and the wear and tear is reduced.

"THE COMBING MACHINE.—Cotton intended to be worked into the finer qualities of yarn is now generally combed, instead of being carded by a finisher-card. The combing machine is thus becoming one of the most important machines in the cotton trade. On its introduction to this country in 1851, it was used for Nos. 200 to 300 only; but in recent years, owing to the demand for a better class of yarns for sewing and other purposes, its use has rapidly extended, and at the present time numbers as low as 30 to 40 are made from combed cotton. When a clear, strong, and uniform thread is required, the combing machine is indispensable, as it completely separates the long fibres from the short ones, which the carding engine does only partially. Cotton that is to be combed is opened, cleaned, and carried on to the breaker-card and the sliver is delivered into cans. A number of these are put up behind a drawing-frame, and their slivers passed through it, to be drawn, straightened, and laid parallel. By drawing the slivers once or twice through the drawing-frame, the loops and kinks are to a great extent taken out, and less waste is made. About 14 cans of the sliver thus made on the drawing-frame are doubled and united at the lap-machine so as to form a lap of $7\frac{1}{2}$ inches wide, which is then passed through the combing machine. The details of this machine are so well known, that a full description is unnecessary here. The machine invented by Heilmann was the first successful machine for combing cotton, and in its principal features it remains as it was originally brought out. Many attempts have been made to supersede it by Lister, Whipple, Stubs, Lacour, Heilmann, Ducommun, and others, but it has always maintained its position. Its mechanical details have, however, been much improved during the last ten years, in order to obtain higher speed, and also greater production; and now 80 nips per minute are obtained, whereas formerly not more than 60 to 65 per minute were obtained. The machines are also made of great length, viz. with 8 heads instead of 6, and their production has been proportionally increased, so that an 8-head machine produces 250 lbs. per week of 56½ hours.

"The improvements introduced since 1866 are as follows:—1. The machine is better constructed, many of its parts are made interchangeable, and some of them have been removed. 2. By the application of nipper-cans at both ends of the machine, torsion is prevented, and a better nip is secured. 3. The machines are now made of 8 to 16 heads, or delivered in length, instead of 4 or 6. 4. All the cans giving reciprocating motion have been set out afresh; they are now cut by machinery, and smoother action, increased speed, and greater production are insured. 5. An improved stop-motion has been applied to stop the machine in case of sliver-breakage, or when the lap is run off. 6. A stop-motion has also been applied to the coiler to stop the machine in case of roller-lap, or when breakage of the sliver at the draw-box occurs; and another apparatus to stop the machine when the can is full has been introduced. 7. A motion has been applied to give a horizontal movement to the comb-brush, for the better cleaning of the circular-comb."

Improvements in the drawing frame are noticed at length; also, in the slubbing and roving frames. The principal improvements are in perfecting details of the work, accomplishing more with the same number of attendants, and avoiding waste.

A NEW ACID PUMP.

THE use of acids in the arts and manufactures is of great importance, and there is scarcely a laboratory or factory which does not use more or less acid, the quantity varying from a single carboy a month in the smaller establishments to more than one hundred carboys a day in the larger works. The carboy, as is well known, consists of a large glass bottle holding from ten to twelve gallons, packed in hay in a box, with its neck protruding from three to six inches. A carboy of sulphuric acid weighs from 170 to 200 pounds, and is a heavy and cumbersome article to handle; and the problem of getting the acid out of this inconvenient holder without danger to life, clothing, and floors, has been the subject of much study and experiment. Various expedients have been resorted to for removing acid from these unwieldy packages, but they have been regarded as impracticable and unsatisfactory.

The late Francis Nichols, of New London, Conn., devoted his time for about eight years to study and experiment in this direction, and invented a pump which would pump the acid independent of the carboy without injury either to the pump or acid. His last inventions and improvements have recently been patented in this country and in Europe.

The principle on which the pump is constructed may be seen in Fig. 1. The body or working part of the pump consists of three glasses and a rubber bulb. The

glasses are very carefully ground together and secured at the joints by screw couplings, making them perfectly air-tight. The two valves are fitted to their places and

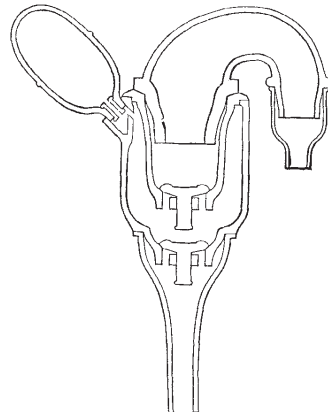


FIG. 1.—VERTICAL SECTION OF ACID PUMP.

carefully ground by machinery constructed especially for the hand, which drives the air into the chamber between the purpose. In use, the rubber bulb is compressed by the glass cups. The lower valve remains tight, and the air escapes through the upper valve. The hand, now removed from the bulb, allows it to expand, and as a vacuum is created in the chamber the upper valve closes and the acid rises through the section tube into the chamber to fill the vacuum. Another compression of the bulb drives the acid up through the upper valve, and the chamber is again filled with acid; as this operation is repeated the liquid flows from the nozzle of the pump. The relative capacity of the chamber and bulb is so nicely adjusted that the acid never rises high enough in this chamber to enter the bulb. It will be noticed that an air chamber is formed at every joint by a downward projection of the top piece; this prevents the acid from ever reaching any joint so long as the pump stands erect. A discharge tube attached to the nozzle of the pump extends to a point just below the bottom of the carboy, so that continuous pumping for a short time will give a siphonic action which can be instantly arrested at any time by the removal of the bulb from its nipple. A metallic bulb may be substituted for the rubber one, giving greater power. By means of a metallic bulb a large tube may be used on the siphon, which will be capable of emptying a carboy of sulphuric acid in less than three minutes.

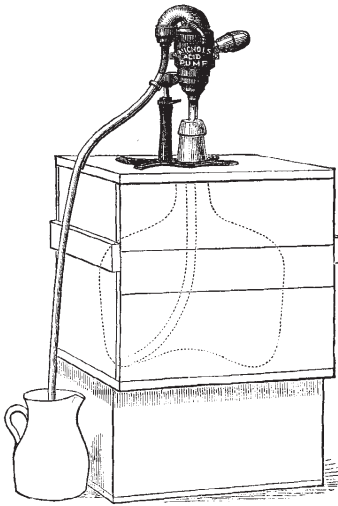


FIG. 2.—NICHOLS' SELF-ACTING ACID PUMP.

The self-acting pump consists of a pump and siphon, which becomes self-acting after a few strokes of the bulb. Once set in motion the acid flows until stopped. Its action is rapid and perfect. The glasses are entirely enveloped in a light cast-iron covering handsomely ornamented, and the apparatus is light, durable, and perfect in its action. Any quantity of acid can be drawn without the least danger to clothing, person,

or floors, and the person using the pump may be entirely inexperienced in such matters.

These pumps have been examined and approved by the U. S. Mint, Assay Office, and Torpedo Station; the fire departments of New York, Boston, Lynn, Cambridge, Rochester; and over five hundred manufacturers of the United States.

Further information may be obtained by addressing the Acid Pump and Siphon Company, New London, Conn.

EXTRAORDINARY COMPRESSING.

THE new Morse Compresses in New Orleans are producing astonishing results by way of largely increased cargoes of cotton from this port.

The ship "Mary E. Riggs," of 1277 tons American register (1226 British), received a cargo of 5400 bales of cotton, weighing 2,568,640 pounds; making 2011 pounds per ton American and 2095 pounds per ton British measurement.

The first cargo of this ship from this port was 3740 bales; the last, and largest (previous to the present one), was 4364 bales, weighing 1,943,498 pounds. Her present cargo of 5400 bales exceeds her largest previous cargo 1036 bales or 625,142 pounds, exceeding her largest previous cargo 1404 bales of same average weight. With freight at one cent per pound and five per cent. primage, the value of this increase, for this medium-sized vessel, is about \$6000. This cargo was compressed, without the advantage of a "Tie Puller," in the ordinary course of business, by the Factors' Press, one of the seven large Morse Compresses. The only cargoes of single bales taken by sail vessels approximating this one are the following:—

The "Minnie H. Gerow" (1304 tons American), from the Champion Press, 2,481,790 = 1903 pounds per ton measurement. The "Western Empire" (1399 tons American register), from the Champion Press, 2022 per ton. The "Minnie H. Gerow," from the International Press (Taylor hydraulic, 64-inch cylinders), 2,644,006 = 2028 pounds per ton. But in all these cargoes of 1903, 2022, and 2028 per ton measurement, tie pullers were used, for which is claimed an advantage of 20 per cent. If the present cargo of the "Mary E. Riggs" had had this advantage, her 2011 pounds per ton American, and 2095 British, would have been 2413 and 2514 per ton—say 20 per cent. larger than any cargo of single bales ever cleared in this country.

Since the above, the British ship "Ben Lomond," of 887 tons register, cleared at New Orleans, by her agents, Messrs. Forstall, Ross & Clayton, with 4363 bales cotton under deck, none in cabin or crew spaces, weighing 2,054,848 pounds, making 2316 pounds to the ton measurement. This is the largest cargo per ton ever taken by a sail vessel from an American port. The larger part of this cargo was "doubled." The cotton was tied by hand (by colored men), and consequently without the 20 per cent. advantage claimed for steam "band pullers." It was all compressed at the Southern Press by the 90-inch cylinder Morse Compress. Not more than three years ago the average cargoes of ships from this port did not exceed 1425 pounds per ton register; and for other modern-built presses the average is now about 1725. The above cargo of 2316 without tie pullers, therefore, exceeds recent average compressing by 35 per cent., or 524,773 pounds, in a single cargo of a small ship like the "Ben Lomond," and at the rate of freight received makes a gain of £820—say, \$3936. The proprietors claim that under more favorable circumstances the 90-inch Morse Compress can considerably excel the above.

NEW SELF-ACTING MULE FOR WOOLEN.

THIS mule is designed and built with what is known amongst practical spinners as a "low head," and as it has a great many important points in its construction, we propose to notice them in detail, commencing with the basement. The headstock stands on strong iron foundation-plates, and mounted on these plates, and parallel with the frame side of the headstock, run two strong main slips, upon which is supported a strong and self-contained square, and upon planed beds on this square are fixed the whole of the brackets. This arrangement conduces greatly to the accurate setting and stability of the working of all the parts contained in the square, and is an advance upon most headstocks of this class; indeed, we have not seen any other woolen mules in which the headstock is so solid in the back part.

The back part of the headstock, containing the taking-in gearing scrolls, is cast in one solid piece, thus securing accuracy of bevil gearing, and imparting strength to that part of the machine where it is most required; and in taking down a machine this part is always packed and sent out intact and complete, upright shaft and bevil, scroll shaft and scrolls, along with every other article fixed in its proper place. The drawing scroll is placed outside of the headstock, on the right hand, just under the "jacking up" gearing, relieving the inside of the headstock from being

crowded, and making the drawing scroll handy to get at, as may be seen from the illustration. The "check" and "pulling up" scrolls are in the usual place at the bottom of the back part of the headstock.

The patent governing motion for making cop bottoms is entirely self-acting, and, being purely automatic, no help from the minder or spinner is required. The quadrant nut ascends the quadrant in exactly the same ratio as the cop bottom increases in circumference, thus producing an evenly-wound bottom, perfectly sound and free from "snicks" and "snarls." We have not seen the working of the quadrant nut so correctly and efficiently done before.

A patent "backing-off" motion is also applied to this mule, which consists of a cam to work along with the ordinary backing-off pulley. This cam being shaped to imitate the spiral coils of yarn on the spindles, brings down the faller wire in the same ratio as the yarn is unwound from the spindles, and the result is that the yarn is always kept tight, and all "snarls" are avoided. This cam is governed by a loose incline upon the "shaper" or coping rail, of which more will be said presently, and which varies the backing-off as the building of the cop proceeds, always producing a firm and sound cop nose during the formation of the entire set of cops, with an unvarying accuracy not previously accomplished.

A patent brake and "jacking-up" or drawback motion is attached to this mule, which is entirely under the control of the operator or operative spinner, and which has wide range of application in its motions; for instance, it can be made to "jack-up" or draw back at various speeds and any distance, from nothing to six inches. The carriage also can be made stand still at the extremity of the draw, to harden the yarn, as long as required previous to *receding* or *drawing back*; and the whole of the above changes are effected without either change of wheels or change of levers. In changing the drawback motion from one distance to another (say from three-inch to four-inch) there is only one move or one change to be made in this mule, while in mules by most other makers it would require five alterations to obtain the same object, viz.:-

1. Alter length of drawback motion.
2. Re-set holding-out catch.
3. Re-set return-band catch.
4. Re-set motion for keeping the winding click out of gear.
5. Re-set motion for putting the winding click into gear.

If any one of the above motions is badly set, there is a "lock" or break down either of drawback motion, quadrant, or quadrant chain. By the use of the patent brake the holding-out catch is entirely dispensed with, and the quadrant chain, during the drawing back of the carriage, is always perfectly tight. The winding "click" is kept out of gear by a positive motion until the backing-off is completed. This is accomplished by connecting the winding "click" to the faller locking motion. By this arrangement the winding "click" can not get into gear until the fallers are locked, which is the completion of the backing-off, thereby effectually preventing one motion interfering with the action of the other, an eventuality at this point which had not hitherto been guarded against. Besides there are other advantages, not to be lightly esteemed, arising from being able to work with the quadrant chain always tight, one of which is that there is much less wear and tear in the quadrant chain itself, and another is that there is no check given to the carriage, as it runs inward at the point where the chain becomes tight. A further mischievous thing attending the working of a slack chain is the sudden rise of the under faller wire during the interval between the first move of the carriage inwards and the point at which the chain becomes tight, when the spindles begin to wind, and the rise of the under faller wire has to be suddenly checked, and the under faller wire has to be pulled down again, subjecting tender woolen yarn to great strain and breakage. No sudden check or strain occurs where a tight chain can be worked; the movement is steady and the pressure uniform. Another matter to which we wish to direct special attention is that by a patent connection of drawing-out, taking-in, and backing-off levers, a correlative action of these levers is ingeniously obtained, by which no two motions can be in gear at the same time. The act of putting the taking-in motion into gear disengages the drawing-out motion, and if the drawing-out motion be put into gear it disengages the taking-in motion, and so forth, thereby avoiding numerous heavy breakages. The double-speed motion is fixed on the rim shaft, and the variation of speed is obtained by working two rims of different diameters on the same shaft, on the same principle as double

speed was obtained on the woolen hand mule. The slow speed rims are from 12 inches to 16 inches in diameter, and the quick speed rims arc from 20 to 24 inches in diameter, and are fastened to a long cast-iron bush, on the opposite end of which is secured a 16-inch driving pulley. When the mule is on the slow speed, the large rim is simply a carrier-pulley; and when the mule is on the quick speed, the small rim, in its turn, merely performs the part of a carrier pulley. This system of arranging the obtaining of speed avoids the complicated overhead gearing usually resorted to. The quick speed can be thrown on at any part of the draw. The twist motion applied to this mule is so easy to alter that any change can be made almost instantaneously, and yet it is firmly secured, and will give any number of turns per inch ever required in spinning any class of woolen goods. The cam shaft-shell is driven by an 8-inch friction, with revolving dies or stops, and the change lever acts directly into it, without any additional stops, links, or bell-crank levers. The troublesome catch boxes with shoes and dolly pins being dispensed with, the whole of the wearing part of this friction, along with the spring (when not actually making the change), are standing still. Suppose the mule to be making four draws in 60 seconds, the cam will be at rest at least 58 seconds, and only working two seconds. The cam requires very little oil, by having comparatively nothing to do. This cam friction completes all its changes, however slow the mule is running, which can not be said of most mules. The front spindle can be taken out if required without disturbing the bottom rollers. If needed, a spindle-stopping motion is applied, which stops the spindles for any given length at the commencement of the draw. We are pleased to see that the makers of this mule have turned back to the

immediate object in hand. Adaptation, stability, ease of change, and certainty of action seem to pervade the entire machine, and if it meets with the success that its merits deserve, a brilliant and useful future awaits it. We hope the makers, Messrs. Asa Lees & Co., Limited, Oldham, will adopt a standard of not less than 84 inches for the draw, as a good length of draw is an immense advantage in woolen spinning, as it minimizes the breakage, being equivalent to a reduced speed, and every practical man knows the advantage of a reduced speed in saving breakage and waste in woolen spinning.—*The English Textile Manufacturer.*

A NEW PATENT HARNESS MOTION.

In calling attention to the "Ingraham Patent Harness Motion," we desire to point out a few of the most prominent features of superiority over all other machines, for the following reasons, viz.:-

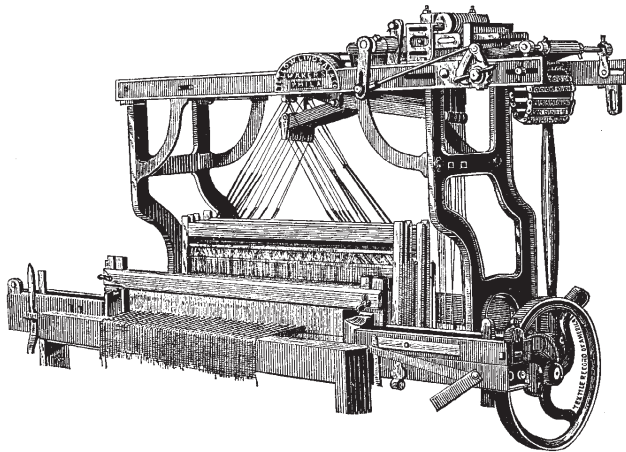
1. The motion of heddle leaves is divided into three equal parts, viz., one-third to open the shed, one-third dwell while the shuttle is passing through, and one-third to close. By this means enabling us to cross the shed equal to an ordinary cam loom, the advantages of which are at once seen by every practical weaver.

2. This machine has been designed and constructed to reduce the amount of power lost by friction or springs to its lowest point, there being no rotary motion beyond the usual crank shaft, and being a positive motion both up and down, thus dispensing entirely with gears or springs, and every motion being direct-acting and positive; thus causing the machine to run as light and at the same speed, with as little power as an ordinary roller loom. The inventor, who has had over 25 years' experience as a weaver, has endeavored to fill a want long experienced by the trade—that is, for a motion that would be at once simple and durable in its construction, and can easily be applied to any make of loom, broad or narrow, and will make any class of goods, light or heavy, figured or plain, which the cross and dwell of the shed enables it to do, with numerous other advantages, all of which may be better understood by a personal inspection. A great many of these motions are now at work, and the loom can be seen in full operation at the shops of Tetlow, Lindsay & Co., 531 East York street, Philadelphia, where all other information will be given.

INDUSTRIAL INNOVATIONS IN THE BRADFORD TRADE.

Messrs. Schmidt & Spreight, of Bradford, have introduced a new heald which promises to supersede the old appliance. Although many patent healds have been invented, the original form made of threads continues in popular favor. The heald shafts in this case are very similar to the common form, but the ends are braced together so that they form a rigid though light frame. The ordinary heald-band is superseded by two light iron bars about half an inch deep, and little more than $\frac{1}{8}$ inch thick, which extend the full length of the shafts, and are placed just outside them. On these are slung the healds, made of flat steel wire. They are about 8 inches in length, and have a crook on each end, which serves to keep them on the bars. One of the difficulties which has been overcome was the bending of the wire edge-wise, so as to form these crooks. Another difficulty was the making of a hole through the wire for the end to pass through, which, without being too small, should allow the wires to hang edge-wise on the bar, as close to one another as might be necessary. This has been accomplished by punching a narrow slot about $\frac{1}{8}$ of an inch long in the middle of the flat of the wire, and then opening the hole thus made. At the same time it was absolutely necessary that the hole thus formed should be free from all sharp edges, which would tend to injure the tender warps. In these respects the new flat heald is apparently perfect, and its inventors claim for it that being made of polished steel, it offers less friction to the ends which pass between the healds, in cases where there are several sets in the loom at the same time. These healds can now be made at the rate of 1000 in an hour, and it is the perfecting of the machine for making them that has been the greatest difficulty.

A SPECIAL meeting of the stockholders of the Borden City Mill, at Fall River, Mass., held on the 9th inst., voted to increase the capital stock from \$400,000 to \$600,000, and equip the new mill with machinery at a cost of about \$400,000. This action will increase the capacity of the mill to about 37,000 spindles and 804 wide looms.



INGRAHAM PATENT HARNESS MOTION.

long "shaper rail." The short rail has never been satisfactory in woolen mules. There are too many loose corners, and, as a consequence, too much chafe attending a movable rail, in addition to working from so short a base, so that altogether the general result and experience of working a short rail has been anything but satisfactory; whereas in the long rail the base of action is co-extensive with the length of the draw, and there is no necessity to have the rail movable, and no liability to have variation multiplied so many times over by working from a short infirm base. This coping motion stands firm on double coping plates, and these are supported on iron foundation plates, both back and front. A loose incline and plate to work with it are supplied, which plate and incline govern the locking of the fallers during the whole process of the building or winding of a set of cops. The loose incline of this "shaper" or coping motion, supplies a long-felt want, and gives the manipulator perfect command of the backing-off and winding of the cops, so that there is no longer any necessity to wind those long, loose bottoms which have hitherto been so troublesome and wasteful. The loose incline enables a bottom to be wound as short and firm as can be produced by any hand-spinner. This mule can easily be altered from spinning to doubling, and *vice versa*, without taking the drawing shaft out of its place. All the motions of the mule appear to be singularly free from liability to interfere one with another, and the mule will bear knocking about without getting out of order or getting "locked," and last but not least, it is about the most noiseless headstock that it has been our privilege to touch or stand by. There is no longer the noise and ring of the speed-reducing gearing of the backing-off friction; this being an independent motion, no more speed is generated than is required for the

CARD GRINDING.

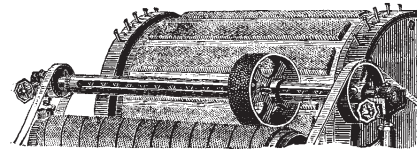
The Hardy Machine Company, of Biddeford, Maine, have been building and constantly improving card-grinding machinery, as a speciality, for the last eighteen years, and this long experience in the business entitles them to the claim of knowing what is required for grinders to best meet the necessities of the card room. Their grinders, as now improved, with ordinary care, will run many years without needing the least repair, and then, as a rule, it will only require the replacing of the little traverse-dog that runs in the right and left hand screw; this is done in a few minutes, without taking the grinder apart, and costs but a trifle.

The grinders, as they now build them, are very durable, from the fact that but eleven pieces in all are required in their entire construction, and they use for traverser motion a substantial right and left hand screw, which aids materially in strengthening the grinder, and make the dog whole (instead of using two pieces as at first), with a friction-ring to prevent its wearing rapidly.

Their grinder may be run at any reasonable speed, or traverse without the least tremble. The principal object is to have the wheel always moving along off the teeth, and as ninety-nine one-hundredths of the grinding is done by the *revolutions of the wheel*, by traversing it faster the grinder will only be worn without grinding the cards any quicker, and as has been proven, not get as good a point to last and do as good carding.

The Hardy Company have in a long manufacturing experience built grinders to traverse by various mechanical combinations, and before adopting the screw, which now is always substituted for the chain in lathes and all other machines where it can be, they tried the chain, that being the oldest mode for a traverse motion in other machines. They found by experiment that the chain would constantly give vexatious trouble by rapid wearing, frequent breaking, and perpetual stretching, and more especially in the grinder, because in a necessarily small shell the pivots and quarter gears on which the chain turned had to be very small; also causing a quick and short turn of the wheel at the ends, so that it would jump badly and grind more in the centre than at the ends of card; and again, that in the grinder they should have some over 400 *continually wearing joints and pieces*. They proved by these experiments, beyond a reasonable doubt, that a grinder traversed by a chain would be *short-lived, and soon condemned as utterly worthless*.

The traverse grinding wheel of the Hardy grinder passes its whole width *entirely off of the card teeth at each end before changing*, and so of course must grind every tooth alike. This is a most important point, and is one of the strong claims of the patents, and another is, the grinder in combination with nicely-made adjustable stands and boxes, so constructed and so attached to carls as to grind easily and perfect both the *doffer*



and main cylinder at the same time. They have the opinion and assurance of the most eminent patent counsel in the United States that they can easily sustain these claims, and subject the builder, seller, and user of any grinder infringing upon them to the *payment of damages and royalty*.

The superiority of the Hardy grinder over the old way of grinding with a long cylinder, with only an inch or two of vibration is very great. It is utterly impossible to grind a card true with a long cylinder, or to get anything but a *chisel point*, with which no good carding can possibly be done. They also leave a *wire edge*, which requires a strickler, costing almost as much as one of their grinders, and cards have to be stripped four times as often, and do not strip half as easy; they will destroy more card clothing every year than their grinders cost, and are bungling, old-fashioned machinery. Over 6000 of the Hardy grinders are now in the textile mills throughout the country, and probably 110,000 cards are being ground with them.

The Hardy grinder received the diploma and medal at Philadelphia, 1876, and always a gold medal (if there were any) at every fair and exhibition where it had been on exhibition.

A NEW BOILER-CLEANER.

The device represented in the accompanying engraving is designed to prevent the incrustation of steam-boilers by removing all the scale-forming matter contained by the water used in them, whether vegetable or other matter in suspension, or salts in solution. The simplicity of the principles upon which the action of this ingenious invention depends, and their entire accord with natural laws, commands the approval of all practical engineers. The problem of preventing incrustation in steam-boilers has proved to be one of the most difficult ones in the whole range of engineering science.

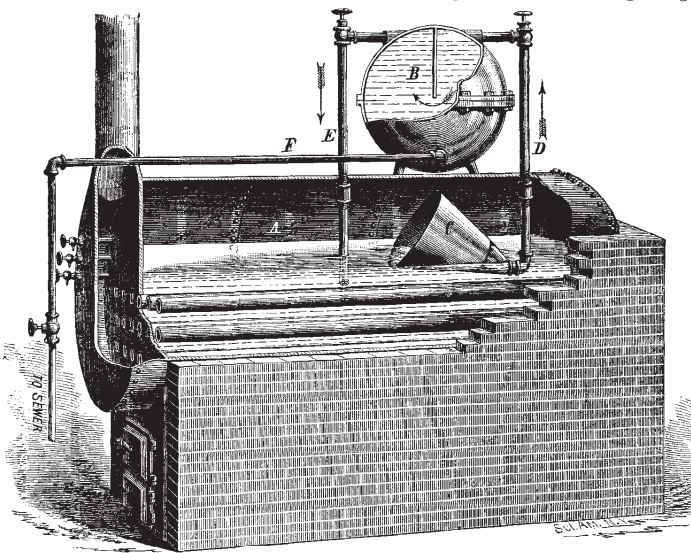
Millions of tons of coal have been wasted, vast amounts of property destroyed, and thousands of valuable lives sacrificed to the evil which this device, it is claimed, effectually removes. The most careful consideration has been given to this subject by scientific men, mainly in the direction of chemical analysis. How to render the solid sulphates, carbonates, and chlorides more soluble, and thus enable engineers to relieve their boilers by frequent blowing, has been the inquiry. But the results of these investigations have

causes a constant circulation of water as long as any steam remains in the boiler. In all boilers heated at one of their extremities there is established a circular motion of the water, which not only raises the solid bodies and agitates them, but also keeps them in constant motion in such a way that the surface currents always set back from the fire, while those at the bottom travel in the opposite direction, so that all matters contained in the water, whether originally held in suspension or precipitated from solution, are carried by ebullition to the surface, and there float until they are finally deposited upon the heating surfaces, and attach themselves in the form of scale, and this continues until the accumulations cause a great increase in the amount of fuel required for evaporation and incur the danger of explosion from overheated plates.

The Hotchkiss mechanical boiler-cleaner affords a complete remedy for these evils by removing all sediment as soon as it rises to the surface. As the suspended matters are thrown upward by ebullition the surface current carries them toward and into the large mouth-piece, whence they are carried by the circulation to the reservoir, where, the water being cooler and in a quiescent state, all solids are precipitated. The solid matter may be blown out from time to time through a blow-off pipe, F, provided for that purpose. The spherical form of the reservoir permits of blowing out the mud which accumulates in it, without wasting the water.

Although the general principle of this invention has not been changed, it has been greatly improved in detail, and cheapened and simplified, so that it may be readily applied to any boiler by an engineer or ordinary mechanic.

Further information in regard to this invention may be obtained by addressing Mr. James F. Hotchkiss, 84 John street, New York City.



HOTCHKISS IMPROVED BOILER-CLEANER.

been only partially successful, and the owners of steam-boilers have found only too often that the remedy proved worse than the disease.

Many mechanical devices have also been tried in this and other countries, but these have been crude and complicated, involving much trouble in manipulating them, and were finally discontinued.

The invention which we illustrate seems to mark a new era in the treatment of this subject. Since its first introduction, in 1876, it has been steadily growing into public favor, until it has secured the unqualified approval of many of the most practical and scientific mechanical engineers in this country.

The proprietor, Mr. James F. Hotchkiss, by a series of experiments and improvements, has reduced the question of the removal of sediment from, and the prevention of incrustation in, steam-boilers to a certainty, and over six hundred times has this fact been demonstrated by trials in every part of the country and with all kinds of water.

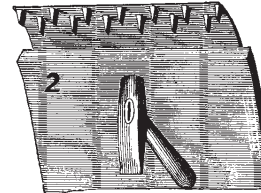
The engraving represents the cleaner as attached to any ordinary boiler. The large iron bell mouth, C, is placed near the tubes or flues so as to bring the bottom of the mouth on a line with the lower gauge cock (low water). This mouth is usually connected by a right and left nipple and elbow to the vertical up-flow pipe, D, piercing the shell as far back as braces will allow, and connecting with one side of the improved reservoir, B, at the top. From the opposite side of the reservoir a return pipe, E, extends to a cooler stratum of water as near the bottom of the boiler as the tubes or flues will allow, the lower the better.

This system of pipes forms a siphon, which, together with the difference in temperature between the surface and the point where the water returns to the boiler,

BELT HOOKS.

Mr. W. O. TALCOTT, of Providence, R. I., has got by all means the best belt hook we know of. It will stand about twice as much strain as any other, does not have to be watched, and but little time is spent in mending. The cut presented herewith shows the manner of fastening the ends. The directions are briefly as follows:— Lay the hook down on something solid, with the teeth up. Put one end of the belt on the teeth, and drive it down tight on the plate. Then put the other end of the belt on in the same way. Let the opposite edge of the hook be tipped up, so that the edge you are driving on shall have a good bearing behind the teeth. The object is to put the belt on without taking the curve out of the plate.

To take up a loose belt, take hold of the belt each side of the hook and twist off one end, cut out as much as you want, and drive it back on the same hook. In orders for rubber belts, Mr. Talcott desires applicants to state number of ply they want.



Manufacturers who are using these hooks express the utmost satisfaction with them. Some very significant tests are shown in Mr. Talcott's advertisement in another part of the paper.

SILK MANUFACTURES OF PATERSON.—Mr. Brocklehurst, of Macclesfield, England, a member of one of the largest silk manufacturing concerns in the world, visited several of the Paterson silk mills recently to see for himself what progress has been made in the trade in this country. He was greatly surprised, and particularly at the general use of steam-power looms in weaving the most delicate and costly fabrics. It is nearly or quite ten years since the Paterson mills began using power looms on scarfs and other fancy articles; but the Macclesfield mills are only just beginning the experiment of using power for hand looms.

BAUGH'S PATENT SECTIONAL MILL.

FIGURE 1 is a perspective view, and Fig. 2 a sectional view, of the mill used in the grinding of bones for boneblack and sulphate of ammonia, at Baugh & Son's laboratory, Philadelphia.

In these mills the lower grinding surfaces are curved, in order that iron may be quickly discharged without injuring the dress when the pressure is brought upon them by the iron becoming jammed.

No. 11 is the extra top breaker, and 13 the top breaker, as they are known in this style mill. They are made with projecting arms or lugs, which are varied in shape to suit different material. They are made to fit over the sleeves 12 and 14, which fit snugly on the spindle, 4, so as to protect it from abrasion from the continued jar of the breaker, and they also obviate the necessity of renewing that much iron with the breakers. 8 is a left-hand nut for spindle used to hold the breakers down to their place—it is made with left-hand thread, so as to tighten when the mill is running. 15 is the middle breaker, used to tighten the grinding plates or sectional dress, 23, with three holes in it for the left-hand stud bolts, 16. 22 is the stationary sectional dress, or the opposite grinding plates to 23; they are held in their places by being wedged in the cylinder in the lower part of 17. These sections are made very deep, so as to admit of a great amount of wear. 18 is also a set of eight pieces of dress for the pot, and are called 1 C small. 19 is the dress which completes the lining for the pot; they wear a very long time and do their work well. These grinding plates are cast of the best quality of iron and with a great variety of matched dress for the rapid pulverization of different materials. 20 is the cone, on which the dress, 23, is fastened; it has a heavy wrought-iron ring or flange around the base to support the plates. It is turned down and balanced, insuring the running of the mill with the greatest possible exactness, providing for equal distribution of work in grinding and wear of plates. 27, wipers used for rapidly discharging the material at the spout. 4, upright mill spindle, the lower end of which works in a step box, 38, being made of cast iron lined with steel. There are two key ways, 35, let into the spindle to hold the bevel cog wheel, 29. 39 is a patented conical anti-friction disk of steel, placed under the spindle, which effectually prevents heating when well oiled.

The step box, 38, is lined with steel, 37, both on the sides and bottom, and is movable and easily renewed when worn out. The step moves up and down in the hollow column, 43; in closing and opening the mill to adjust the grinding, the shaft works freely through the bevel cog wheel, 29, or a pulley that is supported by the column, 43; they have a steel ring, 36, pinned to them, which prevents their wearing away the cast iron when the surfaces come together. 30 and 40 are levers for adjusting the mill, with weights, 32, to regulate the grinding; with these the grinding surfaces are opened or closed, and retained in position to produce any degree of fineness of material that may be required. 45, the driving cog wheel, which reduces the speed of the spindle to one-half that of the driving pulley, 47. 44, wrought-iron counter-shaft. 47, tight-and-loose pulleys, 22 inches in diameter and 10-inch face. The large screw, 1, is the lifting screw for raising the cylinder to change the dress. To change the upper sections of dress, the bolts, 53, are loosened, allowing the mill to be opened at that point. To change the lower grinding surfaces, the bolts, 21, are unscrewed, allowing the mill to be opened at that point. Then the large nut, 8, is unscrewed, and the breakers raised together with the sleeves; next, the stud bolts passing through 15 are unscrewed, when all the dress can be removed. The simplicity of this arrangement, the quickness and ease with which these changes can be made, will be apparent to those who have any knowledge of mills or mill machinery.

The capacity of these mills to crush and grind is from 10 to 30 tons in ten hours, according to the stock.

Mr. BRUSH, the inventor of the electric light bearing his name, lives in Cleveland. He is so modest about his work that one of his friends there was surprised, the other day, to find that the originator of the apparatus was the man he had met and talked with from day to day. He had supposed that the word "Brush" simply referred to something in connection with the make-up of the machine.

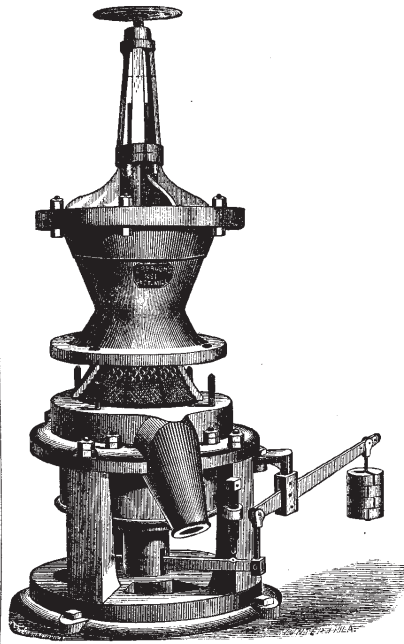


FIG. 1.

DEPRESSION IN THE GERMAN TEXTILE TRADES.

THE *Frankfurter Zeitung* observes that the German official journals are showing much zeal in publishing reports describing a marked improvement in the position of German industry. Nevertheless, the official reports themselves show that great complaints of depression are being made in many districts, and that in the textile districts especially the necessity of curtailing production is being discussed. A report from Breslau says the cotton, mixed woolen, linen, and mixed linen trades have continued in a relatively stagnant

condition. The absence of buyers has had the effect of depressing prices for both yarns and tissues, while the prices of raw cotton and flax have remained relatively high. The accounts of the cloth and "Orleans" weaving industries in the Gorlitz district are still more unfavorable. Competition for supplying the markets of South Germany, Holland, and Sweden with the better descriptions of cloth becomes daily more keen, and prices are therefore being continually beaten down. The small demand at the recent Leipsic Fair has induced several manufacturers to reduce their production still further. This remark applies especially to the "Orleans" manufacturers, whose position is becoming so serious that several are thinking of giving up the trade altogether. The combed-wool manufacturers of Gera and Greiz, whose industry was formerly one of the most profitable of the German textile trades, complain that the rapid advance of wool and yarn prices in the early part of the year and the subsequent reaction which set in during June have had a very adverse influence, especially as large contracts for the supply of woven goods were made early in the spring, and these had to be completed by means of high-priced yarns. The flax-spinners and linen manufacturers of Leignitz also complain that business has been latterly unprofitable. Both spinners and power weavers are compelled to work for stock, and hand-loom weavers are receiving fewer orders from Berlin than in former years. From other centres there are, of course, gratifying accounts of full employment and steady trade. In most of these cases, however, says the *Frankforter* paper, the export trade is of primary importance. Hence it appears that there is a considerable degree of briskness in the foreign trade, combined with great depression of the home trade. This is especially true of the cloth and hosiery branches, these being important export industries. Thus, though certain special industries are active, no general improvement of German trade has been manifested, and it seems likely that affairs in the home trade will become worse rather than better, as the advance of food prices in Germany will compel many classes to contract their expenditure on manufactured goods.

UNSWORTH'S DIRECT-ACTION WINDING DOUBLING MACHINE.—This machine is said to possess the following advantages:—

1st. They have a direct action stop needle, which does away with the levers which are used in other machines, and which are often getting out of order, and consequently are uncertain in their action, and require to be constantly set.

2d. The action of the needle is to draw a bolt, which causes an instant stop.

3d. They are made with a double drum to each bobbin, the advantage of which is great, as the bobbin on which the yarn is being wound rests on the second drum, and the action of the stop is to bring this drum, containing the bobbin, away from contact with the driving drum, thus preventing the great evil, which is in other machines, of having to force in between the surface of the yarn and the driving drum, knives, or a plate or wedge of some kind to make the bobbin stop. This is most injurious to the yarn, as it scrapes up the fibre.

4th. The brake system, which can be applied to this method, and to no other. The second drum holding the bobbin falls into a half-round brake (set one-sixteenth from it when rotating) thus stopping instantly the impetus of the drum and bobbin.

5th. There is a special guide in the machine for guiding the threads on to the bobbin. It is made with a revolving porcelain bowl round which the threads pass, and the action of it is to prevent slack ends going on to the bobbin,—this can not be done in any other machine.

6th. There is a revolving presser bowl from 3 pounds to 20 pounds weight (according to the fibre wound) working on the yarn, which makes the bobbin hold at least one-third more yarn than can be put on by any other machine, and at the same time it lays the fibre, which gives the yarn extra strength when twisted.

7th. A great speed can be attained with this system, and the quicker the machine is run, and quicker the action of the stop; the reverse is the case in other machines.—*Yorkshire Inventor and Manufacturer.*

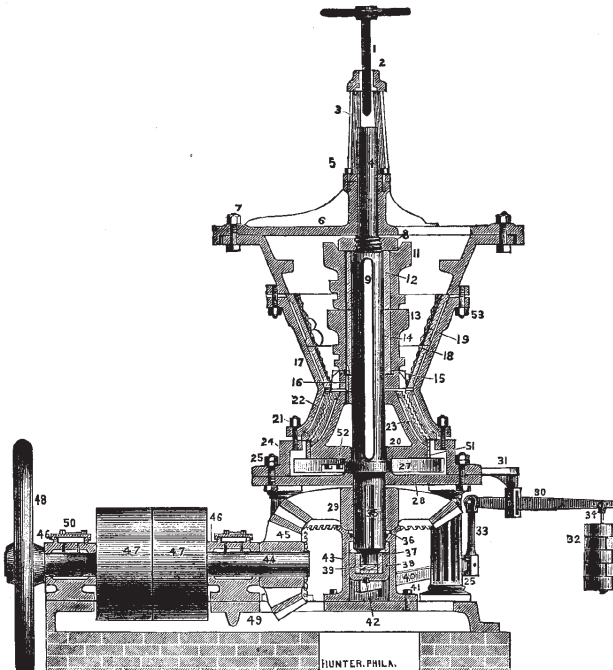


FIG. 2.