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STEAM PIPES AS CAUSES OF FIRE.

The extract from the *Bulletin* of the National Association of Wool Manufacturers upon this subject, published recently in the SCIENTIFIC AMERICAN, has attracted much attention and excited some alarm in the minds of many using such apparatus. Some of these have made examinations into the condition of the wood work in the vicinity of such pipes and report "all right." Some have kindly sent us specimens of the wood, showing its condition after exposure for a considerable time to the action of the heat from steam pipes. Should the article in question lead to a general examination, and should our correspondents be communicative, it is probable much useful information would be elicited. Among those who have favored us with specimens are Dr. Daniel Ayres, of Brooklyn, N. Y. The chips presented by this gentleman were taken from wood in contact with pipes of the low-steam warming and ventilating apparatus, made by D. R. Benton of the same city.

The wood appears somewhat like that which has undergone what is known as dry rot, but shows no signs of combustion. It is remarkably dry, light, and brittle, may be much of it crumbled to pieces by the fingers, and is evidently in a condition to be ignited at a comparatively low temperature. These chips are of spruce timber, with some apparently of pine, which are the most brittle.

We are decidedly of the opinion that these chips would not ignite at any temperature to which they have been exposed during several years in the building from which they were taken, but we should decidedly fear their ignition in contact with pipes filled with high steam.

Some experiments to test the temperature at which wood in this condition would ignite would be of great practical value in settling the question of safety in using steam pipes for heating purposes, and we trust such experiments will be performed by some competent person, and their results made public.

A. H. Walker, of Oswego, N. Y., sends us a specimen of excellent tinder into which some new sack cloth placed in contact with pipes carrying steam at sixty pounds, six months since, has been converted. It is strongly suggestive of fire in its appearance, and catches and continues to burn from the slightest spark.

We would like to see this subject thoroughly ventilated and some definite and reliable conclusion reached in regard to it. The question is one of the utmost importance, and all its bearings should be thoroughly understood.

AMERICAN ENGINEERING IN CHINA.

Ting, late Taotai of Shanghai, the present Footai of the province, whatever these titles may imply, commenced in 1865 an arsenal on a small scale at that city. The works cover about half a mile square, and have been carried to completion under the direction of F. J. Falls, a citizen of the United States.

The Shanghai *News-Letter*, now before us, gives some details of interest, from which we extract some items.

In each of the different departments there is a mandarin, acting as an overseer over the native workmen, to prevent idleness among them, and to exercise a general control, but not in any way to instruct the native workmen, this being done entirely by the foreigners acting as foremen, etc. All the accounts of the arsenal are kept by Chinese officers.

Some steamers have been constructed, launched, and supplied with guns, and more are now under way, in addition to

which one vessel 280 feet long and another vessel 260 feet long are projected—entire machinery, boilers, engines, and armament to be constructed at the arsenal.

A college is in formation, and literary men, appointed by the government, are at present employed with foreigners, translating works on mathematic* engineering, chemistry, etc., in order to prepare class books in the Chinese language for the use of the arsenal, to be read throughout the middle kingdom, to educate the Chinese in all that relates to an arsenal, ship building, etc.

Engineering students are to learn mechanics in the college, and the practical parts in the shops. Navigating students are to have a large training ship, so that they may learn seamanship practically and theoretically.

The works contain a drawing department, pattern shop, foundry, forgings shop, boiler shop, musket shop, engine shop, heavy machine engine and gun workshop, erecting shop, musket-finishing shop, shop for finishing shells, shop for the manufacture of Congreve rockets, rocket tubes, etc., mold loft, yards, storehouses, etc., all fitted out with approved tools and fixtures. Additional heavy machinery has been ordered from England.

Mr. Falls has gained the confidence of the Chinese, and has also the confidence and hearty support of his own officers; and the Chinese Government, being desirous of building steam vessels, and having every confidence in Mr. Falls, leave the entire responsibility of their construction with him.

The earlier energetic efforts made have now grown into successful results, and are fast growing into larger proportions, which will greatly contribute to the building up and regeneration of the Chinese nation, resulting in advancing the Chinese people, to make China strong in her own resources; to make her a living nation.

To Mr. Fall's able supervision, with the hearty support of his officers, Fung-ta-jen and Sung-ta-jen, also with the zeal of subordinate mandarins, these good results are being brought about. This able engineer is entitled to the respect of his fellow-citizens, as his energy and ability reflect credit upon his native country.

THE EXHIBITION OF THE AMERICAN INSTITUTE.

The present writing found the machinery department still incomplete. Only three of the engines exhibited were running, driven by Root's boiler, the setting of Harrison's boiler being yet uncompleted. Only a few of the machines were in operation, and, as nearly every exhibitor was too busy in arranging his machinery to give information, we decided to again defer a notice of this department; and though it contains more of general interest to our readers than probably any other in the Fair, we must ask them to accompany us, for the present, in a ramble first through the

SILK DEPARTMENT.

Those of our readers who have followed the various articles on the manufacture of silk, published in these columns during the past year, are pretty well informed in regard to the present status of this industry. It will, therefore, be unnecessary to occupy much space in any general remarks upon this subject. We will say however, that in many lines of goods American products can now fairly compete in quality with the best that can be imported, while in sewing silks and twists, we are considerably in advance. In dyeing, we are now pretty well skilled, with the exception of what is technically called "weighting," i.e., the restoring, in the dyeing process, of the weight lost in the process called boiling, wherein all of the gum is washed away. In this, however, the manufacturer is the only loser, the consumer being a gainer; for, as the gum adds nothing to the strength of the silk, and as, also, weighting imparts no strength, and also, as silk is sold by the pound, it follows that the purchaser of American sewing silks and twists gets more yards, of equal strength, for his money, than he would obtain were the original weight of the silk restored in the coloring process. But this is not the only reason why American sewing silks and twists are superior, as will be seen further on, when we notice in detail the goods displayed.

The Nonotuck Silk Co., 28 Warren st., New York, exhibit one of the most beautiful cases on the floor, very tastily arranged. It shows the whole progress of the silk from the mulberry-tree leaf, upon which the worm feeds, to finished

SPOOL SEWING SILKS AND TWISTS.

The case contains various specimens of cocoons, raw silk from Japan, and TSATTLEE, a superior kind of silk imported from China. It is brought to this country in bales of 100 lbs., and its value is from nine to twelve dollars per pound. This firm, as well as others, in this country, manufacture sewing silks and twists from Tsattlee, and also, from other fine grades of silk. In Europe, these grades are made into dress goods, ribbons, etc., and inferior grades are employed for twists, etc.; a second reason for the superiority of American goods of this class. English manufacturers state that they would not get first cost for their goods, were they to employ the quality of stock used in America for this purpose. The Nonotuck Silk Co. show in their case a large variety of colors, all of which compare favorably with imported goods. It may be observed here, that a slight deficiency is admitted for American goods, in the aniline colors, but this can only be detected by experts, and in some dress goods shown here, even the most critical would be forced to admit that no foreign goods, of the same class, can excel the beauty of either their colors or textures. The goods of the company under consideration are equal, in this respect, to any goods of the same class exhibited, and we are informed, they have, in their establishment, the oldest American silk dyer in the country, who has been in their employ thirty years.

The following incident well illustrates the progress of the

manufacture of twists in the United States, and also shows how one improvement creates a demand for others.

Less than twenty years ago, I. M. Singer applied to the Nonotuck Silk Co., for a twist suitable for use on sewing machines, and, as an inducement for this company to commence its manufacture, ordered *five pounds*, enough to supply him for several months. This company held Mr. Singer's trade, thus initiated, till it amounted to *eighty thousand dollars per annum*. The value of machine twist now made in the United States, amounts to probably not less than a quarter of a million dollars, the demand having been entirely created by the sewing machine.

Geo. Comings, of New York, exhibits

SILK DRESS TRIMMINGS,

not a very extensive line, but praiseworthy in style and color.

B. Richardson, broker in raw silks, of New York, exhibits a great variety of

RAW SILKS, COCOONS, EGGS, ETC.,

from China, Japan, and Europe. This is a very interesting, and, to those unacquainted with the details of the business, an instructive display. The French and Italian silks are particularly beautiful. An important peculiarity of French and Italian silks is the uniformity of the thread; as in winding, great care is taken to wind from the same number of cocoons, and, whenever any one runs out, to replace it by another. This case is an important addition to the department, although it does not show the progress of the silk industry in the United States so much as the exhibitions of manufactured goods.

Cantrell and Chapin of Crestkill, N. J., exhibit

CANTON MACHINE TWIST,

a cheap variety of goods, but excellent of their kind; in our judgment, they are equal to any of the same class on exhibition. They are, for many kinds of work, as good as the more expensive kinds. Two cases are shown, one of which is arranged in quite a unique manner. It contains 3,500 spools, so placed that the name of the firm appears in prettily blended colors on a black background. This firm, also, manufacture Tram silks and organzines, for weaving, and are preparing to enter upon the weaving of dress goods on

LYALL'S POSITIVE MOTION LOOMS,

one of which is now running on the floor, weaving dress silk, and attracting much attention. Its adaptation to this kind of work was minutely set forth in an illustrated description published on page 17, current volume of the SCIENTIFIC AMERICAN, to which we refer the reader. Another loom of this kind is also at work on goods *six yards and one quarter wide*, but a notice of which would be out of place here.

Werner, Itschner & Co., of Philadelphia, exhibit a small case of

RIBBONS,

which are, though commendable, scarcely equal to some exhibited by other establishments, yet to be noticed.

Horstmann Bros. & Co., of Philadelphia, exhibit a great variety of

UPHOLSTERY GOODS, REGALIA, CARRIAGE TRIMMINGS, MILITARY GOODS, AND LADIES' DRESS TRIMMINGS;

also, sashes, scarfs, and a great variety of other goods of their manufacture, all of excellent quality, and in a great variety of beautiful designs and colors. This firm have probably carried jacquard-loom weaving to a higher degree of perfection than any other American manufacturers, and the variety of the goods made by them is, we believe, the most extended of any American firm. We were much gratified, on a visit to Philadelphia, last winter, to witness the extent and systematic workings of their immense establishment, in which we spent considerable time, an interested spectator. The goods they exhibit are an honor to the firm and to the country, and they attract much attention from the visitor.

James S. S. Shapter, of New York, Secretary of the department, exhibits

DRESS SILKS,

beautiful in texture and color. We were gratified to witness the great progress which has been made in the manufacture of this kind of goods, as evidenced not only by this display, but also by other cases of goods exhibited.

The beautiful case of dress silks exhibited by P. G. Givernaud, of New Jersey, through his agents, Benard & Hutton, of New York, can not be excelled by any goods ever imported. Both in texture and color they will be admitted by good judges to be first-class.

The same may be said of the splendid case of dress silks exhibited by Cheney Bros., of Hartford and Manchester, Conn., the leading silk manufacturers in the United States, who present a much larger variety of goods, forming one of the most attractive features of the Department. Their case contains, besides dress silks, ribbons, machine twist, poplins, Florentines, figured and plain, *gros grains*, extra fine organzine, buttonhole twist, etc., all of fine quality. It is a very rich display.

T. Baare, of Schoharie, N. Y., also exhibits a fine variety of dress silks, of good colors, and of undoubted good quality.

The Dale Manufacturing Company, in which the manufacture of dress silks has only quite recently been commenced, also exhibit a number of styles of dress silks, in connection with a large variety of

TAILORS' TRIMMINGS,

hat bands, and other narrow goods, to the manufacture of which their works are principally devoted. A full description of their mill was given on page 282, Vol. XIX., of this journal, to which the reader is referred. Their case, which is

acknowledged to be the most elaborate in design of any on the floor, contains, also, a fine sample of buttonhole twist, with other samples, which render it one of the most attractive on exhibition.

The Oneida Community, of Oneida, N. Y., exhibit a fine case of machine twist, which is not only admired for its intrinsic merit, but for the superior manner in which it is spooled. It is quite evident the Community can "do some things as well as others."

Wm. Watson & Sons, of Paterson, N. J., exhibit Canton and TSATTLEE TWIST,

which compares favorably with other goods of the same kind on exhibition.

The Excelsior Manufacturing Co., Paterson, N. J., exhibit first-class sewing silk and machine twist.

Dunlap & Malcolm, of Paterson exhibit a small case of machine twist, the colors of which are good.

Hamil & Booth, of Paterson, N. J. (Passaic silk works), exhibit a beautiful selection of sewing silks, machine twist

EMBROIDERY SILKS

tram, organzine, and fringe silks, both colored and in gum, a display which ranks among the best in the department.

INCIDENTAL

to the display in this department is a small case by J. W. Gregory, of New York, containing raw fiber, and plain and colored textures made of the celebrated

RAMIE FIBER,

which will attract much attention from those interested in the introduction and growth of the Ramie plant in the United States. The textures seem very fine and soft, but it is evident from these samples that the art of dyeing them is yet imperfectly understood. They show very poorly in contrast with the brilliant colored silks in the department.

Another small case, by Bernstein & Mack, of New York, contains a

MODEL MACHINE FOR THE MANUFACTURE OF CHENILLE,

with some samples of this class of goods which are pretty.

The progress made in this industry since the former exhibition of the American Institute, is perhaps as marked as in any other department of the fair. This progress has been made against many great difficulties, and exhibits the enterprise and energy of American manufacturers in the most favorable light.

The present tariff is fast building up this industry, and if continued, will not only extend but permanently establish it; and the production of raw silk, already very successful in some sections, may be made to add largely to the present resources of the country. California will, eventually, not only become the vineyard of North America, but, in connection with certain parts of the Southern States, become, so far as the growing of silk is concerned, the Italy of this continent.

From the silk department we will ask the reader to accompany us into the

DEPARTMENT OF THE DWELLING

which comprises apparatus for warming, lighting, cooling, and ventilating, cooking stoves, kitchen utensils, carpets, oilcloths, tapestry, cabinet furniture, table furniture, ornaments for parlors, building accessories, mantels, grates, etc. Carpets are exhibited principally in the woolen department, noticed in our last, and we shall not here allude further to them. The class of

TABLE FURNITURE

comprises a large variety of pressed and cut glass ware, plated goods, cutlery, etc., which we must pass, for the present at least without detailed notice. We will, however, state that the class is finely represented and the wares are finely designed, and some of them very artistic, making a display very creditable to the manufacturers whose goods are displayed.

One of the most extensive classes in this department is that of

STOVES, RANGES, HOT-AIR FURNACES, AND OTHER HEATING APPARATUS,

the most striking of which is the Empire Range, exhibited by Moncuse & L. Duparquet, of New York. It is a magnificent piece of workmanship, twenty-four feet long by six in width, and capable of being extended to any desirable length by putting in sections. It is one of the most complete ranges we have ever seen, provided with an electro-motor engine for turning the spits and all sizes of vessels for the performance of culinary operations. A complete dinner for a regiment might be prepared on it.

Among the manufacturers who have praiseworthy goods of this class on exhibition, we notice W. C. Lester, of New York; Hull Grippen & Co., New York; John Q. A. Butler, New York; H. G. Giles & Son, of New York; Burtis & Rice, New York; Barry & Lane, New York; J. W. Lane & Co., New York. The fact that the exhibitors in this class are principally from New York, does not perhaps derogate from the representative character of the display, as the wares are fair samples of wares of this kind made throughout the country. The furnaces and ranges of Barry & Lane, of New York, and the New Portable Furnace exhibited by J. W. Lane & Co., of New York, are specially commendable.

Next to heating apparatus in importance ranks lighting apparatus. In this class we find a few machines for the production of a

DOMESTIC GAS LIGHT,

among which appears the apparatus of C. F. Dunderdale, of New York, illustrated and described on page 164, current volume of the SCIENTIFIC AMERICAN, to which the reader is referred. The Domestic Gas-light Works exhibited by J. T. & R. H. Plass, of New York, is an apparatus for charging air with the vapor of the light hydrocarbon oils. The Patent

Vapor Stove, House-lamp, and Gas Light, exhibited by D. H. Lowe, of New York, are pieces of apparatus which generate gas from similar liquids for purposes indicated sufficiently by the names of the articles. The most unique of these devices is, however, Gardiner's apparatus for turning on and off, and lighting gas by electricity. This apparatus is, however, intended for lighting the public gas lamps of cities, as well as for use in hotels and private dwellings. The inventor thus describes its application to this purpose: At the Station House may be placed a key-board, and in connection with each key is an indicator, which corresponds with the indicators of the electro-magnetic stop-cocks, which are placed in each lamp post. When the operator wishes to light any street or district, he presses the key, which moves the indicator in the office; at the same moment all the stop-cocks in that district, or street, move according to the indicator at the office. The operator has perfect control of all the public lamps in the city, as he can light any district or street he wishes without interfering with any other portion of the city, and can turn off the gas by the same movement of the keys, as he knows by his indicators when the gas is turned off or on.

Mitchell Vance & Co., of New York, exhibit a fine assortment of

CHANDELIERS AND GAS FIXTURES, GILT AND MARBLE CLOCKS AND BRONZES,

which make a fine display, many of the designs being very artistic indeed. The alcove containing this collection is arranged in an elegant manner, and attracts much attention.

In the department of

FURNITURE

there are some beautiful articles exhibited, many of which are, in the words of Goldsmith—

... contrived a double debt to pay,
A bed by night, a chest of drawers by day.

Among the most beautiful pieces of furniture thus adapted to various uses is the Multiple and Dividing Table, exhibited by Dronhard & Roye, of New York. It is elaborately and beautifully inlaid, the material of which it is constructed being principally ebony. By releasing two small hooks, the table divides longitudinally in halves, the tops of each half spreads out, and two library or card tables are formed with green cloth tops, which replace the inlaid design previously visible. By closing the tops each half becomes a beautiful consol, which may be wheeled against the wall of an apartment, and is as chaste and beautiful in design as the original table. This is a *chef d'œuvre* of workmanship.

M. Sulzbachcher, of New York, exhibits a very attractive piece of furniture, which is by day not merely a chest of drawers, but an elegant cabinet with secret compartments for papers and valuables, shelving for books and papers, etc., etc. The lower part, however, contains a very nice spring bed all complete, but so snugly folded and tucked away that not the slightest suspicion of its existence would enter the mind of the spectator were it not displayed by the attendant. This is also a paragon of fine workmanship, and excites much admiration.

Another bedstead exhibited by Pullman & Bro., of New York, by day simulates—we must confess rather poorly—a bookcase.

Dexter Howe, of New York, exhibits a new kind of rocking chair, which is very comfortable to recline in, and which has no projecting rockers to encumber the room and destroy other furniture; is easy and regular in its motion; does not wear the carpet; is not affected by the uneven surface of a floor; applicable to any style of chair, and symmetrical in appearance. The improvement seems really a good one, and is attracting much notice.

In the display of

WATER FIXTURES

we find some familiar but excellent things.

Wm. S. Carr & Co., of New York, exhibit their excellent new Monitor Pan Water Closet, probably one of the very best things of the kind now made anywhere.

John Keane & Co., of New York, exhibit what they call a "Patent Extractor and Hydro-Valve," designed for house and ship water-closets, intended to obviate all necessity of care in attendants, and to keep itself clean and cut off all foul gases.

The Colwells Shaw and Willard Manufacturing Co. exhibit their

PATENT LEAD-INCASED BLOCK-TIN PIPE,

with a new improvement, obviating all objections hitherto made by plumbers as to the difficulty in making joints in such pipes. Our readers are already aware that we hold this pipe in high estimation, from numerous allusions to the improvement which have been made in these pages.

Among

ARCHITECTURAL IMPROVEMENTS

we notice iron skylights, ventilators, etc., etc., exhibited by the Hudson River Iron Works, of New York, whose work in this line is of superior quality.

Also Perkins' Patent Fire-proof Window Shutter, exhibited by H. O. Baker, of New York, which is also well constructed to subserve the purpose designed.

Some specimens of

STEAM-MACHINE CARVING,

shown by A. Henkel & Co., of New York, are really very remarkable in execution. Heads, figures, bas-reliefs, etc., are exhibited, and are well worthy of particular notice.

Specimens of

NATURAL WOOD PRINTING,

where an exact transcription of the figure formed by the grain of wood, is made upon paper hangings, are shown by the New York Wood Company, of New York. The process by which this is accomplished has already been described in these columns. The hangings produced exactly resemble veneers cut from oak, walnut, or other wood.

P. H. Schaad, of New York, exhibits a most chaste and beautiful

MARBLE MANTEL,

after an original design, which elicits general admiration.

The Penrhyn Slate Company exhibit several specimens of their

ENAMELED SLATE MANTELS,

table-tops, etc., which are also rich in design and finish. Among

LAUNDRY MACHINERY

there are a great many styles of washing machines and mangles. Some of very large size, to be driven by steam power, are shown by the New York Laundry Manufacturing Company, capable of doing an enormous amount of work in a very short time. These machines are running by power supplied by the Institute, and attract much observation. There are other machines intended for power on the floor, but none in operation. We find in this department also a large display of clothes wringers, meat-chopping machines, and a host of all kinds of implements and improvements designed to lessen the work of the dwelling, and add to the comfort of mankind.

A very large number of

MINOR IMPROVEMENTS

and articles are shown, a mere list of which would be too large for our space. Anything from a patent carpet tack to a washing machine may be met with here, and we shall notice only a very few of these efforts of real Yankee genius.

The

BURGLAR ALARM TELEGRAPH,

exhibited by E. Holmes, of New York, attracts universal attention. It is connected with all the windows of the building, and greatly adds to the security of the costly articles on exhibition. It is, in the language of the inventor, "A watchman that has but one house to protect, is always on the spot, never goes to sleep, cannot be bought off, and an experience of eight years without a failure proves that it is perfectly reliable and satisfactory."

No department of the exhibition exhibits the value of small inventions, and the interest taken in them by the public, more than this, which, at the time of our visit, attracted more spectators than any other, except the department of machinery.

THE ONE NEEDLE FAMILY KNITTER.

The first page of the present volume bore an illustration and description of Hinkley's one-needle family knitting machine. The terms in which we spoke of this ingenious and simple device were received in some quarters with skepticism, but we had full confidence that the future history of the machine would demonstrate the soundness of our judgment in regard to its merits.

We styled it a "family knitter" from the conviction that the simplicity of its parts and the ease with which it can be operated, as well as the rapidity with which the necessary manipulations can be learned, would enable even children of twelve or fourteen years to operate it satisfactorily. We were, however, somewhat astonished on the evening of the 24th Sept., upon a visit to the Exhibition of the American Institute, to see a child of only seven years operating the machine with skill and apparent ease. Upon inquiry we ascertained that the name of this little worker, around whom a large and admiring crowd had gathered, was Miss Alice Hall, daughter of Thomas Hall, Esq., of Brooklyn, New York.

This exceeded any opinion we had formed of the general utility of this knitting machine in the household, but when Miss Alice made her bow, and her younger sister, Florence, only four years old, took her place at the machine, we, in common with the crowd of lookers-on, could hardly refrain from some enthusiasm. Back and forth went the machine under the deft management of those little fingers, and still the wonder grew as well as the texture.

Several prominent gentlemen of the press were present, and all agreed that this episode in the routine of the Fair most greatly strengthen the favor with which the public are now regarding this invention.

The machine is exhibited by the Hinkley Knitting Machine Co., No. 176 Broadway, of which Mr. A. G. Page is the president, who has received a great many testimonials respecting its merits, and the demand for it is constantly increasing.

We presume no one visiting the fair will fail to examine it for themselves, as it certainly is one of the chief attractions of the department in which it is displayed.

The knitter is about the size and weight of a Wheeler & Wilson sewing machine, and unlike any other knitting machine is operated equally well by the foot or the hand. The price of the machine is so small that it is within the reach of those in the narrowest circumstances, while its adaptability to ornamental work renders it a most desirable addition to the fancy work tables of the wealthy.

ELECTRIC BEACONS.—Thomas Stevenson, C. E., Edinburgh, recently conducted an experiment at Granton, with the view of showing the practicability of illuminating beacons and buoys at sea with the electric light, produced by means of a battery on shore. A submarine cable, fully half a mile in length, was laid between the east breakwater of Granton Harbor and the chair pier at Trinity. The operator occupied a station near the center of the breakwater, and the light was shown at the point of the pier in front of an ordinary lighthouse reflector, producing a most brilliant flash. The flashes were emitted with great rapidity; as many as 500 can be transmitted in a minute, but the machine can be regulated so as to send one every second, or at any other desired interval. The experiment gave entire satisfaction.