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NEW YORK, SATURDAY, JUNE 14, 1862.

## THE TROY FIRE AND IRON-PROOF SAFES.

The Troy Times in commenting upon the remarks of our correspondent respecting the late fire in that city and its action upon iron safes which appeared in the SCIENTIFIC AMERICAN two weeks ago, charges that our correspondent intended to make a thrust at Mr. Lillie, whose safes are extensively made in that city.

We beg to assure our cotemporary that our correspondent is a high toned gentleman, having no other interest in the matter than to elicit the truth, and in no way concerned either in the manufacture or sale of safes.

In conducting the SCIENTIFIC AMERICAN we are not in the habit of accepting without proper reservation the statements of interested parties in matters which are liable to become the subject of dispute. Our correspondent had no intention to reflect upon the Lillie safe—of this we are perfectly assured.

In the communication referred to our correspondent uses the following language: "Hardly a safe standing out uninclosed by brick has passed through the fiery ordeal." This is really the point of his observations, and how is it sustained by the facts? One of the Troy papers says: "Most of the safes were subjected to an intensity of heat, and for a length of time, which no safes were ever made to withstand, and against which no safe manufacturer, in his senses, would warrant his to pass through with contents uninjured. The result of the most rigid inquiry and investigation will show, we think beyond a doubt, that no safes in the fire came out less damaged than those of Lillie's manufacture."

This confirms in substance our correspondent's advice, that too much dependence should not be placed upon the perfect fire-proof qualities of any safes. In cases of intense heat, and when not encased in brick-work, they are liable to be destroyed. The Troy Times, in its criticism of our correspondent's communication, admits that iron safes (not Lillie's) supposed to be fire-proof, "were burned up, and, as a matter of course, not the least vestige of anything valuable, that was in them, was saved from the flames." Fire is a powerful element, and has often baffled the wit and wisdom of the most ingenious of mankind in attempting to stay its ravages. And we but do our duty as public journalists when we advise the public to be cautious in guarding against its power. We have friends, almost under our eye, as we now write, who lost nearly \$200,000 worth of securities by confidently relying upon the protection which they reasonably supposed to exist in a fire-proof building, and an iron safe.

## INVENTORS LOYAL.

It has afforded us the greatest pleasure to notice the patriotism and loyalty to the government of the great body of our inventors. Thousands of them are serving in the army and navy, as soldiers, seamen, engineers, artisans and mechanics, and their labors have been of great benefit to both branches of the public service. As our army advances, and liberates them from the grasp of tyranny and oppression, this class of our fellow citizens in the rebellious States, prove their devotion to the old flag. Already we have letters from our former patrons in New Orleans, and from portions of Tennessee and Virginia, which

give unmistakable evidence of their patient devotion to their government and country. This is very gratifying to us; it bears out our former impression that no more loyal class of citizens could be found than our inventors.

## EMPLOYMENT OF FEMALES IN INDUSTRIAL OPERATIONS.

The employment of females in industrial operations has the same effect on the wages of male mechanics and laborers as the use of labor-saving machinery. If a people is so savage as to till the earth with their naked hands, and to spin the material for their clothing by twirling the thread between the thumb and finger, they cannot be as well fed and clothed, as they could if their agricultural operations were conducted with the aid of cast-steel plows and reaping machines, and their manufactures had the service of steam engines and all the complex mechanism of modern civilization. Men labor in order to provide for themselves wealth in all its forms—food, clothing, houses, fuel, horses, books, &c. Gold and silver coin is used merely to effect the exchange of the surplus products of one man for the surplus produced by another. The amount of wealth which any people produces depends wholly upon the effectiveness of the tools with which they work, and on the constancy and skill with which these tools are used. A manufacturing establishment filled with looms and spinning frames is just as really a tool as an ax or a hoe. All forms of active capital are really tools in the hands of laborers.

The more abundant and excellent the tools with which any people works, the larger will be the product of wealth to be divided among the individuals. Consequently, the wages in any country are almost exactly in proportion to the amount of labor-saving machinery which it employs. In Hindostan, where cloth is woven by hanging the harness on the limbs of a tree, wages of able bodied men are two and a half cents a day, while in this country, where labor-saving machinery is most freely used, wages range from ten dollars a month upward. Sixty years ago, before the introduction of the power loom and the steam engine among us, the regular wages for men was about seven dollars per month in the average, and excellent seamstresses were hired for forty cents per week.

Now, the effect of having half of the community idle is precisely the same as the effect of working with poor tools; it diminishes the aggregate product of wealth, and there is consequently less to divide among individuals; in other words wages are lower. Those English, Scotch and Irish mechanics who protest against the employment of females in industrial operations, for fear that it will diminish their own wages, are just as foolish as their brother mechanics who object to the use of labor saving machinery.

We are very proud of the fact that so few American mechanics—the graduates of our public schools—fall into either of these delusions. They do not get up mobs to break steam engines in pieces, neither do they organize strikes because girls are employed in the shops. They are quite willing that the roughest and hardest labor should be performed by the iron arm that never tires, and in the more delicate portions they welcome the proffered aid of woman. There is a manliness, too, engendered by our free institutions, that prompts all classes of our people to bid defiance to competitors. We recently heard a broad shouldered, six-foot printer remark, "If I cannot make a living in spite of the competition of women, I may starve, but I do not believe that I shall complain."

## PROGRESS OF OUR IRON-CLAD FLEET.

Three large and splendid impregnable war steamers, on the plan of Ericsson's Monitor, are nearing completion in this city. The builder is Thomas F. Rowland. These vessels will be finished on the stocks, and they are to be launched about the first of August. Three other boats of the same kind are building at Boston, Mass., two at Chester, Pa., and one at Wilmington, Del., making nine in all.

In addition to these, the government is building several other iron-clad vessels of the strongest character, so that we shall soon be in possession of an

iron-clad fleet that will be able to compete with any of the naval powers of the world.

It will not be long before every harbor and river of rebeldom will be fully commanded by these terrible messengers of destruction. With all the vital points and avenues of their territory patrolled and penetrated by the Union iron-clads, it would appear certain that the secessionists will at best have a very brief and uncomfortable existence.

## CAPT. NORTON AND THE SCIENTIFIC AMERICAN

Last week we published a plan for blowing up iron-clad ships, and by the last arrival from Europe we find precisely the same plan suggested by that fertile inventor, Capt. J. Norton. His plan was published in *Saunders's News Letter and Daily Advertiser*, of Dublin, and the paper with the article marked and directed to the SCIENTIFIC AMERICAN, was on its way across the Atlantic at the very time that our article was going through the mails to our subscribers. To show how exactly alike the two plans are, we publish Capt. Norton's letter:—

TO THE EDITOR OF SAUNDERS'S NEWS LETTER:—*Sir*—As the Emperor of the French and the American government are enthusiastically turning their attention to the best means for sinking iron-clad men-of-war, I propose to do it by having a powerful iron-clad ram, provided with a long iron pole, to be shipped to the stem of the vessel under water at the line required; at the point of this pole I would attach a shell or caisson, charged with the most approved fulminating powder, and the invulnerable ram would push its pole under the bilge of the Monitor, in its weak wooden bottom; I would pull a string, which would instantly fire the shell by friction, and give the Monitor and all in it a cold bath. I am ready to practically prove my *modus operandi* to all taking an interest in such an easy way of disposing of an invading enemy.

Yours, &amp;c.

J. NORTON.

Howard's Hotel, Kingstown, May 15.

## THE NEW IRON STEAMER "SCOTIA."

The new steamer *Scotia*, the latest built of the Cunard line, has been here for two weeks, and departed the 4th inst., on her first return voyage to Liverpool. Considerable interest has been attached to this steamer on account of her being the largest merchant vessel afloat with the exception of the *Great Eastern*, and also because she is the latest effort of the celebrated engineering firm of Robert Napier and Son, of Glasgow, Scotland. She is built entirely of iron, and is a paddle-wheel steamer. Her tonnage by builder's measurement is 4,050 tons; the length of keel and forerake is 360 feet; length over all, 400 feet; breadth, 47 feet; depth, 32½ feet. She exceeds the *Persia* in capacity by 450 tons. When loaded to 22 feet she displaces 6,500 tons. Immense in size as the *Scotia* is, she is so well proportioned and sits so gracefully in the water that she does not appear to be such a large vessel as she really is. Her engines are two in number and are splendid specimens of mechanical skill; they are rated at 883 nominal horsepower, but are capable of working up to 3,000 united horse power. They are of the old side-lever pattern, with several new attachments. The valves used are Waddle's (engineer of the *Persia*), balanced double port D-slide kind. Each of the steam cylinders is 100 inches diameter by 12-foot stroke—two ft. longer than the engines of the *Persia*. The pressure of steam carried is 25 lbs., and it is superheated to 318° Fah. Two superheaters are employed; each has 14 pipes 16 inches diameter and 9 feet in length. The flame from the furnaces passes through these pipes, while the steam flows around them on its way to the cylinders. The superheaters can be disconnected from the boilers at any moment by a valve. The saturated brine water, in being discharged from the boilers, passes around a series of pipes, while the cold feed water goes through them on its way to the boilers. By this arrangement the feed is raised to about 150° before entering the boiler. Four large tubular boilers, having 40 furnaces, are used. The main intermediate shaft between the two engines is 31 inches in diameter; the side levers (inverted beams) are each composed of two plates of rolled iron 22 feet in length, 7 feet wide at the middle and 2½ inches in thickness. The rolling of these immense plates was a work of great difficulty. Only one firm in England would undertake the task, and out of the first eight plates that were rolled, seven were rejected on account of defects. All the parts of these engines are massive; some idea may be obtained of the size of their parts by stating that one of the slide valves weighs no less than two tons. The paddle wheels

are 40 feet 8 inches in diameter; and she is provided with Silver's marine governors. Two small donkey engines, two hoisting engines and one steam pump are used on board. The coal bunkers contain 1,800 tons of fuel. A government safety valve is attached to each boiler, and is locked up from the engineers. It is examined at Liverpool by the Surveyor of the Port under the Board of Trade.

The *Scotia* is of unusual strength; her keel plates are  $1\frac{1}{8}$  inches in thickness; the bottom plates are  $\frac{1}{8}$  of an inch; thence up to the load line  $\frac{7}{8}$ -inch plates, and above this  $\frac{3}{4}$ -inch plates. The framing is composed of ponderous bars and angle iron welded and riveted in the most perfect manner. She is divided into seven water-tight compartments, and carries 1,500 tons of merchandise in two water-tight tanks 75 feet by 20 in length and 20 feet in depth. There are 157 state rooms, with sleeping accommodations for 300 cabin passengers. The main saloon is 62 feet in length by 20 feet in breadth, and is 8 feet high. The decorations of the staterooms are tasteful and elegant.

Every thing about this great steamer gives indication that her owners have spared no expense to make her the most perfect passenger steamship ever built.

#### RECENT AMERICAN INVENTIONS.

**Breech-Loading Cannon.**—The principal object of this invention is to obtain a gun in which gun cotton may be used, and which will therefore be particularly serviceable in casemates and between the decks of ships, as the use of gun cotton, owing to the little smoke produced, does not cause the choking thirst, smothering sensation or blindness in the men working the gun in a confined place. Owing to the danger of loading at the muzzle with gun cotton, the breech-loading system is adopted, and the improvements are more particularly directed to the strengthening of the breech and its connections and the surrounding parts, to produce a breech-loading gun of the requisite strength. One improvement consists in fitting the chamber of a breech-loading cannon with a stout tube of steel or other tenacious metal, termed an internal reinforce, the interior of which is much smaller than the caliber of the gun and the length of which is sufficient to enable it to contain the charge. The object of this tube is to strengthen the gun and also reduce the amount of the area of the breech that is exposed to the force of the explosion. Another improvement consists in a novel mode of locking and tightening up the breech, whereby the joint between it and the chamber is made very secure and close. A third improvement consists in a novel priming and firing apparatus. This gun may be used with gunpowder as well as gun cotton. The breech-loading arrangement is very secure and strong. The invention is patented by E. R. McCabe, of Rochester, Iowa.

**Iron Plates for Vessels.**—This invention, patented by Edward Cox, of Covington, Ky., relates both to armor plates applied on the outside of wooden hulls and to iron plates attached directly to the frame of the vessel, the frame being either of timber or iron. It consists in an improved mode of fitting together and combining the marginal portions of the several plates, whereby they are so locked as to hold each other both in a direction lengthwise of the vessel and in a vertical direction, and to assist in holding each other to the sides or frame of the vessel and in strengthening the vessel, and the necessity of using plates of very large size is obviated. A patent has also been taken in England on this invention through the scientific American patent agency.

**Piston Packing.**—This invention consists in the arrangement of spring valves and guides in combination with apertures in the piston head follower, in such a manner that the apertures admit the steam or other fluid from the cylinder into the piston, and are instantaneously closed on reversing the piston, and the steam or other fluid can effectually be employed to produce a tight and reliable packing; it consists further in the arrangement of an additional packing ring on the inside of the ordinary main packing rings of the cylinder, said additional packing ring being provided with a toothed expansion rack and with a spring plate, in such a manner that by the action of the steam or other fluid, the inner packing ring is expanded and the device between the outer or inner packing rings is effectually closed, and by the spring plate the

steam or other fluid is prevented finding its way in between the inner and outer rings. The patentee is P. L. Kreuter, of Bloomington, Ill.

**Machine for Making Candles.**—This machine consists of a horizontal rotating table divided radially to its center into any number of equal sections, each one of which has secured to it a rack for the reception of the molds, and on one side or in front of which is situated a series of spools from which, and through a perforated board, the wick is supplied to the molds when the latter are brought opposite to them by the rotation of the table. The molds are divided vertically and centrally for the reception of the wicks and the removal of the candles, clamps being used to receive the wicks from the spools for their introduction to the molds, and to retain them there before and during the pouring in of the tallow or other material. Andrew Black, of New York City, is the patentee.

#### GIFFARD'S INJECTORS.—THE MACHINE BUSINESS IN PHILADELPHIA.

While in Philadelphia for a few hours last week, we made a brief visit to the extensive machinery manufacturing establishment of Messrs. Sellers, and found, to our surprise, that they never were more busily employed in the manufacture of lathes, planers, and all the various machines that are employed for making the parts of engines, and machinery for general manufacturing purposes. We consider this a good indication of the wonderful prosperity and activity of our manufacturing operations amid the conflict now existing in our land. This firm has manufactured about 1,000 Giffard's injectors, about half the number of which were for stationary engines, and the others for locomotives. These ingenious boiler feeders are now employed, to some extent, on almost every railroad in our country.

We noticed a very simple and beautiful arrangement of frictional gearing applied to a new lathe in this establishment. Instead of using a complicated train of toothed wheels to obtain different speeds, any speed required was obtained by the use of three frictional plate wheels, placed one above the other. By moving any of these wheels nearer to or farther from the center of the intermediate wheel, the speed was varied accordingly. The middle wheel is composed of two circular plates, the upper and lower ones of single plates, fitting into the middle plate wheel as into a deep groove.

#### Inventors Relating their Experience.

Persons who are about to secure Letters Patent, and have not decided upon the Agency they will employ to transact their business, are recommended to read the following letters received at this office within a few days. The experience of these inventors may be a guide to others who have Letters Patent to secure:—

MESSRS. MUNN & Co.:—I have just received my patent, and a better-pleased fellow than I am you never saw. The specifications are just what I wanted: I could not have described the machine as well myself. Your work is well done in every respect, for which receive my thanks.  
Yours, truly,  
W. T. ABELL.

Vernon, Iowa, May 25, 1862.

MESSRS. MUNN & Co.:—Yours of the 17th was duly received covering official notice from Washington that my application for a patent has been allowed. Permit me to express to you my sincere thanks for the fidelity and open-hearted manner in which you have conducted yourselves toward me and the efficient manner you have performed my business. I now know there is one Patent Agency in which I can place implicit confidence—a fact I have heretofore believed to be fiction. When I made the application for a patent on my Aerial Machine through your Agency, it was with the determination that it should be the last time I should be swindled by Patent Agents. And when I received the specification for examination and signature I could not but notice the great contrast between the plain simple style in which it was prepared with those I have received from other Agencies. I thought if I was to be deceived again (which I expected), it would be in a new style by which, at least, I should learn something. But imagine my disappointment, therefore, on receiving yesterday's letter, and finding the lesson to be diametrically the opposite from what I had expected. It is impossible for me to express the sincere thanks which I feel for the great kindness which you have shown me. I shall endeavor to show my gratitude by recommending your Agency and paper to inventors. I shall ever feel that I have received a great favor at your hands, and that, too, when least expected. With deepest gratitude, I remain, yours,  
LUTHER CHILD CROWELL.

West Dennis, Mass., May 20, 1862.

MESSRS. MUNN & Co.:—Gentlemen—I received this day the official announcement that my patent for an improvement in Lamp Burners is ordered to issue. Many, many thanks are due to you for the very skillful and thorough manner in which you have performed the complicated and intricate duties of your profession, and the railroad speed

with which you transact your business with the Patent Office. I shall take great pleasure in recommending your Office to all persons who have business with the Patent Office. You also obtained a patent for me in 1859, after it had been twice rejected, and I consider it as valid a claim as could be asked for. These circumstances are sufficient to make me feel grateful toward you, and to incline me to recommend both your Agency and your invaluable paper. Yours, truly,  
SAMUEL MARSHALL.  
Wilmington, Del., Fifth month 27, 1862.

MESSRS. MUNN & Co.:—Your letter announcing that my application for a patent has been allowed, is at hand. I am very thankful to you for the very able manner in which you have managed my application at the Patent Office and for bringing it to a successful issue. When I began making my model it was my intention to employ an Agency in Boston, but on reading in the SCIENTIFIC AMERICAN what you did for inventors I made up my mind that the best thing I could do was to employ you; and I am so well pleased, that if ever I have any more business at the Patent Office, it will be intrusted to your Agency.

Yours, &c., R. T. HATHAWAY.

New Bedford, Mass., June 2, 1862.

#### Tests of Galvanized Wire Rope.

Several experiments with wire rope were lately made at Liverpool, England, for the purpose of practically ascertaining the value of wire for standing rigging. The first was a piece of 2-inch galvanized charcoal wire, the Admiralty test for which is 4 tons 6 cwt.; it broke at 5 tons 15 cwt. This piece was taken from the 'topgallant backstays of the ship *Bogota*, and was supplied to this ship four and half years ago. It is still in good condition, there being no signs of rust in it, and it stood upward of 30 per cent above the admiralty test. The next test was a piece of  $1\frac{1}{2}$ -inch galvanized wire rope, which broke at 2 tons 12 cwt. 2 qrs., the Admiralty test being 2 tons 5 cwt. One piece  $3\frac{3}{4}$ -inch wire rope, six-strands, stood 17 tons 15 cwt.; one piece  $3\frac{3}{4}$  inch galvanized wire rope, four-strand formed rope, made of fine wire, stood the strain of 12 tons 5 cwt. It was found that the rope composed of the greatest number of strands or wires stretched the least. Galvanized wire rope, for rigging, is now coming into common use.

#### Improvement in Iron-Built and Iron-Clad Vessels.

Wm. Ballard, of New York city, has recently made an improvement in iron-built and iron-clad vessels, which is considered to have some valuable features, and for which a patent has been ordered to issue. Part of the invention is applicable advantageously to mercantile as well as naval vessels. The issue of the patent is temporarily suspended, for the purpose of secrecy, but when the patent issues we will publish a description of it.

**TO OBTAIN THE GENUINE FLAVOR OF COFFEE.**—The aroma which resides in the essential oil of the coffee-berry is gradually dissipated after roasting, and of course, still more so after being ground. In order to enjoy the full flavor in perfection, the berry should pass at once from the roasting pan to the mill, and thence to the coffee pot; and again, after being made should be mixed, when almost at boiling heat, with the hot milk. It must be very bad coffee, indeed, which these precautions being followed, will not afford an agreeable and exhilarating drink.

**WASHINGTON SAFE.**—We think we can assure the Hon. Secretary of War that Washington is safe from any attack of the rebels. The only danger is that Congress, if it continues in session much longer, may possibly explode. If the President could quietly shut up that great public gas manufactory, we think the political atmosphere would be less noisome.

**MARSH GAS.**—M. Boussingault, as stated in *Comptes Rendus*, has discovered that under the influence of direct sunlight the leaves of aquatic plants give off a notable proportion of carbonic oxide and carbureted hydrogen. He thinks that this emanation of carbonic oxide may be one of the causes of the unhealthiness of marshy districts.

**INSTEAD OF THE USE OF THE LANCET FOR THE SUPPRESSION OF BOILS AT AN EARLY STAGE,** Dr. Spooner, of Boston, recommends an ethereal solution of iodine (30 grains of iodine to one ounce of ether), applied with a brush morning and evening. The same application gives relief in chilblains and in erysipelas, or it may be varied by a solution of nitrate of silver.

A GERMAN woman at Winsted, Connecticut, thinks "we in this country don't know anything about war yet." During the existence of a war in Germany, she was compelled to work in a blacksmith's shop for three years, so scarce were men.