Correspondence

OUR SPECIAL CORRESPONDENCE.

The Most Surprising Result of the War—The Unparalleled Prosperity of the Manufacturing Interest—The Cotton, Woolen, Silk, Hair and Iron Manufactures—The Great Fortune Made by the Screw Company—The Healthy and Stable Condition of our Manufactures.

PROVIDENCE, Nov. 27, 1864.

MESSRS. EDITORS:—Among all of the surprising results of the war, certainly the most surprising is the extraordinary prosperity of our manufacturing interests, and this is most manifest in this center of the manufacturing district. It is true that only about one-third of the cotton machinery is running, but the cotton manufacturers, by the great rise in the staple, have made more money during the last four years than they have in any previous four years since Samuel Slater landed in the country and introduced the business of spinning by machinery. In all other departments of manufacturing, profits are unprecedented. Edward Harris, of Woonsocket, the largest woolen manufacturer in the country, is building quite a village to accommodate the workmen for his new mill. In this city the Fletchers, who, very quietly, in a little wooden factory, accumulated a great fortune in manufacturing coach trimmings, shoe strings, and other braid, have finished an enormous mill for the extension of their works. The Perkins Street Iron Company have purchased an extensive tract of land running from Harrison to Dexter streets on the north-east side of Long Pond, where they are about to erect a very large rolling mill for the manufacture of boiler and sheet-iron of various descriptions; also of galvanized gas pipe and gasometer iron of all the different gages. The land includes three and a quarter acres, which will be occupied by the buildings, coal yards, stables, etc., necessary in so large an enterprise. The main building will measure 200×100 feet, beside two wings, 60×60 each. The blacksmith's and carpenter's shops will measure 40×100 feet. The buildings will be of wood, and one story in hight, as all the machinery, on account of its great weight, must be placed on the ground. There will be eight chimneys, each 65 feet in hight and 6 feet square. There will be three engines of some 600-horse power. The rolling mill will be of the most massive description, such as is used in rolling the Monitor iron. About three hundred hands will be employed, and some operatives from England are already engaged. There are only two or three as large establishments of the kind in the country, including those of Baltimore and Philadelphia. A very large per cent. of the sheet iron now in use in this country is imported.

A large silk factory at Olneyville is nearly finished, and there is an extensive manufactory of hair cloth at Pawtucket. Capt. Walter O. Bartlett has recently erected machinery in this city for the manufacture of lead pipe on a scale to supply the demand throughout this region, and is turning out a very perfect article. There are two establishments for the manufacture of horse shoes by machinery, and I just saw a wagon go by heavily loaded with boxes of the finished article.

But by far the most profitable of all the manufactures of the city is the making of screws. Here is one man who is taxed for $700,000. Some years since one of his creditors failed, and settled with him by giving him a few shares of stock in the Screw Company. There is another, an old schoolmate of mine, whose rich and miserly old uncle made a sharp bargain, as he supposed, in selling his nephew some stock in the Screw Company, and now the young man is far richer than his uncle. It has not been unusual for this company to divide 10 per cent. per month for many months in succession. They have purchased several patents, paying for one of them $60,000. A rival establishment, as you are doubtless aware, is now in course of erection at Jersey City, opposite New York.

In Providence, as in other places, the manufactories are being erected by capital in the hands of the owners, and there will, consequently, be no danger of those general bankruptcies which occasioned such wide-spread distress in the early days of manufacturing, when mills were built with money hired from banks on four-months notes. The sales of the manufactured articles are generally for cash or on thirty days, instead of the eight-months credit system which formerly prevailed. Our manufacturing, as well as our commercial industry, rests upon more stable foundations than it ever did before. B.

Duck Guns.

MESSRS. EDITORS:—Duck guns of 50 to 100 pounds weight have not attained in this country to that degree of perfection which those of English manufacturers have, and as the subject will be interesting to many of your readers, and is one which, if understood and practiced, would save quite a sum annually to the country, which is now sent to England, I will endeavor to explain the manufacture of the barrel, omitting the forging.

Swivel duck guns are generally made from 60 to 100 pounds weight, 7 to 9 feet long, and from 1¼ to 1½ inches bore, according to the size and weight. I will now give the dimensions of three different guns, which were celebrated for long range and close shooting. The following diagram will be necessary to understand them:—

a b c d

a is the muzzle of gun, *d* is the breech, the space from *b* to *c* is called the cylinder, and is of uniform bore. The relief is commenced at *b* and the bore is gradually enlarged to *a*; the breech is opened behind by enlarging the bore from the rear end of cylinder, at *c*, gradually to the breech, at *d*. Now let us turn to the formulas:—

DIMENSIONS OF A 62-LB. GUN MADE BY FULLARD, A CELEBRATED LONDON MAKER.

Cylinder	2 feet 8 inches long.
Relief	4 feet 1 inch long.
Opened behind	6½ inches long.
Total length barrel	7 feet 3½ inches.

Bore of cylinder, 1½ inch diameter; relieved to the $\frac{1}{20}$th of an inch; opened behind $\frac{1}{34}$th of an inch.

A GUN OF 90 LBS., MADE BY FULLARD.

Cylinder	2 feet 9 inches long.
Relief	4 feet 2 inches long.
Opened behind	1 foot 3 inches long.
Total length	8 feet 2 inches.

Bore of cylinder, $1\frac{15}{32}$ inches; relieved to the $\frac{1}{16}$th of an inch; opened behind, $\frac{1}{20}$th of an inch.

A GUN OF 70 LBS., MADE AT BIRMINGHAM.

Cylinder	2 feet 7 inches long.
Relief	4 feet 4 inches long.
Opened behind	10 inches long.
Total length	7 feet 9 inches.

Bore of cylinder, 1¼ inch; relieved to the $\frac{1}{16}$th of an inch; opened behind to the $\frac{1}{32}$ of an inch.

The critic may ask—Why is relief given at the muzzle? I answer, for the purpose of making it throw shot close together at long distances. Why opened behind? Because if relief were given at the muzzle, and the rest of the bore left a perfect cylinder, the gun would shoot weak. By enlarging the bore behind we retard the powder sufficiently to insure its full ignition, thereby gaining strength in shooting. In turning off the outside of the barrel the workman should make a perfect taper from breech to muzzle, so that the line of sight will be perfectly true. He should also be careful to leave plenty of metal at the breech, and remember that the heavier the gun is in proportion to the bore the better it is to preserve aim in firing. Short guns require to be made much heavier than long ones to ease the recoil proportionately. J. T. S.

Kingston, N. Y., Nov. 22, 1864.

Rule for Cutting Screw Threads.

MESSRS. EDITORS:—I take the liberty to inclose to you a rule for cutting screws in engine lathes, which is as follows:—

Multiply the number of desired threads to the inch, and also the number of threads to the inch in the lead screw, by any number the product of which will correspond with the gearing you have. If you wish to cut fractions of threads, use the denominator for a multiplier, and add the numerator. Example—Suppose we wish to cut 12 threads to the inch, and the lead screw is 4 threads to the inch, we multiply them both by 5, which is 5×12=60; 4×5=20; 60 and 20. A gear of 20 teeth on the spindle, and one of 60 on the screw will cut 12 threads to the inch. Suppose, however, that we want to cut a fraction of a thread; we will take 9⅗th threads to the inch, and the lead screw is 5. Multiply them both by the denominator, which is 5. No. of threads in lead screw —5×5=25; 9⅗×5=48; 25 on the spindle, and 48 wheel on the screw will cut 9⅗ threads to the inch. If the lathe gearing is compound different calculations will have to be made, but most lathes have or use straight gearing, which this simple rule is best calculated for. It may be necessary sometimes to use a fraction for a multiplier; it depends, however, upon what gearing is in the shop.

CHAS. E. ALBRO.

No. 12 Abingdon Square, N. Y.

[In cutting screws every careful mechanic will take an old mandrel and trace the thread upon it, so as to verify the calculation by actual count before executing the work in hand.—EDS.

Official Report on Davis's Composition.

NAVY DEPARTMENT, Nov. 25, 1864.

MESSRS. EDITORS:—I have sent herewith a copy of a report of Commander J. W. A. Nicholson, dated the 2d inst., in relation to the use of Davis's composition on the hull, side armor and propeller of the *Manhattan*.

G. A. FOX,
Assistant Secretary of the Navy.

U. S. SHIP "MANHATTAN," MOBILE BAY, ALA., November 8, 1864.

Rear Admiral D. G. FARRAGUT, U. S. N., Commanding West Gulf Blockading Squadron.

SIR:—The outside of the vessel's hull, side armor, and the propeller, were covered in New York with three coats of Davis's composition, and presuming the Department would like to know the result of its action, and whether it is really an article of merit or not, I make the following report:—

No grass or barnacles had formed upon our propeller or side armor up to the 20th of July last, owing to having been most of the time at sea, steaming; but since then it has formed with astonishing rapidity on the side armor, requiring to be scraped off constantly.

The propeller has been covered until a few days since; I then had it thoroughly scraped; there was a solid mass of shell fish, two inches thick, upon the blades, with now and then a cluster of oysters jutting out, about two inches more, and an occasional bunch of grass a few inches long.

Now, as this was the state of the propeller, which had been frequently turned over, what must be the condition of the hull? A short time ago, with 20 pounds of steam, and making 40 revolutions, we averaged about three knots; under the same steam and revolutions we could formerly make six knots.

It is claimed for the "Davis composition" that it will keep vessels from fouling. It has not acted thus in this instance. On the contrary, I think that this vessel fouled faster than would have been the case had either white or red lead been used on her hull.

J. W. A. NICHOLSON, Commander.

Steam Plows Wanted in Louisiana.

MESSRS. EDITORS:—I have seen noticed several times in the SCIENTIFIC AMERICAN the steam plow, which is being profitably used in England and South America. Such plows are much needed in Louisiana, on our sugar and cotton plantations, where deep plowing is of the greatest importance. The plan most common among our best planters is to plow with four mules and two men, one to drive and one to hold the plow. Two acres per day, four inches deep, is a good day's work. Could we plow ten or twelve inches the yield in sugar would be double. Will Northern men send us the plows on such terms that we can buy them, say one-half cash and one-half mortgage? I am confident a number could be sold if they were here. PLANTER.

New Orleans, La., Nov. 16, 1864.

Trial of the Ames Gun.

MESSRS. EDITORS:—In an article on page 325, current volume of the SCIENTIFIC AMERICAN, entitled

"The Ames 'Union' Gun a Practical Triumph," signed J. G. R., the writer takes occasion to speak of "four shells (with an improvement upon them) weighing from 110½ to 112 lbs.," which he says "were of the Stafford pattern." This statement is entirely incorrect. The four shells mentioned were not of the Stafford pattern, nor in any way similar to them. They are made on an entirely new plan, of which I am the inventor and patentee. The improvement consists in the sabot and mode of applying it, which increases the range and accuracy of the projectile, especially in guns like those of Mr. Ames, where large charges of powder are used. The two sub-caliber shot, also mentioned, were made by me, and under my patent. I have just finished a long course of experiments, occupying a space of four years, in which I have been entirely successful. I have sold all my patents to "The Bridgeport Steel Projectile Company," located in Bridgeport, Conn., who are making extensive arrangements to manufacture projectiles under my patents. Your correspondent was probably misinformed. By simply giving this letter a place in your columns you will oblige one of your old subscribers.

WILSON H. SMITH.

Birmingham, Conn., Nov. 26, 1864.

Flying of the Albatross.

MESSRS. EDITORS:—I would suggest to experimenters, constructing flying machines, a careful study of the form, structure and movements of the albatross. When in motion there is probably no bird, proportioned to his size and weight, that flies with less muscular power. With no other than a scarcely perceptable, though rapid, motion of the feathers that extend along the lower edge of the wings, he is able to maintain a current of air commensurate with his velocity; which current, acting like a wedge on the concave inclined surface of the under side of the wings, supports him for hours in his elevated position. Yet the albatross, though he seems to fly with so much ease, exhibits much difficulty in rising and alighting in a calm. In rising he goes floundering off, beating the water with his feet and wings for several hundred yards before he can attain sufficient hight and velocity to support himself in the air with motionless wings; and, in alighting, he does well if he can manage to overcome his inertia within fifty yards of his objective point; he must then stop, look about, and approach his object by swimming.

But in the regions usually inhabited by the albatross, calms are of rare occurrence; strong gales generally prevail; when, to rise, it is only necessary to turn his head to the wind, spread his wings, set his propellers in motion, and, with one vigorous spring with his feet, he is off. To change his course, a slight motion of the head and tail to one side changes the center of gravity; one wing is depressed, the other elevated, when the course is changed to the direction indicated by the depressed wing. It appears to me that the main difficulty to be encountered in flying with a machine constructed in imitation of the albatross, is to be found in overcoming the inertia of rising and alighting. This difficulty may perhaps be obviated by means of an elevated platform attached to an engine capable of attaining to a high degree of velocity, placed upon a circular railway, having considerable radius to the circle.

G. W. G.

Combination Type.

Some gentlemen engaged in the work of bringing a type-setting machine to perfection, have undertaken to ascertain what words in our language occur most frequently. They have taken ten thousand words from ten different authors, and by a careful count have ascertained how many times any word at all in the composition is given in the whole course of it. The word "the" occurs most frequently. One of the examples taken was the Review of the Week from the *Traveler*, and there the word "the" occurs more frequently than in any other. They have also ascertained, in the same way, the number of times all combinations of letters occur in the examples taken. They have then selected twenty-three from those which occur most frequently, and they propose to have these—such as "the," "and," "ion," "ing," "en," "er," etc., cast as single types, thus saving time and labor. This latter improvement is likely to have a trial without waiting for the new machine.—*Springfield Union.*

["Some gentlemen" can save their time and money by addressing Mr. Tobitt, of this city, who has used such type for many years.—EDS.

RECENT AMERICAN PATENTS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week; the claims may be found in the official list:—

Process of Amalgamating Gold and Silver.—This invention consists in the construction and arrangement of certain mechanical devices for utilizing the process of amalgamating gold and silver by means of the distilled vapor of quicksilver. The ore, in a pulverized state, is fed from a hopper into a rotating or oscillating and inclined cylinder, into which also is fed a current of the vapor of quicksilver distilled in a retort set near the hopper. The said vapor thoroughly permeates the agitated mass of pulverized ore and amalgamates with the particles of gold and silver, whose surfaces are exposed to it, becoming condensed in the course of the operation and the whole mass is passed from the cylinder into an ordinary "Arastra," where it is worked in water by skids or drags in the usual manner of operating that machine. Henry W. Adams, of New York city, is the inventor.

Apparatus for Separating Quartz.—This invention consists in the employment of two crushing wheels, each provided with a series of cogs and intervening cavities, and placed in such relation to each other that they mesh into each other like cog wheels, so that a rotary motion imparted to one of said wheels is transmitted to the other without the use of gear wheels. This is done in such a manner that quartz or any other substance thrown between said crushing wheels is gradually drawn in and crushed between the cogs of one and the cavities of the other. Furthermore, by the difference in the velocity of the crushing surface of the cogs and that of the cavities in passing each other, a grinding effect is produced which facilitates the crushing operation in a great measure. These crushing wheels are provided with projecting side flanges to prevent the substance to be crushed and that already crushed from getting between the journals and journal boxes. Andrew Buchanan, of Brooklyn, N. Y., is the inventor.

Brush Handle.—This invention relates to an improvement in wire brushes, such as are generally used for cleaning off castings. These brushes are generally made by tying a number of wires together until a bunch is obtained of sufficient thickness for a brush. One end of this bunch forms the handle, and the other end, in which all the ends are left open and not fastened together, forms the brush. A brush of this kind can be used until it is worn down to the handle, but that portion of the wire which forms the handle is mere waste, and large quantities of wire are thus wasted and thrown away as useless. To obviate this waste which, particularly with the present high price of wire, is of considerable account, is the object of this invention. It consists in the employment, for the purpose of holding a wire brush, of a hook or loop projecting from a shank which is secured in a suitable handle and to which two jaws are hinged in such a manner that when the shank is taken out of the handle, and the jaws are opened, the wire which is intended for the brush can be readily wound round the hook or loop, and when the shank is introduced into the handle, the jaws, by coming in contact with the edges of the ferrule, are closed, and the wire is firmly and securely confined, and a brush is obtained which can be used up to within a short distance from the hook or loop. Fred. Rudolph and Wm. Kasefang, of Jersey City, N. J., are the inventors.

Street Railway Cars.—This invention relates to an improvement in the construction of cars for street railways, commonly termed horse cars, and it consists in a means employed for bracing the bodies of the cars by which the permanent form of the cars is maintained and its durability greatly promoted. The bodies of these cars are supported on two axles necessarily located near the center of the body, and the tendency of the overhanging ends is to droop, distorting the form, and diminishing the strength of the structure. To prevent this, various methods have been adopted, among which is the truss or arc rod, fastened at the ends and strained taut by studs with adjusting screws located over each axle. This plan has not been successful because the methods for securing the ends of the rods have been insufficient, a difficulty fully obviated by this invention. John Stephenson, of New York city, is the inventor.

Machine for Scutching Tangled Flax.—This invention consists in the use of scutching blades attached to radial rotating arms in such a manner that they will yield or give, and thus be enabled to perform their work in a much more efficient manner than if arranged fixed or stationary. The invention also consists in an improved feeding device for feeding the flax to the cutters, the same consisting of a pressure roller and a concave, whereby the flax may be fed uniformly to the scutching blades. The invention also consists in the means employed for adjusting the scutching blades nearer to or further from the concave as may be required; and it consists further in the employment of a screen to separate the woody matter from the fiber. William C. McBride, of Raritan, N. J., is the inventor.

Self-acting Pulley Brake.—The object of this invention is to dispense with the necessity of "belaying" during the process of hoisting and lowering with tackle and falls, and to prevent the occurrence of those accidents which are frequently caused by a loss of control over heavy weights, such as scaffolds, ships' sails, merchandize, etc., while suspended during the operation. It consists of a spherical wedge, fitted between a groove in one end of the body of the block and the unoccupied portion of the corresponding groove in the circumference of the sheave, having a spiral spring attached and passed through the space between the grooves, when, by a small degree of stretching, the end of the spring is hooked upon a pin which is fixed into the opposite end of the first-named groove for that purpose, so that the tension is just sufficient to prevent the wedge from falling out of place and to render it susceptible of being acted upon by the sheave which revolves freely while hoisting, throwing off the brake during the process; but upon the slightest indication of a backward revolution of the sheave the brake is drawn firmly between the grooves, performing the function of a "chock," when the sheave is stopped and a small proportion of the hoisting power is sufficient to sustain or lower a weight, as in the latter case the rope glides over the sheave at the will of the operator. A weight which two men can lift with the ordinary tackle, requires a third man to "take in the slack" by the process of belaying, which cannot always be conveniently done, and often magnifies the danger of accident rather than preventing it. By the use of the above invention the third man is not required for a similar weight; his hire is thereby saved and the labor reduced. This brake is exceedingly simple and does not require a peculiarly-constructed pulley for its application, as is the case with other inventions of this class, which renders them expensive, complicated and liable to get out of repair, but may be applicable to any of those which are in use at the present time in a few minutes without altering or disjointing the block. The inventor of this device is John Jochum, of Brooklyn, N. Y.

An Immense Establishment.

The Cambria Iron Works, at Johnstown, Pa., are being enlarged, though already the most complete and extensive establishment of the character in the country. These works give employment to about two thousand five hundred workmen, whose labor produces every week an average of over eight hundred tuns of railroad iron. The ore and coal necessary to produce this iron are taken out of the hills surrounding Johnstown, to the large and seemingly inexhaustible deposits of which the location of the rolling mill at that place is due. The monthly payments of the proprietors of the rolling mill to their employees, to neighboring farmers, lumbermen, etc., amounts to about one hundred thousand dollars, nine-tenths of which sum passes at once through the channels of home trade.

A GENTLEMAN went into a store in Manchester, N. H., recently, and inquired for small copper-toed shoes. The shopman immediately ordered him off, saying that this was no time or place to talk politics