

## BUSINESS AND MANUFACTURING ITEMS.

**SILK.**—A large Boston silk-weaving concern is reported to be about to remove its machinery to Paterson, N. J.—One of the largest silk mills in Paterson, says the *Press*, has lately been taking a hundred or more hands, besides introducing additional machinery sufficient to set up a large mill, running on full time, and turning out large quantities of silk. *Per contra*, many of the other mills are nearly stopped.

**LEATHER.**—A tanner in New York is experimenting in tanning cat-fish skins, which it is thought will make good leather. The cat fish of the Western waters, it is said, sometimes weigh from one to two hundred pounds.—It is time that our ratskins were beginning to be utilized. At the present enormous price of gloves, our inventors and manufacturers ought to be equal to doing something with our undeniable plethora of raw material in the shape of rats. Rat catching for the glove makers is a great business in Paris and other European cities. Our rats want reconstructing, badly.

**IRON.**—The Newburyport Arms Company has commenced turning out rifles and pistols.—A new machinists' tool manufactory has been started at Providence.—The Badger Iron Works, New York City, have just completed two carriages for 20-inch guns, weighing 12 tons each, for the Chilean Government. The guns are to be cast at Pittsburg.—After a suspension of three months, the rolling mills in Youngstown have resumed operations at the old wages.—The iron sand of New Zealand is to be smelted on a patented plan by a company formed for the purpose, and operations will be commenced without further delay.—The Cornwell Iron Works, near Cedar Bluff, Ala., have resumed the production of their superior quality of iron, which will be shipped to New York in pig.—A new railroad rolling stock manufacturing company has been incorporated in Dayton, Ohio.

**COTTON, ETC.**—The Renfrew (South Adams) Manufacturing Company are putting up a mill, 150 feet long by 66 wide, with two wings, each 40 feet by 56, and will run 260 looms.—The cotton mills of Columbus, Ga., burned during the war, are mostly rebuilding and will resume operations in the course of the present year.—The Falls City Manufacturing Company, Louisville, Ky., propose to increase their capital by \$50,000 and eventually to \$1,000,000, and to take another large factory for their linen works, and to manufacture flax machinery for their mills.

**RAILROADS, ETC.**—The gross earnings of the Erie Railway for 1866 were over fourteen and a half millions (\$14,596,413 09) against nearly sixteen and a half millions (\$16,462,227 90) in 1865. Net earnings, \$3,743,273 05; net decrease from 1865 \$964,559 52. The falling off is attributed to the stoppage of the Government war business and the general stagnation following the war. The company operate 784 miles of road, have 371 locomotives and 6,000 cars, a capital stock of \$25,111,210, a funded debt of \$22,429,920, and property amounting at cost to \$54,287,874 49. A dividend has been declared of 4 per cent on common and 7 per cent on preferred stock.—The Hudson River Railroad Company have recently created new stock equal to the whole amount of the old (\$7,000,000) making their capital now \$14,000,000 in addition to \$5,550,000 funded debt. Fifty per cent on each share of new stock is allowed to the old stockholders as accumulated profits (including April dividend) and the other half, raised in cash, is to be applied to the improvement of the station property in St. John's Park and of the whole line from New York to Albany.—The Oregon Central Railroad is intended to connect the steamship landing on the Columbia River with the head of the Willamette Valley, 150 miles. It has a land grant of 12,800 acres per mile and a State subsidy of \$10,000 per mile in gold-bearing bonds, for the first 100 miles. The work is to be commenced at once and finished in three years.—The new Suspension Bridge at Niagara is to be located on the American side near the gas works; on the Canada side a short distance below the Clifton House. The stockholders organized on the 2d ult. The preparation of materials has been commenced, and the bridge is to be erected in the course of the summer.—The first 305 miles of the Union Pacific Railroad were graded, bridged and ironed with a heavy T-rail and supplied with depots, repair shops, stations, locomotives, cars and all the necessary appurtenances of a first-class road for \$50,000 per mile.—The St. Paul and Chicago Railroad (capital, \$6,000,000, to be completed in two years) is to connect St. Paul with the Chicago and Milwaukee roads at Winona, 101 miles, and run thence 50 miles to the Iowa State line. It has a land grant of 904,960 acres, nearly an air line from Chicago to St. Paul, and very light grades. Beyond St. Paul, the St. Paul and Pacific line runs nearly straight to the Hudson's Bay Company's territory, and is already in operation 76 miles.—The Persian telegraph is to be completed from Teheran to the Turkish frontier, by the end of June.—After ten years' warfare, the Great Western and Grand Trunk Railways of Canada have come to an agreement on rates and fares.

**WOOLEN.**—There are five hundred woolen factories in the State of Indiana, some of them having over three hundred thousand dollars invested.—The stockholders of the Amesbury (Mass.) Woolen Mill Company have decided to sell at auction the entire corporate property which cost about \$140,000. The company is heavily in debt.

**MISCELLANEOUS.**—The Chicago *Journal* says that one of the leading architects estimates at least three million dollars' worth of contemplated new buildings entirely abandoned or indefinitely postponed on account of the eight-hour movement.—The tobacco manufacture of New York City and the suburbs is an enormous business, said to exceed that done in any other staple, and to be second only to cotton as an export, selling \$100,000,000 annually, employing 25,000 persons, and conducted by 1,613 firms.—A new paper mill is to be built

at Elmira this summer, and a new tannery.—High street, Columbus, is to be paved with the Nicolson pavement, at a cost of \$80,000.—The Western farmers are sowing flaxseed very extensively the present season.—The Board of Engineer Officers detailed under the Act of Congress to form a plan of improvement of the Hudson below Albany, have decided to proceed with the plan formerly adopted and partially carried out.—The city of Chicago is deepening the Michigan and Illinois Canal by an excavation through solid limestone ten feet deep and eight miles long, so that boats can float out of Chicago River into the canal without a lock, and a current will be formed in the Chicago River to the great improvement of that stream. The work will be completed in about two years. The Washington street tunnel is also going forward.—Free water power and freedom from taxation for five years, has been voted to new manufacturers on the Molunkus River, near Sherman Mills, Aroostook county, Me.—Dam and mills are going forward in Andover, Me., on Black Brook; also a starch factory on Gardiner's Brook.—The various Holyoke (Mass.) Mills unite in mitigating dull times for their employees by economy in board; the prices established in the corporations being \$3 50 for males, and 2 50 for females.—On the dissolution of the large furniture manufacturing firm of Mitchell & Rummelsburg, Cincinnati, by the death of Mr. R., the surviving partner recently threw the establishment into a co-operative stock concern, with a capital of \$2,000,000 in \$100 shares, a considerable part of which was taken by the workmen.—The salt manufacture has been resumed at the old mills near Emporium, N. Y., with the advantage of the Buffalo and Washington Railroad.—Harmony Mills, Cohoes, N. Y., have in one building two unobstructed rooms measuring 70 by 625 feet and 612,500 cubic feet, and five in another building, 72 by 560.—A paper mill is going up in Butler county, Ohio; cost \$100,000.—Little Rhode Island employs \$33,000,000 of manufacturing capital and produces \$103,000,000 worth of goods in a year. Considering the state as one complex Yankee machine, the attentive spectator will perceive issuing from its different mouths every second in working hours nearly ten yards of cotton cloth, nine yards of calico, one yard of woolen cloth, one dozen of shoe and corset laces, one yard of worsted braid, and a spool of thread; a horseshoe and a gross of screws every four seconds, beside other matters too numerous to mention.

## Correspondence.

The Editors are not responsible for the opinions expressed by their correspondents.

## The Recoil of Guns.

MESSRS. EDITORS:—In the article on "The New Steam Gun Carriage," page 350, the following part appears not entirely correct, viz:—"A ball moving at 1,000 feet per second of initial velocity, weighing 450 pounds, exerts a force equal to 450,000 foot-pounds. If the gun and carriage weigh 50,000 pounds, they will have an initial velocity of 9 feet per second and a force of 450,000 pounds, which must be absorbed before they are completely brought to rest."

The energy of the ball is correctly calculated at page 302,

$$\frac{450}{2 \times 32.15} \times 1,000^2 = 6,998,444 \text{ foot-pounds.}$$

Energy of gun and carriage

$$\frac{50,000}{2 \times 32.15} \times 9^2 = 62,967 \text{ foot-pounds.}$$

Total energy exerted by powder = 7,061,411 foot-pounds.

Assuming the charge at 40 pounds, the effect above overcoming resistance of atmosphere is 170,000 foot-pounds per pound of powder, which agrees with table page 302.

Taking the distance traveled through by the ball till leaving the muzzle at 12 feet, the total average pressure is  $7,061,411 \div 12 = 590,951$  lbs. on an area of 176 square inches, or 3,357 lbs. per square inch above atmospheric pressure.

Owing to the high degree of expansion, the initial pressure in the gun must be perhaps ten times as large or more, say 35,000 pounds per square inch. The area of the 11-inch cylinder taking up the recoil is 95 square inches. If the piston moves one foot before stopping, the average pressure will be  $62,967 \div 95 = 662$  pounds per square inch: at four feet motion, 165 pounds. Further calculations without more complete data, and disregarding friction, are of no value.

The difference between the energy transmitted to the ball and that imparted to the gun and carriage is by no means in opposition to the laws of Newton, as some of your correspondents appear to think.

The expression, "a force equal to 450,000 foot-pounds," is objectionable. It appears to be settled among engineers that whatever is expressed in foot-pounds is called "work" or "energy," while a "force" is given in pounds or other unit of weight.

Washington, May, 1867, }  
Third Div. Q. M. General's Office. }

## Electricity in Iron Smelting.

Of all the remarkable applications of electro-magnetism which have been made within the past three or four years says the *Athenæum*, the most remarkable is perhaps the one now talked about, namely, the use of an electro-magnetic current in the smelting of iron. We hear that the experiment has been tried at one of the leading ironworks in Sheffield, and with complete success. The mode of operation as roughly described, is to place a fixed electro-magnet opposite an opening in the side of a furnace, to excite the magnet by means of a Smee's battery, and to direct the current of magnetism into the molten metal. The effect is surprising; the metal appears to bubble and boil, the melting is expedited, which economises fuel, and the quality of the iron is so much improved

that for toughness and hardness it can hardly be equalled. It appears that some, if not all the impurities which remain after the ordinary process are driven out by the use of magnetism; consequently, this new application of the occult element may be regarded as full of promise, for all who work in iron. All of which is to be taken with a grain of salt.

## Vitrified Photography.

De Mothay and Marechal have produced a new method for fixing vitrified photographic images in porcelain enamel, glass, etc. The article is first varnished with a solution of 4 parts of caoutchouc in 100 of benzol, with the addition of one part normal collodion. After drying, a second coating of iodized collodion is poured over the first, and unites intimately with it. It is then immersed in a bath of nitrate of silver, and the image is produced either by camera or superposition, developed by any of the usual agents, and fixed by two successive baths, one containing a solution of an iodo-cyanide, and the other an alkaline cyanide. It is next steeped for some instants in a solution of protoxide of iron, pyrogallol acid, or any other substance that will reduce the salts of silver. The image is intensified by the action of pyrogallol, gallic or formic acid, or sulphate of protoxide of iron mixed with an acid solution of nitrate of silver: requiring four to six applications for images to be seen by reflection, and twelve to fifteen for those to be seen by transparency. During this operation the image is washed three or four times in alternate baths containing iodo-cyanides and alkaline cyanides, and then, immediately afterward, in sulphate of protoxide of iron, pyrogallol acid, or other reducer of salts of silver. The consecutive baths are to dissolve the non-adherent silver precipitated over the whole plate in each reinforcing bath, while intensifying the fixed image. The washings in the reducing bath, rendering the metallic surface neutral, increase powerfully the subsequent action of the re-inforcing bath. The image is now immersed for several hours in a bath of chloride of gold and nitrate of platinum, or again in a bath of chloride of gold, according to the color desired. During this steeping, the silver of the image is partly replaced by platinum or gold or a mixture of both. The platinum bath gives eventually by vitrification a greenish black, the alternation of platinum and gold yields black, and the gold alone results in gilt images. Next the image is washed in a solution of alkaline cyanide, or a concentrated solution of ammonia; then covered with a thick varnish of caoutchouc or gutta percha, and heated in a muffle, when the organic matters are consumed and the metal left. Finally, the image is covered with a silicic or boracic glaze, and brought to an orange red heat by which it is vitrified, and unchangeably fixed.

## Illustrated Patent Office Report for 1865.

We are indebted to Messrs. E. R. Jewett & Co., publishers, Buffalo, N. Y., for a bound volume, Part II., Illustrated Mechanical Report for the last part of the year 1865.

The engravings are well executed, the inventions clearly defined and the entire work a marvel of neatness. These Reports which Messrs. Jewett & Co. have published for a number of years are in great contrast in point of execution to most of the public documents issued under the direction of Congress.

We hope the Commissioner of Patents will exert all of his influence to award the continuance of the publication to Messrs. Jewett & Co., who have done the work so acceptably.

## Recent American and Foreign Patents.

Under this heading you will publish weekly notes of some of the more prominent home and foreign patents.

**BOUQUET STAND AND HANDKERCHIEF HOLDER.**—A. D. Frye, New York City.—This invention relates to a new and ingenious arrangement whereby the beauty and value of a bouquet of natural flowers is greatly increased by its combination with the beautiful designs of art. The bouquet is formed on a highly ornamental tubular holder which may either be held in the hand or be made to stand of itself; the lady at the same time is relieved of the trouble of holding her handkerchief while the handkerchief itself is receiving the perfume of natural flowers.

**CAR COUPLING.**—John D. Anderson, Corry, Pa.—This invention relates to a new and improved method of coupling railroad cars.

**ROTARY STEAM ENGINE.**—J. H. Van Sandt and J. J. Hunt, Princeton, Ind.—This invention relates to the manner in which an uninterrupted action of the steam upon the shaft of a steam engine is obtained whereby the objections to a crank and the difficulty experienced from dead center is overcome.

**METHOD OF CONVERTING AND MULTIPLYING MOTION.**—H. Burk, Mineral Point, Ohio.—This invention consists in forming an eccentric or zig-zag channel in the sides of a wheel that is attached to and revolved by a rotating shaft, and in constructing a pitman so that it shall receive a rectilinear motion from the wheel by having its end fitted to the irregular groove before mentioned.

**SAWING MACHINE.**—Henry Hassenpflug, Huntington, Pa.—This invention relates to a portable sawing machine which is to be chiefly used for cross cutting, and for cutting cord wood, and for scroll work, but which may also be changed so as to be used for ripping. The invention consists chiefly in the self-feeding apparatus whereby the wood is gradually fed to the vertical reciprocating saw; also in such a construction of the parts that the distance between the ends and the fulcrum of the lever by which the saw is operated can be changed at will, so as to increase or diminish the power or the speed of the machine as may be desired.

**GRASS PLOW.**—L. B. Lathrop, San Jose, Cal.—This invention relates to a new plow which is constructed with a view of reducing manual labor in plowing and to secure an ease of draft not heretofore attained.

**BATH TUB.**—John Carroll, New York City.—The object of this invention is to construct a bath tub of sheet metal and wood in such a manner that it will be durable, light, and easily packed for transportation.

**PENCIL SHARPENER.**—Hubert Burgess, San Francisco, Cal.—The nature of this invention consists in constructing a device by which slate and lead pencils, also crayons, may be sharpened in the most perfect and expeditious manner.

**APPARATUS FOR REMOVING WATER AUTOMATICALLY FROM THE HOLDS OF VESSELS.**—H. L. Stibbs, Savannah, Ga.—This invention has for its object to furnish an improved apparatus by means of which water may be removed from the holds of vessels automatically.