A. S. LYMAN'S PATENT ACCELERATING RIFLE.

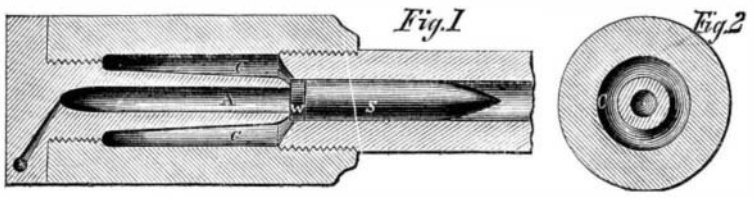
Fig. 1 is a longitudinal section of the breech of an accelerating hunting or target rifle.

Fig. 2 is a cross section through the accelerator.

A is the initial charge chamber; C C is the accelerating chamber; S is the shot.

This rifle is loaded at the muzzle when standing nearly vertical. The powder first fills the center tube, A, which holds twenty grains, then runs over into the accelerating chamber, C C, which surrounds it, and is upward of ten times as large as the center or initial charge chamber. A wad, W, of leather (made by cutting a piece from sole or harness leather with a punch) is next pushed down upon the end of the initial charge chamber. This cuts off all connection between it and the accelerating chamber. The barrel may then be wiped out if desirable, and the shot sent home.

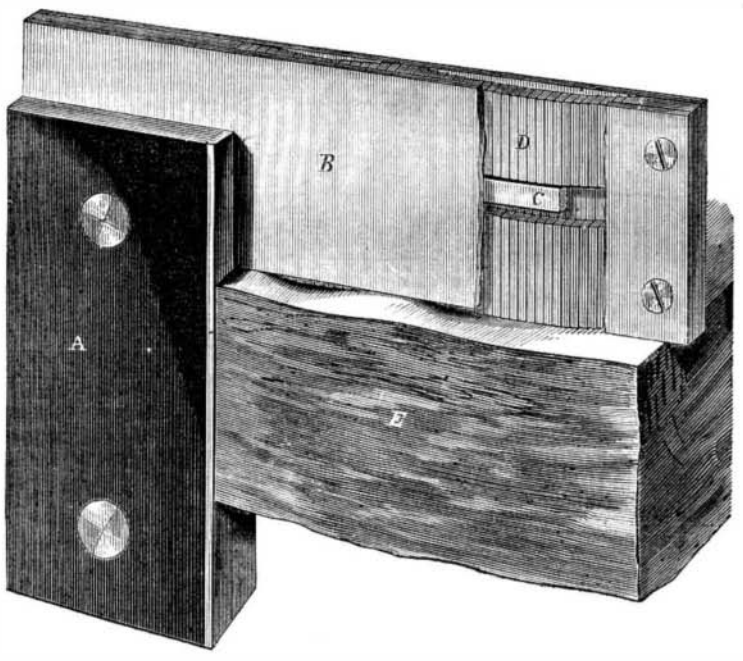
The range of this little rifle but ⅝ inch diameter of bore, and weighing, with its telescope, less than 15 pounds, using half an ounce of powder and one ounce shot 2¼ inches or six calibers long, is 1,000 yards with 1° 28′ elevation, and 1,300 yards with 1° 58′ elevation. It will be seen that this is a greater range than is obtained by any known cannon at the same elevation except the Accelerator, and more than twice as great as that of the Whitworth or any other rifle known of the same caliber.



This great range and horizontality gives it a vast advantage for hunting and other purposes where the exact distance is not known, as explained in description of Accelerating Cannon in SCIENTIFIC AMERICAN of Aug. 3d.

Improvement in Try-Squares.

In the use of the ordinary try-square for trueing up stock it is necessary either to stoop repeatedly in order to look under the blade of the square, or to raise the piece being operated upon to permit the light to show between the blade's edge and the work. Of course, this, if long continued, is a wearisome labor, especially if the piece being trued is heavy or bulky. The object of the improvement in the square shown in the engraving is to obviate this necessity by permitting the eye to note the progress of the work by a glance at the top of the blade. How this is effected may be seen by the following description:—A is the handle or stock of the try-square and B, the blade. This latter is hollow or double, composed of two longitudinal blades secured, as seen, a little distance apart. Running lengthwise through the center of the space between these blades is a square bar, C, on which hang cross pieces, D, with a mortise in each sufficiently long to permit a slight vertical movement on the central bar. These drops are about one-sixteenth of an inch in width, made of steel, and fitting nicely one to another. The central bar permits these uprights to drop below the level of the lower edge of the blade but only flush with the top edge. Thus it will be seen that when the piece which is being planed becomes true, all those uprights which bear on its surface will be exactly level with the top edge of the blade. The block of wood, E, is purposely shown to be very uneven to exhibit the working of the square, a portion of one side of the blade and a part of the central bar being broken away to expose the parts.



BURGUM'S IMPROVED TRY-SQUARES.

This invention was made at the suggestion of a correspondent in the SCIENTIFIC AMERICAN a few weeks ago and it appears to meet a want long experienced. For further particulars address John Burgum, Concord, N. H. Patent pending through this office.

A QUARTETTE OF MATHEMATICAL GYMNASTS.

The errors which have lately been made in calculating the power of projectiles, the resistance of armor plates, and the force of steam vessels when used as rams, seem to indicate that a knowledge of first principles is more necessary for a correct appreciation of mechanical problems than any amount of abstract mathematical skill.

The scientific gentlemen whose errors on the subjects alluded to, it is intended at this time to point out, are Captain Noble; Professor Daniel Treadwell, late of Harvard University; one of the Shoeyburyness scientific reporters, and Rear Admiral Louis M. Goldsborough, of the U. S. Navy.

The curious blunder of Captain Noble, of her Britannic Majesty's Service, the famous artillery calculator, in computing the dynamic force of the fifteen-inch shot, has a parallel, in point of inaccuracy, in a late error (which will presently be referred to) of another Shoeburyness mathematician in calculating the resistance of a certain iron-clad target, and also in the blunders committed by Professor Treadwell in his calculation on the fifteen-inch gun. Captain Noble, it will be remembered, made the following error in his calculation of the power of the fifteen-inch shot. Referring to page 30 of his report, the result of his calculations is stated as follows, viz.: That with a "50-pound charge and a 484-pound shot an initial velocity of 1,070 feet per second will be the result." This is equivalent to a force represented by 8,658,760 pounds raised one foot high, which divided by 50 gives only 173,175 foot-pounds as the energy exerted by each pound of powder.

On June 27, 1867, Captain Noble fired the fifteen-inch gun at Shoeburyness with the following result: Charge 50 pounds, weight of shot 450 pounds, velocity 1,214 feet per second, dynamic force of the shot 10,328,400 foot-pounds, or divided by 50 gives 206,570 foot-pounds for each pound of powder. Thus Captain Noble was no less than 1,569,634 foot-pounds out of the way, and he himself practically demonstrated the fallacy of his calculations, together with his want of knowledge of the weapon he had condemned on the results of blundering computation. And more unfortunate still for the reputation of this officer, he asserted that 50 pounds "is as heavy a charge as it will stand." Now these guns have been fired frequently, some of them for 100 rounds, with 100-pound charges of mammoth powder=83 pounds of such powder as Noble's calculations are based upon. Consequently the energy produced represented by 83×206,570 (the force of one pound)= 17,145,310 foot-pounds, or about double the power this ordnance officer asserted it was possible for the fifteen-inch gun to exert!

We are sorry to say that Professor Treadwell has blundered still more than Captain Noble in his speculations on the capacity of the fifteen-inch American gun. In Vol. VII. of the Proceedings of the American Academy of Arts and Sciences, we find the following statement in a communication from Professor Treadwell, read by Professor Winlock, viz., that the fifteen-inch gun with a projectile of "315 pounds" weight and a charge of "50 pounds" of powder an "initial velocity of 1,118 feet per second" is obtained, which is equal to a "force in pounds raised one foot high, 6,057,950."

Referring to the results of trials before alluded to, it will be remembered that 50 pounds of powder projected a 450-pound shot with no less a velocity than 1,214 feet per second, which is equal to 10,328,400 foot-pounds, or 4,276,450 more foot-pounds, or nearly double the *vis viva* stated by the Professor. And in order to show still further to what extent he has underrated the real power of the gun, it is only necessary to repeat that with a proper charge the gun imparts an energy to its shot of no less than 17,145,310 foot-pounds, as tested by more than a hundred discharges from one single gun, as before stated.

In the same communication we find the following put down as the performance of the Armstrong wrought-iron coil gun: "Weight of shot 600 pounds," "charge of powder 100 pounds," "initial velocity 1,400 feet," "force" of shot "in pounds raised one foot high, 18,375,000." According to these statements a pound of powder in the 15-inch only exerts a force of 123,039 foot-pounds, while the late Shoeburyness trials show that this piece actually exerts a force of 206,567 foot-pounds; thus the Professor underrates the American gun to the enormous extent of 83,537 foot-pounds for each pound of powder employed, a degree of blundering quite inexcusable in one who undertakes to teach the American Academy of Arts and Sciences. The enormous friction of the rifle shot and the absence of friction in the 15-inch shot, should have suggested to the Professor that his calculations must be erroneous.

Again, the 100 pounds which he puts as the charge in the Armstrong gun has only been used on one or two occasions; 70 pounds was called the service charge, and even that ruined the gun in a very short time, and the last one tested burst at the sixth fire with but 70 pounds. In a word, the English themselves admit this gun to be a dead failure. But with this charge, *i. e.* 70 pounds, and a 511-pound projectile, an initial velocity of only 1,250 is obtained; hence the force of the shot is equal to 12,500,000 foot-pounds, or only 178,528 foot-pounds against nearly 207,000 for the 15-inch.

While Professor Treadwell has overstated the power of the abortive 13·2-inch English wrought-iron coil gun, he has as we have shown understated the power of the American 15-inch cast-iron gun in the ratio of 6,051,950 foot-pounds to 17,145,310 foot-pounds, that is, he has underestimated its capacity *nearly three-fold!*

In looking through Professor Treadwell's paper, an explanation which seems to account for these astounding blunders may be found in the fact that the document in question is intended as an argument in favor of the coil system of constructing cannon, his patent system. On this point it will be enough to say that the Armstrong coil system, which the Professor crowns with unearned laurels, is utterly unable to meet the strains put on heavy ordnance; in short, it is a complete failure, and is so acknowledged in England by the fact of its abandonment for a simpler system. The Armstrong system is now admitted to be founded on erroneous mechanical principles.

Much more remains to be said on this point, but we pass on to the next candidate, the Shoeyburyness scientific reporter. And with respect to the blunder made by this official in his calculations on the resisting power of an iron target, we cannot do better than quote from the London *Army and Navy Gazette* of August 24th. The *Gazette*, after giving its views of the self-satisfied air of the Shoeyburyness ordnance and select committee men, says: "There is, we see by the pages of the leading journal, a recent and rather remarkable illustration of the utter fallaciousness of the calculations at Shoeburyness, which the scientific officers would have done better to have kept to themselves. It was considered desirable to test the power of the American system of laminated plates as compared with that of solid plates. One target was composed of a solid 7-inch plate, one of two 3½-inch plates, and one of three 2⅓-inch plates, bolted together."

We are told that "the ratios of resistance under the 'empirical rule' ought to have been 49, 24, and 16 respectively. The result was ludicrously at variance with the empirical rule, and is represented in the proportion of 61, 57, and 52 respectively." It is not likely that any comments can add to the force of the teachings of such a result.

The blunder to which we now call attention, in point of ignorance of principles, is entitled to cap the monument of blunders whose base and shaft is formed by the others which we have already mentioned. It is the extraordinary hallucination of no less a mathematician than Admiral Goldsborough with regard to the smashing or punching power of rams. The Admiral's fallacious reasoning deserves to be pointed out at the present time, from the fact that he still clings to an error which, if he has any conception of the subject, he must have seen long since.

In his report to the Secretary of the Navy in 1864, the Admiral strongly advocates the employment of rams for the protection of harbors, unprovided with guns, which he says "are detrimental to unity of purpose." This view he attempts to sustain by the absurd statement that a ram weighing 10,080,000 pounds, moving at the rate of 15 knots an hour or 25 feet per second, "is equal in point of shock" to a ball of iron weighing 252,000 pounds striking with a velocity of 1,000 feet per second. This ball is 10 feet 2¾ inches in diameter. The striking force of the ram is measured by its equivalent of a little over 100,000,000 of foot-pounds, while the striking force of the 10 feet 2¾ inches ball is measured by no less than 3,906,000,000 foot-pounds. In other words, the Admiral, by not understanding the fact that the comparative "shocks" of the impact of moving masses are measured, not directly as their velocities, but as the squares of their velocities, has committed the ludicrous blunder of exaggerating the power of his ram nearly forty fold.

The Admiral's ramming theories appear to have been conceived while he was in command of the naval force in Hampton Roads opposed to the *Merrimac*, and while that iron-clad was nightly haunting his dreams. The official delivery of these theories was formally announced with the ceremony due to a royal birth, in the report to the Secretary referred to.

We have a few other mathematical acrobats on our list, but as their summersaults were turned on another stage, we will not mention them at the present time, but we hope before long to place them before the readers of the SCIENTIFIC AMERICAN. We will briefly observe, however, that one of them is not a thousand miles from the Navy Department, and he is still, we believe, accumulating figures with extraordinary cunning and industry.

GLEANINGS FROM THE POLYTECHNIC ASSOCIATION.

The meetings of this Society were resumed, after the summer intermission, on Thursday evening, Sept. 19th. The attendance was small, and the exercises were of a somewhat miscellaneous character, being chiefly confined to discussions and comments upon a budget of scientific items collected by the Chairman, Prof. Tillman, during the summer months.

FACTS CONCERNING DEAFNESS.

Following the reading of a note upon the causes of deaf-dumbness Dr. Richardson remarked upon some prevalent but false notions, respecting the use of aids to hearing and to sight. Persons having but a slight impairment of their auditory apparatus, are loth to have recourse to speaking trumpets fearing that thereby permanent deafness will ensue. But this is a mistaken idea, for the use of this aid is in effect a kind of invigorator, bringing the organs of hearing into full play, and thereby developing rather than paralyzing them.

In supporting similar views in relation to the organs of hearing and sight, Dr. Richardson recounted the observations made by Dr. H. R. Smith, of Chicago, during a recent visit of scientific research to the Mammoth Cave. The fish of these subterranean lakes are not only without eyes or even traces of an orbit, but so far as he could ascertain by careful and

indefatigable investigation, are destitute of the sense of hearing; these facts going to prove the truth that the functions of the auditory and optic nerves become impaired by the partial or total deprivation of their natural stimuli, sound and light.

But on the other hand, excessive use of these nerves tends to their paralyzation. The case of three boiler makers of this city made permanently deaf by hearing incessant hammering, was mentioned; also many cases of loss of hearing by artillerymen. In this connection it was incidentally mentioned, that the noise made by brass cannon affected the auditory nerves more painfully than that made by iron ordnance.

CONCERNING TEETH.

A note upon late experiments, relative to the readiness of digestion of varieties of food, brought up Mr. Fisher, who advocated the more thorough comminution of food on the score of health and economy. In the rambling discussion which ensued, one speaker presented the testimony of a late French *savan*, who maintains that the superiority of an Indian's teeth, for example, is due to the fact that, from insufficient cooking of their food, they are obliged to make great use of them; that the dentist's occupation was a sign and concomitant of excessive civilization. The dentists present denied the charge, affirming that rudimentary teeth of both sets were formed before the birth of the child; that the mastication of food in no way entered into the question, excepting perhaps in the case of the mother; and that the Indian had better teeth simply because the constitution of the generality of their females was better than that of the civilized woman.

Some other topics of minor note occupied the controversial powers of the members during the remainder of the evening, and the Society adjourned at a late hour.

Birkhols' Metal.

We see it stated in the papers that A. Birkhols, formerly of Colt's factory in Hartford, the inventor of a metallic composition resembling brass, for the manufacture of which a company has been formed in Providence, R. I., with a capital of $300,000, has sold his patent to them for $40,000 of the stock, three cents duty on every pound manufactured, and a salary of $4,000 for superintending the manufacture.

The following is a copy of the patent:—

Be it known that I, Alexander Birkhols, of the city and county of Hartford and state of Connecticut, have invented or discovered certain new and useful improvements in the composition of cast metal, by means of which greater strength is acquired, and I do hereby declare that the same is described in the following specifications.

So as to enable a person skilled to make the same, I will therefore proceed to describe its component parts, the essential ingredient of which is cast iron. To make one hundred pounds of this composition, I first take two pounds of cast iron, two ounces of charcoal, put into a crucible and heat to a white heat. I then add thereto sixty pounds of copper. Heat till both are melted together, then add four ounces of borax and thirty-eight pounds of zinc.

The mode of proceeding during the melting is much the same as with all other metals melted in crucibles. When melted it may be poured into molds or bars suitable for the forge or rolling mill. Its strength is estimated to be eight thousand pounds greater to the square inch than the best wrought iron, rendering it far more valuable for various purposes.

The proportion of parts may be varied, which will only change proportionably the desired effect, viz., greater amount of strength and solidity; but I believe that the proportions about as described will be best for all practicable purposes. I have described its component parts and the mode of proceeding to produce my improved composition, so as to enable a person skilled to make the same.

What I claim, therefore, and desire to secure by letters patent, is the introduction of cast iron into a composition composed of copper and zinc in about the proportion, substantially in the manner as described.

ALEXANDER BIRKHOLS.

The Uchatius Process.

Many of our readers will still recollect an interesting invention made by M. Uchatius, an officer in the Austrian service, and which was first brought under public notice at the Paris Exhibition of 1855. It is a direct method of steel manufacture by mixing granulated cast iron and iron ore, in proper proportions, in a crucible, and by these means forming the exact combination required for any given quality of steel. In 1856, at the same time when Mr. Bessemer's invention had been pronounced to be a failure, this process was at the hight of its renown, and experiments were made in France and in England on a more or less large scale, although not in anything like commercial practice, to test its value. A company was formed in France, and, we believe, under the auspices of the Government, for the working of M. Uchatius's patents, and everything then believed to be necessary for steel manufacture on a large scale was provided. The causes of failure in this instance are now perfectly intelligible, since the advancement of what may be called the science of steel manufacture has, since that date, enabled us to judge of the importance and value of certain details which were then unknown or overlooked, and the absence of which caused the practical failure of a process which in principle was perfectly correct, and would have in time become of considerable importance, had it not been surpassed by the progress of a still more glorious and revolutionizing invention, viz., the Bessemer process. The Uchatius process, however, has been commercially introduced at one place, and the steel works has continued its operations now for about ten years, and so far as can be judged from the excellent quality of its products, and from the continuance of this mode of manufacture with perfect success. The steel works referred to is at Wykmanshyttan, in Sweden. In 1862, this concern sent Uchatius steel to London, which was remarkable for its tenacity and uniformity of grain, and now in the Paris Exhibition we find the same works represented by another excellent collection of the Uchatius steel. We understand that the Uchatius steel of Wykmanshyttan is used exclusively by the royal mint at Stockholm for dies of coining presses, polished rolls, and other similar articles requiring steel of great strength and closeness and uniformity of grain. The reason why this process succeeded in Sweden and failed in France and in England is the same which made the Bessemer process first succeed in that country, viz., the purity of the Swedish ores. The ore employed for the Uchatius process at Wykmanshyttan is that of the Bisberg mines, which can be seen in its natural state at the Paris Exhibition, forming part of the large trophy of ironstone and iron erected in the Swedish machinery gallery. It ranks among the purest and richest magnetic ores to be found anywhere. From this ore and from granulated pig iron made of the same ore, probably mixed with iron containing manganese, if the original granulated iron does not contain a sufficient dose of this latter metal, the Uchatius steel is made. The production is not inconsiderable, and the article finds a market at Gefle, principally in the form of a bar steel of small dimensions, at a price of 30s. to 35s. per cwt. Uchatius' process would have become a practical success in England, had it not been swept away by Mr. Bessemer's invention before it had time to establish itself in practice. The steel manufacturers of this country and the public at large have all reason to be satisfied with the historical coincidence of the two inventions, since there would otherwise, and had Bessemer followed behind Uchatius, have been two revolutions to be passed through instead of the one which has taken place. We should have had to change from the old mode of steel conversion to the Uchatius process, and ultimately again from that to the Bessemer process.—*Engineering.*

Animal Grafts.

Plastic surgery recognizes life in a part and grafts one portion of the body on another, or replaces a portion of a nose or a finger when lopped off, and witnesses its continued growth. In lower animals this principle is more astonishingly developed. Cut a polyp into a dozen pieces and each fragment will develope itself into an independent and perfect type of the species. A French naturalist, M. Vulpian, cut off the tails of tadpoles, and saw them not only live but grow for ten days, indifferent to all theories of nervous centers, digestive apparatus, or circulatory systems. But the member that seems to have the strongest dose of the "vital principle," is the tail of a rat. This is the very ideal of life, and here, if anywhere, we ought to locate the seat of vitality. The following experiment was made by Mr. Bert. He dried a rat's tail under the bell of an air pump, and in immediate proximity to concentrated sulphuric acid, so as gradually to deprive it of all moisture. Then he placed it in a hermetically sealed glass tube for five days. At the end of this time he subjected it for a number of hours to a temperature of 98° Cent. in a stove, and subsequently sealed it a second time in his tube. Four days more having elapsed, he united this tail by its cut extremity, to the freshly cut stump of a living healthy rat, and quietly awaited the result. His success was as complete as it was marvellous. It commenced to expand and perform the natural duties of a tail, and three months afterward he demonsurated by a second amputation, and a careful injection, that it was furnished with proper vessels and was a living part of the second rat!

What rich lessons practical surgery may learn from such experiments, can be imagined. A careful anatomist has transplanted a fragment of bone from the skull of one rabbit to the skull of another, and found it form adhesions and replace the lost portion perfectly. A piece of periosteum taken from a rabbit twenty-four hours after death, grew and produced bone when grafted neatly on a living animal of the same species. Nerves also have been removed from one body to another with success, and some very singular results noticed where a portion of a motor was excised and supplied by a fragment of a sensory filament. The diseases to which grafted members are subject, after they have been exposed to certain re-agents, are also full of hints for the pathologist and the physician.—*Medical and Surgical Reporter.*

MANUFACTURING, MINING, AND RAILROAD ITEMS.

The East India telegraph is progressing through China.

There is only about a quarter of the shipping tunnage building in Maine at present compared with last year.

England uses 850 million postage stamps annually, France 450 and the United States 350 millions.

The efforts of the French Emperor to increase the extraction of coal in France, have been so far successful that from 13,000,000 to 14,000,000 tuns will probably be mined this year. Rather an insignificant amount compared with the coal production of America or England.

The cities of Bombay and Singapore, India, have for two years past been lighted with gas made from coal brought from Australia. This coal besides being cheaper, is quite free from sulphur, so that the gas is easily purified, and a larger supply of coal may be stored without deterioration or danger from heating.

The ties for the Kansas Pacific Railroad will cost a dollar each. The coal must be transported 200 miles.

The Prussian King has accepted the present by Krupp of his monster gun now in the Paris Exposition, and its ultimate destination will be some coast battery.

A California paper says that the company engaged in taking out borax in Lake county, will soon be in condition to extract five tuns of this article per day from the Borax Lake.

Gold dust to the value of $800,000, arrived at St. Louis, from Montana, on the 9th inst., the largest consignment received at one time.

Maine claimed recently to possess the oldest locomotive in America. It was broken up the other day at a Bangor machine shop. This locomotive was the "Pioneer," a ten tun engine, and was one of the early machines built in England by Stephenson, the inventor of the locomotive. It was built at Newcastle-upon-Tyne, in 1835, and ran its first trip November 6, 1835. Its last work was done August 15, 1867.

Diamonds have been found in the Cape colony, in the neighborhood of the Orange river, by some Amsterdam prospectors; one of the gems is valued at $5,000.

It appears from quarterly returns made by the various manufacturers of sewing machines in this country, that during the year ending June 10, 1867 there were manufactured and sold 151,135 double-thread, and 18,970 single-thread machines.

The first paper mill built in the United States was erected at Roxborough, Pa. 1693. The second mill was built at Elizabeth, N. J., in 1728, during which year the first mill in Massachusetts was built in Boston. In the year 1860 the number of paper manufactories in the United States was 555, their total product, being valued at $21,216,802. Of these manufactories New England had 204; the Middle States 273; the Western States 54: the South 24. The increase since that year has been very large.

The American Fishhook company of New Haven, Conn., turn out from each machine, one hundred fishhooks per minute.

The Boston Hartford and Erie railroad by the first of next month will have their road in operation to Mechanicsville, Ct., where a junction will be made with the Norwich and Worcester railroad.

The largest journal turbine wheel ever built in the country, is being constructed for the Fairmount water-works of Philadelphia. Its diameter is ten feet three inches: weight, including gearing etc., about 200,000 pounds.

Some of the Lowell cotton mills which have been slacking up for a few months past, are again pushing business.

The amount of capital expended on the Suez canal, last year was $10,600,000. The estimated amount still required to be expended before the work will be completed, is said to be $29,600,000.

For improving the navigation of the Mississippi river, Government has authorized the construction of a canal seven and a half miles in length, around the Keokuk rapids. The contract for the removal of obstructions in the rapids just above Rock Island, has been awarded, and among the novel means for rock excavation, is an immense drill weighing over four tuns, which with a fall of thirty feet, it is reported, plows into the solid rock more than four feet at a single stroke. It would interest us to be informed of the structure of the rock where such extraordinary results could be attained.

Work on the Manassas Gap railway, is progressing very rapidly about three hundred hands being employed. The rails are now being laid between Piedmont and Markham, and the track graded and readjusted to the summit of the Blue Ridge.

The production of coal this year has not reached that of 1866 but the great falling off in the demand for manufacturing purposes has caused a great reduction in rates. Prices are now so low that the mines are not making any money, and it is predicted that many small companies formed during the past two or three years, must succumb to the general stagnation.

The first sample of pig-iron ever made on the Pacific coast is on exhibition in San Francisco.

The contract for building the mountain section of the Pacific railway, some six hundred miles in length, has been awarded to Mr. Oakes Ames, who is to receive therefor over $47,000,000. This is the largest railway contract ever made in this country.

The California gold mines are said to be yielding more freely than ever before. As a specimen; near Smartsville upwards of $1,000,000 of gold have been taken from one claim of 100 acres, since March 1864. "It takes a mine to work a mine" says an old Spanish proverb, and to open the mine under notice, took nine years of incessant labor, and an enormous expenditure of money. It has four miles of sluices, three rods wide and three feet deep, in which is distributed three tuns of quicksilver to catch the gold. The water used in washing costs $25,000 per annum, and 125,000 pounds of powder are expended annually in blasting.

Recent American and Foreign Patents.

Under this heading we shall publish weekly notes of some of the most prominent home and foreign patents.

ATTACHMENT FOR GRAIN CLIPPER OR HEADER.—Samuel Manning, San Francisco, Cal.—This invention relates to a new machine to be attached to the ordinary clipper or header, for the saving of grain, which is fallen or blown down, commonly termed "lodged grain."

CARRIAGE SPRING.—Thomas De Witt, Detroit, Mich.—This invention consists in the application of fixed studs to a carriage spring, composed of two parts connected together and arranged in such a manner that a spring superior to the ordinary elliptic spring is obtained.

LOUNGES, SOFAS, BED BOTTOMS, CHAIRS, ETC.—Casper Martino, Trenton, N. J.—This invention has for its object to furnish a neat, convenient, secure, and reliable means of securing coiled wire springs, in a position in lounges, sofas, chairs, bed bottoms, etc, and for raising and lowering a movable part of such articles.

DEVICE FOR HITCHING HORSES.—J. B. Thornton, Madison, Wis.—This invention relates to a device to be attached to the inside end of carriage wheel hubs by means of which, if the horse or horses harnessed in and to the carriage be hitched to such device, upon any attempt to move forward the wheel is turned sufficiently to draw in the rein, and thus to stop them; while if they move backward, the devise is free to slip around the wheel hub, and no harm thus occasioned.

SPADE.—W. H. Miller, Brandenburg, Kentucky.—This invention consists principally in a novel attachment of the handle for operating the tines constituting the rake, to throw them into position for use as a rake or as a spade.

RAILROAD STATION INDICATOR.—George T. Lape, Summit, N. Y.—This invention relates to a new and useful mode of constructing apparatus for indicating to passengers in the railroad car the names of stations as they approach or pass them, in the distance, between them and the termini of the road.

DEVICE FOR MIXING FLUIDS.—George Watkins, Brooklyn, N. Y.—This invention relates to a new and improved device for mixing and agitating fluids, and it consists in a novel means employed for operating the revolving beaters whereby the latter have two motions, a rotary one on their own axis, and another in a circle, around the tub or receptacle in which the fluid to be mixed is placed.

PETROLEUM STEAM HEATER.—Lewis R. Wiggin, Farmington, N. H.—This invention which relates to device for heating tar, wax, glue, blacking, oil, and other articles used for chemical and mechanical purposes, consists of a double bottomed tank or receptacle for the substance to be heated, and of a standard through which water is conveyed between the two bottoms, and rising into a steam generator, from the top of which passes a worm coiled in the tank. A chimney passes through the steam generator, at base whereof a petroleum or kerosene lamp or other source of heat is placed.

SETTER FOR SAW MILL.—Titus Whitmore, Dubuque, Iowa.—The object of this invention is to provide a device by which the logs may be set automatically to a circular mill saw for manufacturing lumber, and consists in providing an index plate made in the form of a disk with a cam, and a crank lever located upon a shaft, for the purpose of throwing off the set of the log to the saw, when it has gained the point designed for the thickness of lumber.

LADDER.—B. F. Turner, Bridgeton, N. J.—This invention consists in the application of hooks to one of the sections or lengths of the ladder, whereby the uppermost section or length may be adjusted to reduce the length of the whole ladder, as may be required. The improvement further consists in the application of a base whereby the ladder may be held firmly in an upright or slightly inclined position, without leaving it against any support. The improvement consists, lastly, in an adjustable or reversible platform, whereby the device may be used as a slip ladder.

SECURING KNOBS TO THE ARBOR OF LOCKS.—D. B. Cobb, Jersey City, N. J.—This invention relates to a new and improved means for securing knobs to the arbors of locks, whereby a very strong and durable connection of the aforesaid parts is obtained, and one which admits of a very ornamental and chaste appearance being given the knob.