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Rail-Road News.

Tunnel at Buffalo.

The Buffalo Courier gives the following description of a gigantic undertaking near that city:—

About the greatest object of interest in the vicinity of our city just now, is the Tunnel of the Water Works Company in the rock under the Erie Canal and the Black Rock harbor to the Niagara river, about half a mile beyond the city line.

The perpendicular shaft or well is about eight feet in diameter and thirty feet deep, nearly the whole being through rock. From the bottom of the well starts the Tunnel, which is nearly circular, and about six and a half feet in diameter, running nearly horizontally towards the bed of the river, which is distant about three hundred and sixty feet. A slight slope upward, as the Tunnel advances, allows the water which pours into it from springs or crevices in the rock, to run back into the well out of the way of the workmen who are engaged incessantly, day and night, in blasting the rock. They have now proceeded about two hundred and eighty feet from the well, progressing at about two feet per day. Only four of the miners employed are able to work at once, changing three times during the twenty four hours. The work is all done by lamp light.

The rock is soft and easily drilled and as yet no crevices have been found of sufficient magnitude to offer very considerable impediments to the work. The blasts are discharged about once in three hours, four charges being let off at once. When the holes are drilled to a sufficient depth and charged, all hands leave the hole to avoid the deafening roar of the explosions, and as a matter of safety in case they should open any water course connecting with the river, in which event the Tunnel would be likely to fill with water uncomfortably fast to people so far away from the external world.

At the mouth of the well the noise of the blasts is like the discharge of heavy artillery, and the earth and buildings are considerably shaken by the shock. The water which accumulates in the well is removed by two large pumps driven by a steam engine which is also used to lift the broken stone from the pit.

Railroad Completed.

The Montgomery and West Point Railroad, in Alabama, having an extent of ninety miles, is finally finished. It is the first work of the kind ever completed in that State. It has already, it is said, poured into Mobile the grocery and cotton trade of a large number of counties in Georgia and Alabama, and has done, remarks the Montgomery (Ala.) Journal, more for Mobile than all other causes put together.

A walk before breakfast on these heavenly spring mornings, is conducive to health, and costs nothing but a little energy.

WHIPPLE'S PATENT MACHINE FOR BRICK MANUFACTURING.

Figure 1.

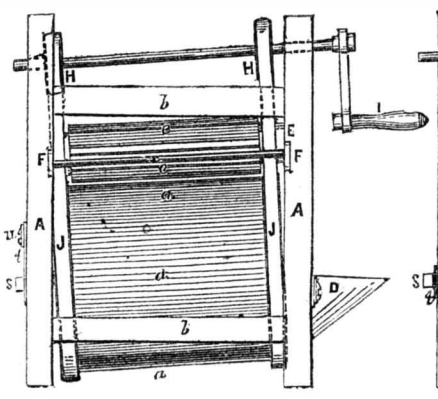
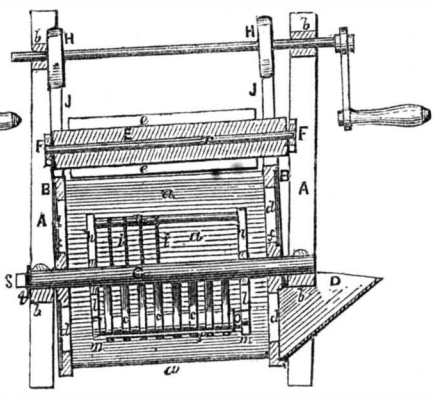


Figure 2.



The accompanping engravings represent an improvement in machinery for preparing clay for making brick, which is the invention of Mr. Heman Whipple, of Port Richmond, Staten Island, N. Y., and for which a patent was granted on the 6th day of last March.

Fig. 1 is a side elevation of the machine; fig. 2 is a longitudinal section; fig. 3 is a front end elevation; fig. 4 is a transverse section; fig. 5 is a diagram illustrating the crushing or pulverizing action. The same letters of reference indicate like parts.

The nature of this invention consists in the use of a revolving screen working on a stationary axis set at a straight inclination and having attached to, or suspended from it, lugs or crushers which pulverize the clay, which is fed in at one end of the screen and is carried along by the rotary motion under the crushers and completely pulverized, whence it falls down through the apertures of the screen; the waste matters, such as had lumps, and which had been mixed up previously with the stock clay, are expelled at the back or lower end of the screen.

A A are uprights with cross ties, *b b*, forming the framing, *a a a a* are metal bars forming the screen; these bars may be placed at any required distance apart. They are bound in a cylindrical form by the hoops, B B, which

Figure 3.

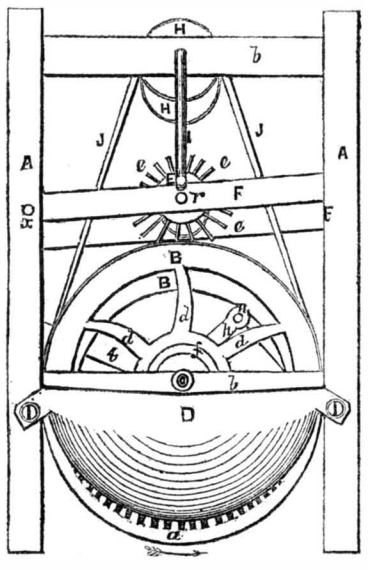
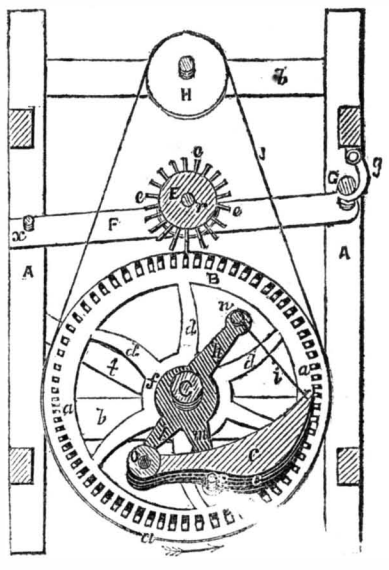
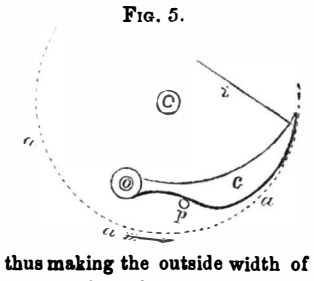


Figure 4.



have notches to receive the ends of the said bars. To the hoops, B B, there are attached arms, *d d d d*, connected with naves, *f f*, which form the bearings of the screen. The bars, *a a*, should be of such a shape in their cross section, and so arranged that any particles once entering the spaces from within between them, will readily pass off,—they are broader on their interior than their exterior

Fig. 5.



edges, thus making the outside width of their spaces greater than the inside; for this purpose bars of a triangular half round or any other appropriate shape may be used, with their narrowest face outside. The screen may also be made of a cylinder having slots corresponding to the spaces formed by the bars, *a a*. C is the stationary axis on which the naves, *f f*, rotate; it rests on the lower cross piece, *b b*, and is prevented from turning by its back end, S, being made square, and having an arm, *t*, fastened to the upright, A, by a screw, *u* fig. 1. The axis, C, is slightly inclined, thus giving the screw a slight dip towards its back end. On the axis there are secured arms, *h h*, *l l*, *m m*, (figs. 2 and 4), *a* is a cross bar connecting the arms, *h h*. H is a bar connecting the arms, *l l*, and *p* is a rod connecting the arms, *m m*; *c c c c* are crushers working on what is termed a hinged joint on the rod, O, at one end, while at the other extremity they are attached by cords or chains, *i i i i*, to the bar, *n*, at their lower side by the rod, *p*. Either arrangement of the suspension chain, *i*, or the supporting rod, *p*, may be used so as to prevent the crushers, C, from rubbing on the screw; or both arrangements as represented may be used. D is a stationary hopper to feed in the clay. *e e e e* are pickers arranged radially round a small drum, E, which is keyed to the axis, *r*, working in either end in side levers, F F. The pickers are of nearly the same length as the bars of the screen and they drop into the spaces between the said bars. The side levers, F F, are hung on a rod forming a joint on which to work; their other ends are connected by a bar, G, which is held by a hook, *g*, (fig. 4); H H are pulleys driven by a lever handle, I, and they are secured on a shaft. These pulleys drive the screen by belts, J J, which pass around the hoops, B B, of the screen.

The stock clay is fed into the hopper, D, and is carried forward by the rotary motion of the screen (shown by the arrow) under the pulverizers, *c c c c*. These crushers are of such a weight that they squeeze the clay and pulverize it, yet owing to the way they are hung and supported, they yield or rise when stones are passing under them, so that no damage is done to the machinery, while there is sufficient crushing pressure to pulverize the proper clay and push it through the spaces of the screen. The several crushers are made of different sizes, shape or weight. Those at the mouth of the screen may be made so as merely to slightly crush the material, and the after ones made to pulverize it very fine—thus distributing the work gradually among them. The pickers, *e e*, may be thrown in or out of gear with the bars by lowering or raising the side levers, F F, working as a hinge joint on the rod, *y*. By unfastening the hook, *g*, (fig. 4,) the pickers enter the spaces between the bars, and as the screw rotates the picker roller rotates also, and thus they clear the screen of any soft clay that might otherwise adhere to it and choke up the spaces between the bars.

We have thus described this invention in such a way, we believe, that all who read carefully will understand. Its practical qualities are of a very superior order. More information about the sale of rights &c., may be obtained by letter addressed to Mr. Whipple, directed as above.

Gas from Wood.

The Tribune of last Monday notices an invention, of Austrian origin, it seems, whereby it is stated that an eminent chemist in Vienna is said to have obtained gas from wood, and that the Railroad Depot at Munich had been lighted up with it. The invention is spoken of very favorably and at some length, and gas made from fir wood (pine) is made out to be much cheaper than coal gas. This is neither a new invention nor one that will be of any benefit to us. Every chemist knows that good gas can be made from wood, and we made experiments with hard maple, hickory, and Blosburg coal, in 1840, to test their different gas producing qualities, but the coal came paid for the trouble.

prim wood makes good gas, but then the quantity depends upon the rosin in the wood. The woody fibres which are mostly composed of nitrogen, give out no illuminating gas. It is much better to use rosin at once, at least for cheapness of material, as it saves freight, &c. It is stated that "when the discoverer announced his project every engineer and chemist declared it impossible." This, poetically speaking, shows how dark the minds of such men must have been.

Stopping of Flour Mills.

The Missouri Republican of the 23d ult., states that in consequence of the prevailing high prices for wheat, and low rates for flour in that and the Eastern and Southern markets, some ten or twelve of the principal millers have resolved to stop their mills for the present.

Smoothing irons seem to be rather a late invention. About the time of Elizabeth and James the I., large stones inscribed with texts of Scripture, were used for the purpose of ironing.

Miscellaneous.

[Special Correspondence of the Scientific American.]

Matters and Things Connected with the Great Exhibition.

LONDON, 28th April, 1851.

There is a silly rumor going about England that it is the intention of the French Socialists and the English Chartists to combine and provoke a civil war during the progress of the Exhibition, and, as a consequence, a vast deal of nervous anxiety is entertained by the speculative portion of the John Bulls. How this report originated, or what grounds it has, we are unable to say, but true it is that such a belief exists, and to a very great extent.

Up to the alpha of May (which bids fair to glide in upon us in all its loveliness) no one is admitted to the Exhibition but "exhibitors," "agents," "Commissioners," or "assistants," and these, even, are cross-questioned to such an extent that it makes a visit little more than a series of disagreeable annoyances. At almost every turn, a policeman demands "your ticket," which, if you chance to be an American, only admits you to the American division; if an Englishman, to the English portion, and so on. In consequence of this unnecessary rigidity, and the officiousness of the men on duty, those inquisitive persons who wish to enjoy a general stroll over the various sections, are compelled to resort to all sorts of stratagems and finesse. It is not an uncommon thing to see a group of strangers, who have by some device, got into the building, crawling along through the rows and "confusion worse confounded" of bales and packing-cases, in breathless anxiety, watching the movements of the attendant police, in the fear that every moment they may put an end to their wanderings.

The American department is progressing, we regret to say, *slowly*. There seems to have been a spirit of jealousy and a desire to monopolize the arrangement, on the part of several gentlemen who claim to be representatives of the government. Mr. Riddel, the Commissioner, appears to be active and enterprising, but from some cause or other, not *entirely* discernable, the wheels of the machine do not move as glibly and unconstrainedly as we would wish. The French have adjusted *their* differences, and are now going on, as the Yankees say, like "clock-work"—their stalls are erected in a style of great magnificence, the shelves being, in some instances, lined with velvet, and everything is worthy of the taste and elegance of their national industry.

At a meeting, on the 13th, of above two hundred French contributors, it was announced that some of the most celebrated pupils of the Parisian School of Industry were to be sent under the care of their several teachers, free of expense, to visit the Exhibition, and that Richard Cobden, M. P., proposed offering the hospitality of home during the summer holidays, to one of those boys, an example of which, it was stated, many other distinguished Englishmen had expressed their intention of following. The idea was caught up with the utmost enthusiasm; and there was not a French exhibitor present who did not at once declare that he would, in return, invite some pupil of the English schools of design. Here, then, we have, springing from the Exhibition, a true beginning of perpetual international amity.

The total number of packages received, up to the date of my letter, is 9,575.

Seventy tons of white lead have been used in painting the monster building.

A company has been formed, at Madrid, Spain, for the purpose of conveying passengers to the Great Fair. It is thought that half of the Spanish grandees will be in London during this year.

The Americans who are astray here will find lots of their papers on file at "Lloyd's Reading Room," which fact they may find it important to remember, as the rooms will be turned over to foreign visiters from 7 A. M. to 3 P. M. This is a kind, considerate provision on the part of the proprietors of this fine *depot de journal*, and will be availed of, we have no doubt, by the hosts of strangers.

There is a general complaint here that there is no established place where Americans can meet. With the exception, perhaps, of House's Grand Sarsaparilla Depot, in the Strand, (and, by-the-bye, we would observe that Dr. Townsend is famous already in all parts of the realm), there is no hotel, shop, or building, in this great metropolis, where you could, with any degree of certainty, look after a brother-American. A spot should be selected, as it would be gratifying for us to know who is coming, who has come, and all the particulars.

H. H. P.

Opening of the Great Exhibition.---London on the 1st of May.

LONDON, May 2, 1851.

We were on the ground—that is to say, opposite the great building—at 6 o'clock in the morning, when we flattered ourself that, by selecting such an early hour, we should get a desirable standing-place and escape, to some extent, the rude jostling of the leviathan crowd,—but, when we arrived, it seemed that seventy thousand individuals, beside ourself, had conceived the same shrewd idea, and, per consequence, at just past daylight, the throng was most intense; there were acres of human beings from Knightsbridge to the Albert Gate of Hyde Park, and so on to Buckingham Palace, taking in the vast area of the Green Park and all the various thoroughfares leading thereto. We shall never forget the sight; and even at this early hour, an old inhabitant of London remarked to us that he had never witnessed its equal in broad day, much less at a time when it was fair to presume that half the metropolis were in their beds. The crowds kept pouring in the direction of Hyde Park by shoals of hundreds, thousands, and tens of thousands, until about 2 o'clock, when, after the Queen had left the crystal building, the mighty current seemed to turn and disappear in the mazes of London streets. It is calculated that there were over 3,000,000 people in the neighborhood of Hyde Park, among which were natives of various countries, not forgetting the glorious presence of about 600 Americans who contributed, in a small degree, to swell the almost interminable mass of vitality.

The carriages commenced their approach to the east, south, and west doors of the building about nine o'clock, and at the hour of eleven the cortege reached from this point along Picadilly to the Regent Circus, on to Long Acre, and around to Gray's Inn, a distance of about eight miles. This cortege was formed of every variety of vehicle, from the stylish aristocratic carriage of the nobility to the tradesman's humble cart, all of which contained holders of season tickets, which, not being admitted after 12 o'clock, they made good use of their time by riding to their place of destination. The inmates of the carriages—more especially the ladies, were in full dress, and the spectacle presented was very magnificent—the liveries, too, were out in all of their variety, from plain black to red and scarlet plush, blue and orange, three-cornered hats trimmed with silver and gold lace—the richness and variety of which combined to make up a delicious street panorama.

At half-past ten, to the minute, the Queen and His Royal Highness left Buckingham Palace, which was besieged by tens of thousands of persons, and proceeded along Constitution Hill. First in order came a troop of the Life Guards, then the Gentleman Usher of Sword and State, in a state carriage drawn by six bays; the second carriage was occupied by lords and grooms in waiting on Prince Albert; the third by the lord in waiting, the Treasurer of the royal household, and the Vice Chamberlain; the fourth by the groom of the stole to the Royal Consort, Captain of the Yeomen of the Guard, Captain of the gentlemen-at-arms, and the master of the buck-hounds; the fifth by maids of honor in waiting, bed-chamber women, and the earl marshall; the sixth by the lord steward and maids of honor in waiting. Then followed, in coronation dresses, twelve state footmen walking two abreast, after which came the Queen's state coach drawn by four cream-colored Arabian horses, attended by grooms, conveying Her Majesty the Queen, the Prince Consort, and the mistress of the robes, the Duchess of Sutherland. The master of the horse, a guard of honor, and an escort of the Life Guards, closed the line, which was, in all respects, a truly gorgeous display. Her Majesty looked in excellent health, and when the royal carriage passed us, she was chatting and laughing with the Prince, who bore his blushing honors with becoming grace and dignity.

As the royal cortege proceeded along it was hailed with tremendous cheering at every point by the wilderness of spectators, and although the crowd was so great, few, if any, accidents occurred to mar the universal enthusiasm. After Her Majesty had alighted at the Exposition, she ascended a platform raised to the north of the centre of the transept, on which a chair of state was placed, when, after she was seated, a select choir sung "God Save the Queen." After Her Majesty had been in the building some five minutes, Prince Albert joined the Royal Commissioners, and when the music had ceased, proceeded to read to Her Majesty a short report of the proceedings up to that time, which he then delivered to Her Majesty, together with the catalogue of the articles exhibited. Her Majesty returned a gracious answer, handed to her by the Secretary of State; after which his Royal Highness again took his place by the side of Her Majesty. His Grace, the Archbishop of Canterbury then said a prayer, invoking God's blessing upon the undertaking, and the choir sang the Hallelujah Chorus.

After this, a procession was formed, consisting of the various committees and commissioners, native and foreign, and the royal suite, which turned to the right, then moved to the west end of the nave by its north side, returned to the east end of the nave by its south side, including the south end of the transept and proceeded back to the centre along the north side of the nave, which arrangement enabled all of the visitors who had places assigned them to see Her Majesty and the procession.

On Her Majesty's return to the platform she declared "The Exhibition Opened," which declaration was followed by a flourish of trumpets and the firing of a royal salute on the north of the Serpentine, whereupon the barriers which had kept the nave clear was thrown open and the public allowed to circulate.

After Her Majesty's return to Buckingham Palace, the crowds gradually broke and dispersed, all more or less gratified, delighted, or vexed with disappointment, or weary from waiting, as the case might be. It was a memorable event, and will be a bright page in the annals of English history. Shops and stores were closed in the business portions of the metropolis, and with few exceptions there was a general suspension of business.

The arrival of strangers from the country, on Wednesday, was extraordinarily large. It was calculated that the extra passengers by the North Western Railway exceeded 5,000, and those who arrived by the Great Western are estimated at nearly 3,000 more than the ordinary number. The steam vessels from Rotterdam, Hamburgh, Antwerp, Hull, Edinburgh, Calais, Boulogne, Havre, and Dieppe, were unusually crowded with passengers, so that, on a moderate calculation, the number of persons who arrived in London by different conveyances, on the 30th of April, was not less than 55,000. In the vicinity of the railway termini not a bed can be had, as the saying goes, "for love nor money."

The "Times," learns that the Queen has signified her intention to visit the Exhibition some Saturday, during the hours before the public are admitted, when all exhibitors are invited to be present and in their places, to answer any inquiries which Her Majesty may desire to make respecting articles exhibited by them.

H. H. P.

For the Scientific American.

Steam---"Stame."

Your correspondent, Mr. Whipple, of Westfield, Mass., states he has obtained more than twice as much power from fuel employed for stame as from fuel employed for steam. Although this advantage is of considerable value, yet I have and can obtain much more than four times the power from fuel employed for stame than can be obtained from fuel employed for steam, in a high pressure engine, and much more than six times the power from fuel employed for stame in a low pressure engine. These great and beneficial results directly depend on the properties of the engines, and particularly on the peculiar construction and position of the heaters employed.

Having experimented with many different formed heaters, I have obtained very different results therefrom: for instance, among other and certainly unexpected objections, I found, on passing steam through a cylindrical heater, corresponding with the description given by Mr. Whipple, that the steam was but little heated therein, being apparently driven in a direct course through it without coming in sufficient contact with the cylinder, which had quite as extensive a surface as another equally heated heater, but constructed of a long coil of tube; the effect produced by the cylinder was not more than half that produced by the coil—apparently from the better contact of the steam in its passage therein.

The coil, cylinder, engine, and connected philosophical apparatus, for showing the nature and value of "stame," are still open for public inspection. Very respectfully,

JAMES FROST, Engineer.

The Useful More Enduring than the Magnificent.

The tomb of Moses is unknown; but the traveller slakes his thirst at the well of Jacob. The gorgeous palace of the wisest and wealthiest of monarchs, with the cedar, and gold, and ivory, and even the great Temple of Jerusalem, hallowed by the visible glory of the Deity himself, are gone; but Solomon's reservoirs are as perfect as ever. Of the ancient architecture of the Holy City, not one stone is left upon another; but the pool of Bethsaida command's the pilgrim's reverence at the present day. The columns of Persepolis are mouldering into dust; but its cisterns and aqueducts remain to challenge our admiration. The golden house of Nero is a mass of ruins; but the Aqua Claudia still pours into Rome its limpid stream. The Temple of the Sun in Tadmor, in the wilderness, has fallen; but its fountain sparkles as freshly in its rays as when thousands of worshippers thronged its lofty colonnades. It may be that London will share the fate of Babylon, and nothing be left to mark its site save mounds of crumbling brickwork. The Thames will continue to flow as it does now; and if any work of art should still rise over the deep ocean of time, we may well believe that it will be neither a palace nor a temple, but some vast aqueduct or reservoir; and if any name should still flash through the mist of antiquity, it will probably be that of the man who, in his day, sought the happiness of his fellow men, rather than their glory, and linked his memory to some great work of national utility and benevolence. This is the true glory which outlives all others, and shines with undying lustre from generation to generation, imparting to works something of its own immortality, and in some degree rescuing them from the ruin which overtakes the ordinary monuments of historical tradition or mere magnificence.

To Deaden the Sound of an Anvil.

If a chain, about one foot long, formed of a few large links, is suspended to the small end of an anvil, it will destroy that sharp thrilling noise produced by striking on it with the hammer: the vibrations of the anvil are extended to the chain, which absorbs them without producing any sound. This is good advice to anybody who has a blacksmith or, worse yet, a coppersmith for a neighbor.

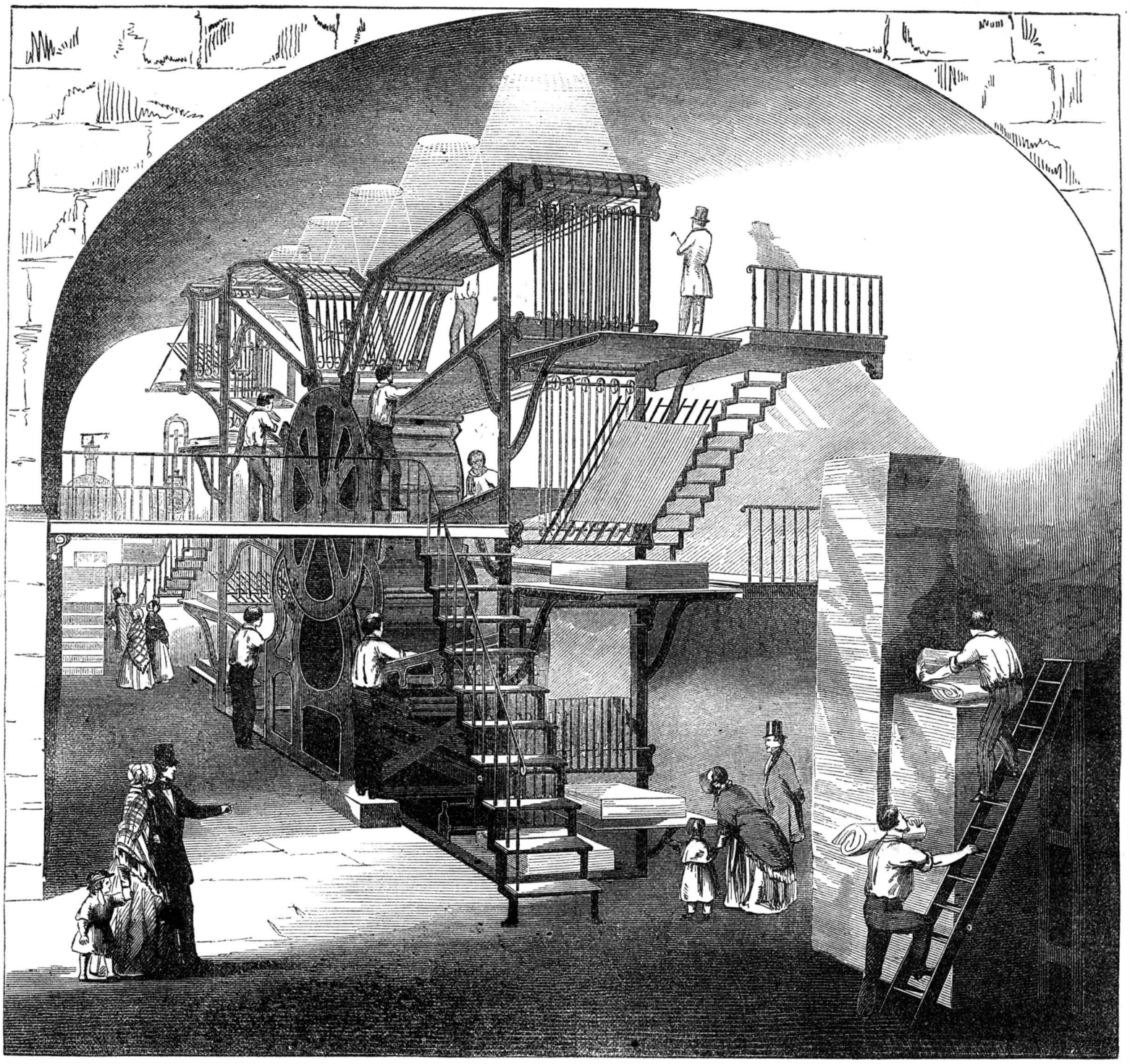
Straw Bonnet Manufactory.

At Sag Harbor, L. I., there is a very large manufactory of straw bonnets: there are about 100 females employed, and about 24,000 bonnets will be sent to this city from it during the present season.

A man's character is frequently treated like a grate—blackened all over first to come out the brighter afterwards.

The English papers record the death of the brother of Mungo Park, the great traveller.

HOE'S MAMMOTH ROTARY PRINTING PRESS.



The Art of Printing consists in having types made of a composite metal, cast into a single piece for every letter that is seen in a book or newspaper. These letters are put together one after another into words and sentences, and punctuated with commas, &c. The words are arranged in lines, the lines in columns, and set up in an iron frame named a *Chase*. The type are all of the same depth, and are wedged up and secured in the chase, when it is then denominated the *Form*. It requires a great deal of labor to set up the type,—the men who do so are termed *Compositors*. The inking of the type in the form, the placing of a sheet of paper on it, then pressing the said sheet down on the type, and afterwards removing it, constitute the art of printing, and these several operations are performed in a mere expeditious manner by the press which illustrates this article than by any other in the world. This mammoth press, the largest ever constructed, was designed and built by Messrs. R. Hoe & Co., New York: it is 40 feet in length and 5 wide; it has a large centraldrum which revolves like a broad wheel. The *form* (or there may be a number of them) is placed on the periphery of the central drum, but only occupies a portion of it. The *chase* is curved and forms the section of a circle, with the surface of the type forming the outside of the same. The type are secured in the curved chase in a peculiar manner. The column-rules are straight and run parallel with the shaft of the large drum; the head and dash rules are curved. The column-rules have bottom flanges; they slide in the grooves in the bed of the chase, and are secured by brass dove-tail wedges. The cross section of a column-rule is of a wedge shape, being thinner at the bottom than at the top, to wedge in the type at the widest part of a circle which they form with the large drum. This is an essential feature in securing the type, and its application is certainly the result of a very happy thought. The type is firmly screwed up in the chase by set screws.

The surface of the large drum of the press is composed of smooth metal plates, and performs the office of an ink distributor to the small rollers which ink the type. Below the large rotary drum, there is a trough running across the frame, into which the ink is pumped from a reservoir by a force pump, so as to keep the trough always full. Above the ink trough there revolves a large roller, which takes up the ink on its surface, conveys it to another roller, that one to a third, and it to the smooth surface of the revolving drum, distributing the ink on it. The use of the three rollers to convey the ink from the trough, is to work and spread it on the distributing surface. As the type in the *chase* stands higher than the smooth surface of the rotary drum, the ink-roller below would cover the type with ink when it came round to it, were it not for a contrivance of Messrs. Hoe to obviate this difficulty. The large ink-roller below has its gudgeons worked on springs, which press it up against the smooth surface of the large drum, except at the exact time during the passage of the type; then a cam forces down the ink-roller below the surface of the type, until the *form* is past the point of contact, when it rises up against the distributing surface with its supply of ink.

Around the fixed frame at different but exact points above the large *drum*, there are eight revolving tympan cylinders, or rollers, which feed in the sheets to the revolving drum, and against the surface of which the *form*, as it revolves, impresses the paper. The attendants push in the sheets, one by one, to the tympans, in each of which is an open section, with fingers worked by a cam, which are open when they come round to receive a sheet, then close upon it, wrapping the said sheet around the smooth surface of the tympan; at this very period, the type on the large drum has come round, and is acting on the paper. When the type has printed the sheet, the fingers spoken of open like the human hand and the printed sheet is whipped off the tympan and carried away back to the end of the press, there to be taken off and folded neatly down by a vibratory flyer, four of which are placed above one another, (one for each tympan,) at each side of the press. The two outside edges of each sheet of paper are held against a smooth, narrow strap on the tympan at each side. Above each tympan cylinder, it will be observed there are a number of small pulleys, with straps running around them, extending the whole length of each tympan, and running on its surface. The straps of these small pulleys run away back over a like set of pulleys, above the flyers. Whenever the type forms its impression on the sheet, the fingers spoken of let the paper free, and then these small straps whip up the sheet, and carry it along, as on a flying railroad, to be folded by the flyer. After the form makes its impression on the paper which is wrapped around the tympan, it comes in contact with the two small ink rollers, which ink the surface of the type, and fit it to print the sheet on the next tympan, and so on continually. These small inking rollers have their journals fitted on springs, so as to allow them to be pushed up or down by the type, and then to be forced against the distributing surface, to take up the ink for their next performance.

In this one press, it may be said, "there are eight combined," that is, in respect to its effective power. One, two, three, or more tympan cylinders can be detached, and the rest left free to work. This makes it very convenient, for it requires but a moment's labor to set the press so as to work with any number less than the eight attendants.

Although this machine is so large, strictly speaking it is exceedingly simple in its operation, and it works with a smoothness and regularity that commands admiration. The building of this great press for the New York Sun, was commenced in 1849, and it was completed in 1851.

In the construction of this press Messrs. Hoe & Co. state that there are employed no less than six thousand bolts and screws, one thousand two hundred wheels, two hundred and two wooden rollers, four hundred pullies, four hundred tape guides, besides an amazing amount of cogged wheel connections, arms, braces, and other connections. There are also required to give motion to various parts of the machine, no less than five hundred yards of belting.

It can print 20,000 copies in one hour. It has been in successful operation printing the New York Sun for the past three months, and it operates with astonishing precision.

New Inventions.

New Cloth Measuring Machine.

At a recent meeting of the English Institution of Civil Engineers, Mr. Joseph Whitworth, of Manchester, exhibited a new measuring machine, for determining minute differences of length. The accuracy of the machine was demonstrated by placing in it a standard yard measure made of a bar of steel, about three-quarters of an inch square, having both the ends rendered perfectly true. One end of the bar was then placed in contact with the face of the machine, and at the other end, between it and the other face of the machine, was interposed a small flat piece of steel, termed by the experimenter "the contact piece," whose sides were also rendered perfectly true and parallel. Each division on the micrometer represented the one-millionth part of an inch, and each time the micrometer was moved only one division forward, the experimenter raised the contact piece, allowing it to descend across the end of the bar by its own gravity only. This was repeated until the closer approximation of the surfaces prevented the contact piece from descending, when the measure was completed, and the number on the micrometer represented the dead length of the standard bar to one-millionth part of an inch. Eight repetitions of the experiment in a quarter of an hour produced identical results, there not being in any case a variation of one millionth of an inch.

Ship Measurer.

Mr. Abijah S. Hosley, of this city, has invented and taken measures to secure a patent for a most beautiful instrument to be used in taking the dimensions of the *models* of ships and other vessels, and which is termed a "ship model measurer," and which must be of great service to our nautical modellers and naval architects. By means of this instrument, by measuring the model, the proportions which it bears to those of the vessel it represents, are ascertained precisely, also the dimensions of the ship to be built from the model are set forth in its various parts, so that the ship builder obtains those necessary measurements which will enable him to construct a vessel in a much shorter space of time than can now be done by any means in use for that purpose. This is a very useful and beautiful invention indeed, and one which cannot fail to come into general used in a very short time.

Improvement in Apple Mills.

Mr. Samuel Amspoker, of Eldersville, Washington Co., Pa., has made an improvement in cider mills which is equally applicable to other mills when animal power is employed, and for which he has taken measures to secure a patent. The nature of this invention consists in causing the mill and its several parts to revolve on a vertical centre or shaft, while the crushing cylinder or roller (one or more) receives a separate motion on its axis by means of a friction roller, which rolls on the raceway on the ground, and which is attached to the driving shaft, so that in addition to its own rotary motion as well as that of the mill carried round by the horse or other animal, the driving power of the mill is governed at all times without alteration of the pace of the horse, by additional pressure or weight to the axis of the pressure roller.

New Railway Torch for Signals.

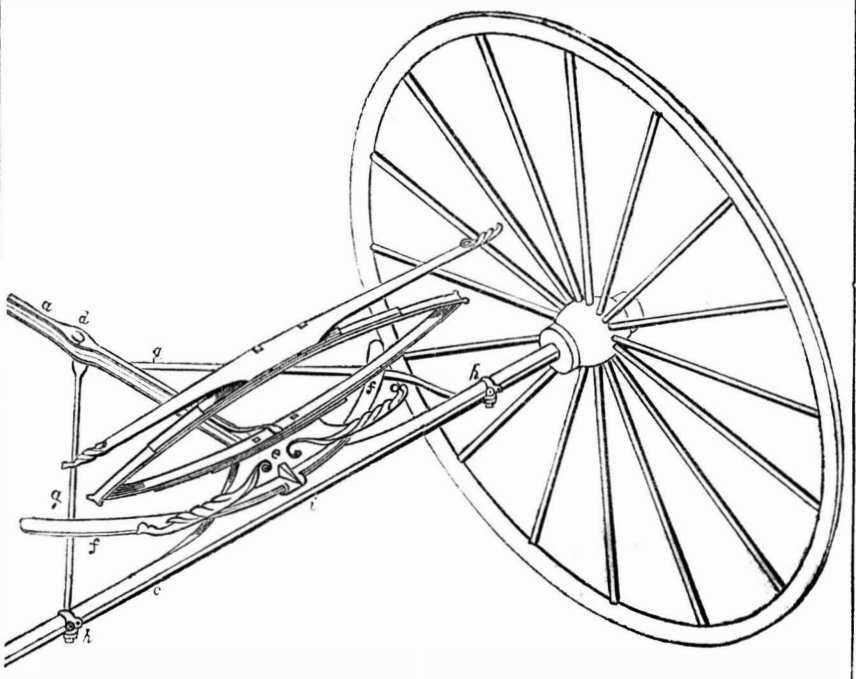
In England it is well known that great attention is paid to signals, and as the trains on our railroads become more numerous, so will we have to adopt the same system. The following is the account of a new torch recently introduced upon one of the English railroads:—The torch consists of a small oil fountain containing about half a gill of oil, with a tube, burner, and wick attached, which slide horizontally inside of a case, completely protected from the wind by a slide valve and small dome in which the light burns, ventilation being supplied to the burner by two air tubes below, so disposed that the stronger the wind blows the better the torch burns; the flame is only sufficient to light the burners in the signal lamps, and will burn full four hours. The valve, which is inseparable from the torch, is hinged and loaded; after the outer cover is removed the point of the torch is passed into the lamp at the same time raising the valve inside, and when withdrawn the valve shuts, preventing admission of the wind.

New Patent for Rising and Descending Inclinations in Railways.

Wm. F. Carr, of Wayland, Steuben county, New York, the Post says, has filed his caveat for the patent of an invention for ascending and descending any grade upon railroads. He claims that it is a great improvement on the metheds now in use. It has, he affirms, enabled him, in the experiments he has made, to surmount an ascent of eight hundred and forty-five feet to the mile. Its principle is said to be simple and easily supplied in practice. A third rail furnished with cogs, is laid by the side of the outside rails and cogs are put on the flanges of the driving wheels.

All that we can say about it is that if Mr. Carr had consulted us, he might have saved his money. His invention is at least six or ten years old. Mr. Hoyt of Indiana has a patent or such an invention.

EVERETTS' CARRIAGE COUPLING.---Figure 1.

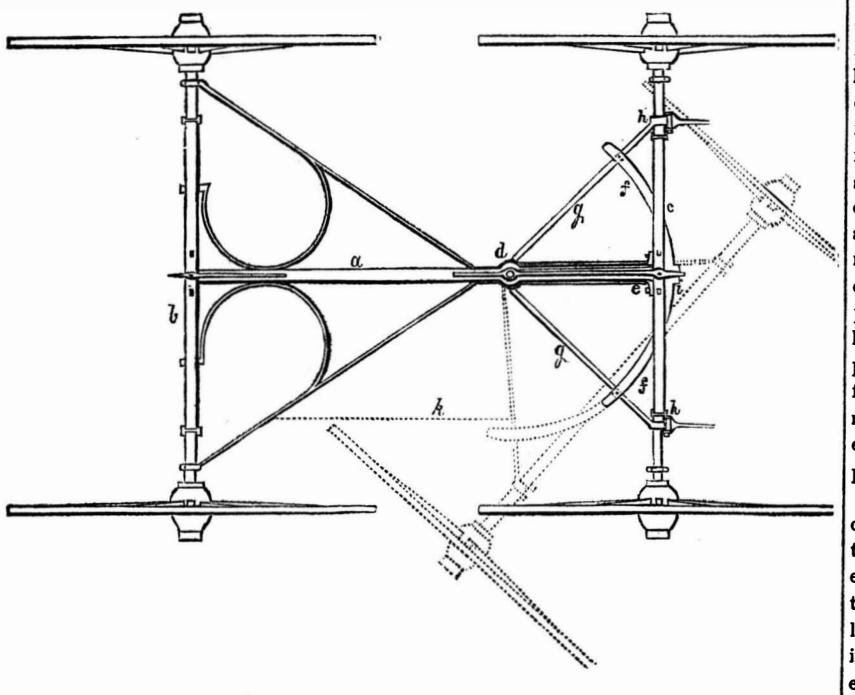


This is an improvement in carriage coupling by Messrs. Edward and Charles Everett, patentees, Washington, D. C. These figures are taken from a carriage lately constructed.

Figure 1 is a perspective view of the fore part of the running-gear, and fig. 2 a plan of the entire running-gear, with the position of the fore wheels in the act of turning shown in dotted lines. *a* is the perch; *b* the hind axle; *c* the fore axle, which is coupled to the perch by the bolt, *d*, placed some distance in the rear of the fore axle. The head block, *e*, and fore spring slide on a segment, *f*, which is attached to the fore axle, *c*, by bolts, and also by the two arms, *g*, radiating from the perch bolt, *d*, to the shaft clips, *h*, on the fore axle. At the front of the sole plate of the head block, *c*, is a projection, *i*, which bends round the front edge of the segment, *f*, and serves as a stop to prevent the wheel from striking the body, when turned to either extreme, by coming in contact with one of the radial arms, *g*; *k* shows the line of the side of the body.

The carriage above represented will describe a circle, in turning entirely round, of six and a half feet diameter, while one of the same proportions, but with the perch bolt through the fore axle, will not describe a less circle than twenty feet diameter. The facilities for getting in and out are great, as the fore wheel turns entirely out of the way, and there is ample room for steps. It is stronger than the old

Figure 2.



plan, as the fore axle is not weakened by a hole through its centre, and the strain of the draught is borne by the two radial arms; and as the wheels are never prevented from turning the risk of breakage is much lessened, and the disagreeable scraping of locked wheels altogether avoided.

This improvement permits the use of large fore wheels, with all the advantages derived from them in saving friction and surmounting obstacles with facility, and at the same time obviating the disadvantages which have hitherto attended their employment, and with this improvement a carriage can be turned in a small space as those which have small fore wheels will run under the body; and besides, the wheels never touch the body, and the parts are so arranged as to give a greater degree of strength than the old method of coupling.

This plan is applicable to all vehicles where it is desirable to use large fore wheels, and it may be applied to those already constructed with little trouble and expense. More information may be obtained by letter addressed to Messrs. Everett.

For the Scientific American.

Theory of the Rifle.

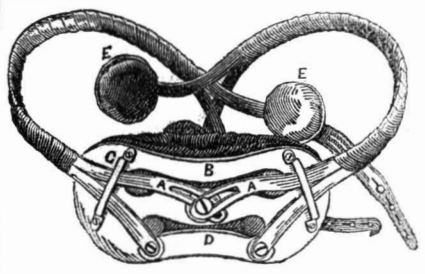
The theory and fact of the superiority of the rifle-barrel gun over the smooth bore, is as follows: in the smooth bore the ball, when discharged from the muzzle, acquires a rotary motion by friction against one or the other of its sides, the axis of which motion is always at right angles with the line of its flight, but may be with respect to the earth, either vertical, horizontal, or inclined. It is obvious that, as the axis of rotary motion is at right angles to the line of flight, therefore one side of the forward half of the bullet revolves in the direction of its progressive motion, and the other half the reverse. Such being the case, the ball meets with much more resistance from the air on the side revolving forward than on the side revolving backward, and is, in consequence, deflected from a right line to the right or left, upward or downward, according to the direction of its axis of rotation.

To obviate the irregularity in the flight of the bullet, caused as above stated, the rifled barrel was invented, and effects the desired object with great certainty. The twisted grooves formed in the bore of the rifle—which, in the most approved rifles, make about one turn in the length of the barrel—cause the ball to rotate about an axis which lies in the same direction as the line of flight; hence its forward half meets on all sides an equal resistance from the atmosphere, and is not deflected from a right line otherwise than by the force of gravity.

H. W. H.

Claremont, N. H.

Knapp's Self-Arresting Abdominal Supporter.



The instrument represented in the accompanying engraving is the invention of Mr. Moses L. Knapp, of Painesville, Ohio, and was secured to him by patent on the 28th of last January. A A are the front springs, having four branches, but united into one branch on each side, extending round to the back pads, E E, of which there are four; B D is a polished front wood frame, with a movable cushion inside, and with ventilation openings in it. There is a clamp, C, for each spring in front, and at A A there is a slot in each spring, to adjust the said springs by expansion or contraction by the central set screw, to suit any size or form of the wearer—an improvement long desired. It can be adjusted to the exact degree of comfortable wearing, it has a polished concave wooden surface, with ventilations and a movable cushion, also four back pads suspended by elastic steel springs, affording gentleness of pressure and freedom of motion to that important part, the spine—each part being at once beautifully and happily combined.

From the testimony of medical men and others, Mr. Knapp is confident that his invention is perfectly adapted to attain the desired end in the relief of those for whom it is intended. We believe this to be a most excellent and durable instrument, and a meritorious invention. More information may be obtained by letter addressed to Mr. Knapp.

Improvement in Carriage Springs.

Mr. Benjamin J. Barber, of Saratoga Springs, N. Y., has taken measures to secure a patent for an improvement in springs for carriages, which is stated to combine greater strength and elasticity than any of the springs in common use. The improvement consists in combining a C and eliptic spring; a C is attached to each end of a "semi-eliptic spring."

Scientific American

NEW YORK, MAY 24, 1851.

Young Mechanics---The Way to Rise.

We stated last week that few of our mechanics rose direct from the workshop to important places of trust in the Republic, and we also stated that but a few of the great many were qualified to fill important situations even in connection with the trades they learned Why is this? Is it not possible for men to be as well educated in the workshop as anywhere else? Do mechanics not possess the same abilities as those who follow the professions? Yes. Well then, why is it they are not in general fit to march out from the workshop to fill the highest and most honorable offices in our country?

The answer is, they do not in general try to qualify themselves to fulfill their proper duties, as citizens of this great Republic. We suppose that our mechanics themselves would be planet-struck, if it was proposed to run one of their number for President, but it is not our object, except in an angular direction, to point to political situations—we hope the point however, will not be lost.

We have alluded to the absence of a taste for sound and solid reading among our mechanics, and we have now to complain of the absence of a pure and lofty conversation. The majority of our young men belong to fire or military companies, and during their spare moments, their conversation consists more in what this and that engine can do, &c., and not about how it can be done. Idle, vain and frivolous conversation has a very injurious tendency, like reading bad books. A pure conversation and gentlemanly discussion of useful questions, has a very elevating tendency. Young mechanics, we speak to you, in all earnestness; if you wish to rise, you must be enthusiastic about your business, and in the pursuit of knowledge connected with it. In your spare moments, endeavor to seek enjoyment in talking about the principles of your trades, seek to know the why and the wherefore of everything connected with them, and whatever your hand findeth to do, do it well and with all your might. Do not be eye servants, do not use profane language, and give yourselves the best education you possibly can. Every machinist should learn to draw, so should every carpenter, and do not be content until you fully understand, and can construct every machine, apparatus, or whatever it may be, and can take charge of and superintend every branch of business connected with your trades. Men possessing such qualifications are sure to rise. And what is to hinder you from possessing such qualities, along with a character for honesty, fidelity, and ability? Let every one put this question to his own heart.

New Theory of the Central Heat of the Earth and the Cause of Volcanoes.

Mr. Stevenson Macadam, of Edinburgh, Scotland, has advanced a new theory, as indicated by the caption of this article, which puts an entire new face on the subject, and is distinguished by the firm, clear, unmistakeable logic of the Scottish School. It is well known that as we descend towards the centre of the earth (for all the small depth yet penetrated), the temperature increases at the rate of about one degree every 45 feet. Proceeding to reason upon this as a basis, many suppose the centre of the earth to be a red hot fluid mass, and they account for volcanoes and hot boiling springs upon this theory. Sir Humphrey Davy once held this opinion, but discarded it. The favorers of it believe that the solid crust of this earth lies on the fluid mass as a lump of ice on water; but not so Mr. Macadam: he has adopted the *spheroid* theory, which is thus explained:—If we throw some water on a red hot piece of iron it rolls up into little globules and evaporates very slowly, each drop or spheroid keeping at a far lower temperature than boiling water. A quantity of water, by ordinary boiling, will evaporate fifty times faster than water in this spheroidal state. It is found that there is no real contact between these spheroids of water and the red hot metal, but a kind of reflecting atmosphere of heat. Mr. Macadam believes the crust of our globe to be lying upon the interior red hot round sea at the centre of our planet, in the same way that the spheroid lies on a red-hot plate. The internal crust he likens to a concave mirror, and the hot fluid mass to a sphere, with an atmosphere between the two of vaporized metal. He believes this heat is constant, and that the crust of the globe is influenced by two great forces—gravitation and spheroidal repulsion.

As it regards volcanoes, he believes they are caused by basins of metal at a high temperature, to which water finds admission, thus generating steam, which causes volcanic explosions in some cases, and hot springs in others. The volcanic theory is thus set down as caused by chemical action, the central heat theory has nothing to do with chemical action.

These are the principal features of his theory, and it may be true and it may not. Among the many new and useful discoveries which are continually being developed, there is much that is speculative and of no real earthly benefit—speculations which can never be settled, consequently any person has the perfect right to be as wild and extravagant, or plausible, as he chooses, there being no risk to run, while there may be considerable notoriety gained. This theory of Macadam, however, is the most plausible on the subject which has yet been advanced, we think; and as he allows us 25 miles of solid crust, after which all is red hot fire, we may consider ourselves on solid floating ground until some better theory is advanced.

Electro-Magnetism as a Prime Mover.

Although much has been recently said and written about the application of electro-magnetism as a prime mover, it is not a new subject by any means. After the discovery of Electro-Magnetism, by Oersted, in 1819, it at once became apparent that a new mechanical power was given to man, and many were enthusiastic about its superior advantages over steam, as a propelling power. Our own Professor Henry, now of the Smithsonian Institute, first demonstrated the method of developing great magnetic power in soft iron by a small battery, and as a natural result he applied it to propel machinery. In 1831 he described, in Silliman's Journal, a machine for producing a reciprocating motion, "by a power never before applied in mechanics—by magnetic attraction and repulsion." He stated, however, that it was no more than a philosophical toy, but deemed it not impossible that a modification of it might be applied to some useful purpose. In 1833, Dr. Schultless, of Zurich, Switzerland, exhibited a machine propelled by this power, and so did Dr. Ritchie, of London. In 1834, Prof. Jacobi, of St. Petersburg, described to the Academy of Sciences, in Paris, a method of propelling machinery by electro-magnetism; and, about the same time, Mr. Davenport, of Vermont, who has corresponded with the Scientific American, contrived a machine upon the same principle. In 1836 Mr. Davenport propelled a turning lathe with his electric engine, and at the same time Mr. Davidson, in Scotland, had a turning lathe and a small locomotive in operation by the same power. In 1838 Prof. Jacobi applied his electro-magneticengine to propel a boat at St. Petersburg; and the effort was apparently a very successful one, for the boat had paddles, was 28 feet long, 7½ wide, drew 2½ feet of water, and with only a battery of 64 platina plates, and but a small engine, he propelled the boat with 12 persons in it at the rate of 3 miles per hour, against the current. In 1840 Mr. Davenport, we believe, printed for a short period, in this city, a paper named the "Electro Magnet," the press which printed it being moved by his electro-magnetic engine. Capt. Taylor obtained an American patent in 1838, and in 1839 he patented it in England, and exhibited a working model in London, which moved a lathe used in turning articles of wood, ivory, and metal.

These were great experiments, and aroused public attention to this "beautiful, cheap, and simple power," as it was termed. In New York, about 1841, electro-magnetic engines became a kind of mania, and hundreds were manufactured to meet the market demand. It did not last very long, however: it was found that they were expensive, weak of power, inefficient, and troublesome. In 1842, Mr. Robert Davidson, of Aberdeen, Scotland, (a mechanic like our Mr. Davenport), built a locomotive weighing five tons, and experimented with it on the Edinburgh and Glasgow Railway. He had 6 batteries, in all containing 60 zinc plates, with iron ones intervening. Th carriage ran at the rate of 4 miles per hour—a failure, to be sure, as we stated last week. The experiments of Jacobi, Davenport, and Davidson, caused disappointment; still, many attributed their failures to mechanical and other defects, and not to the inherent nature of electro-magnetism. This is the right spirit, for, until all the depths and shoals of this science are discovered, it is folly to despair. Among the many successful investigators and experimenters in Electro Magnetic science, the name of Prof. Page stands high; and his recent experiment with an electro magnetic locomotive at Washington, is the greatest effort of the kind ever made. It makes no matter how much mechanical power may be developed by electro-magnetism, if that power is derived at too great an expense to compete with steam, and it is our opinion that the economy of steam power is not so well understood as it should be by many who are sincerely laboring to perfect electro-magnetism. Hunt, in his experiments, says he proved that the greatest amount of magnetic power is produced when the chemical action is most rapid. Hence, in all magnetic machines, it is more economical to employ a battery under an intense action, than one in which the chemical action is slow. It has been proved by Mr. Joule that one horse-power is obtainable in an electro-magnetic engine, the most favorably constructed to prevent loss of power, at the cost of forty-five pounds of zinc, in a Grove's battery, in 24 hours; while seventy-five pounds are consumed in the same time to produce the same power in a battery of Daniell's construction.

A voltaic current, produced by the chemical disturbance of the elements of any battery, no matter what its form may be, is capable of producing, by induction, a magnetic force, this magnetic force being always in an exact ratio to the amount of matter, (zinc, iron, or otherwise) consumed in the battery.

What amount of magnetic power can be obtained from an equivalent of any material consumed? The following were regarded as the most satisfactory results yet obtained:

1. The force of voltaic current being equal to 678, the number of grains of zinc destroyed per hour was 151, which raised 9,000 pounds one foot high in that time.

2. The force of current being, relatively, 1300, the zinc destroyed in an hour was 291 grains, which raised 10,030 pounds through the space of one foot.

3. The force being 1,000, the zinc consumed was 223 grains; the weight lifted one foot 12,672 lbs.

We have no data of the battery expense of the locomotive of Prof. Page, but the experiments of Mr. Hunt and others have proved that one grain of coal consumed in the furnace of a Cornish engine lifted 143 pounds one foot high; whereas one grain of zinc consumed in the battery, lifted only 60 lbs.

The difference of expense between steam and electro-magnetism is obvious, the latter is fifty times more expensive, and some new discovery in its chemical developement must be made before it can hope to enter the field as a competitor to propel machinery. We have heard many objections against the huge engines, boilers, &c., required on board of steamships, and have been told how electro-magnetism would do away with "all unnecessary encumbrances," but we have no hopes that Prof. Page's Rotary Electro Magnetic Engine—for he has fallen back on this idea of Davidson and Avery—nor any other propelled by the same power, can be placed in any less space than a steam engine; we are sure, at least, they will have to be built just as strong, and all those we have seen, exhibited, according to their size, had far less power than the common steam engine.

We consider the locomotive the prince of prime motors, and we have no hopes of ever seeing it superseded by an electro-magnetic engine. We may be mistaken, but when 400 tons can be drawn 58 miles at the expense of only 1½ cents per ton for coal, as has been done by a locomotive, we may begin to talk of the importance of Electro Magnetism as a prime mover.

Astronomical Observations at Washington.

The second volume of "Astronomical Observations," made under the direction of Lieut. Maury, at the National Observatory, Washington, containing the Appendix, has just been published. It is a work which does honor to our country, and Lieut. Maury has our thanks, and will have that of all our readers, for the information we are permitted to glean from its pages in relation to the Electric Clock of Dr. Locke, &c. Capt. Wilkes, of the Navy, it is stated, was the first to apply the magnetic telegraph to the determination of longitude. This was done five or six years ago, for determining the difference of longitude between Washington and Baltimore, and he reduced the results down to the accuracy with which the time, between the ticks of the second-hand could be measured by the eye and the ear; this was the first time the magnetic telegraph was reduced to a valuable astronomical instrument. In 1848, Dr. Locke, of Cincinnati, informed Lieut. Maury that he had invented a Telegraphic Register Clock for Longitude. This clock has been erected in the "National Observatory," by Dr. Locke, and the principle of its operation is the breaking and closing of the circuit, so as to make regular marks on a fillet of paper of a certain length, to indicate the 100ths of a second, unless the circuit is broken by the operator, who is observing the heavens, noting the transit of stars. He then lays his finger on the key, breaks the circuit, and, during the time the circuit is open, there is left a blank on the paper, which can be measured by compasses, and will tell whether the blank was 100th or ½ a second—time of transit.

Pay Your Postage.

When any person sends a letter to another upon matters of business, to gain information, he, as a gentleman, should pay the postage. Mr. O. Child, of Illinois, whose Saw Mill was illustrated in No. 26, who was made to reside in Ohio, by mistake, has received a number of letters for which he has had to pay double postage. We believe that but few realize the extent of our circulation; when any machine is illustrated in our columns, if it has any merit, it is sure to meet with great attention, and hundreds of letters are sent to the proprietor; in such cases it is no more than just and fair for correspondents to pay their own letters. Those who wish to write to Mr. Child will be pleased to direct letters to Granville, Illinois, —not Ohio.

Cotton Crop Prospects.

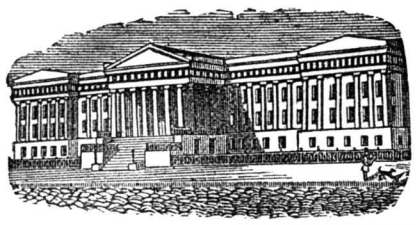
In South-Western Georgia and all that region of country beyond Macon, as well as in the north-eastern counties lying on the Savannah river, the plant is small and unhealthy. The same is true of Burke and Jefferson, two of the most productive counties in the State. The cold weather has kept the plant from coming up, and consequently the stand is a poor one. In no particular, is the prospect so good as it was at this time last year. It will require favorable seasons and a late fall to make so large a crop as the last.

The Seventeen Year Locusts.

We perceive by some of our cotemporaries that the seventeen year locusts have been plowed up in many places in Maryland and Pennsylvania. All those who desire to obtain the most correct description of the appearance and habits of this insect will find the same in an article by Dr. Smith, in number 27, this Vol. Sci. Am.

The Patent Office.

We have been informed that four Assistant Examiners have been appointed in the Patent Office; their names are F. Southgate Smith, of Ohio; Wm. C. Langdon, of Kentucky; Timothy Fitch, of New York, and Henry Baldwin, of Tennessee, at a salary of $1,500 each.



☞Reported expressly for the Scientific American, from the Patent Office Records. Patentees will find it for their interest to have their inventions illustrated in the Scientific American, as it has by far a larger circulation than any other journal of its class in America, and is the only source to which the public are accustomed to refer for the latest improvements. No charge is made except for the execution of the engravings, which belong to the patentee after publication.

LIST OF PATENT CLAIMS
Issued from the United States Patent Office.
FOR THE WEEK ENDING MAY 13, 1851.

To Jonathan Sullivan, of Lexington, N. C., for improvement in Straw Cutters.

I claim, in combination with the toothed grooved cylinder and curved stationary knives, the clearers, arranged and operating substantially as shown.

To John R. St. John, (assignor to James Renwick, G. F. Barnard, and E. B. St. John, of New York, N. Y., Trustees of the St. John's Compass and Log Manufacturing Co.), for improved method of supporting the vanes of aquatic velocimeters. Ante-dated Dec. 27, 1850.

I do not intend to claim any of the parts herein described, as taken separately; all are well known and in common use: but I claim attaching the disc or plate to the sliding frames, one of which frames carries the shaft of the paddle blades, when said frame and plate are fitted to be lowered into or raised out of a tube, in such a manner that when in place for use the plate prevents any indirect current of water from ascending into or descending out of the tube, to disturb or destroy the accuracy of the instrument, leaving the paddle blades subject only to the direct action of the vessel's progress through the water, substantially as described.

To Rufus Bixby, C. S. Bixby, and John Grist, of Dayton, Ohio, for improvement in Planing Machines.

We claim the employment on one or both sides of the grooving cutters, of a chain or band applied and operated in the manner substantially as described.

To Charles Hoskyns, of New Orleans, La., for improved apparatus for relieving the helmsman from the shock of the rudder.

I claim the combination of two sets of pawls between which a wheel is placed, loose upon the shaft, having an endwise motion thereon, by means of the male and female screw, as described, said wheel being provided with a hub, so fitted as to disengage the pawls when the hub arrives at the limit of its end play in either direction; the result being that the rudder secures itself through the agency of the pawls, and is unlocked so as to be free to move in either direction, by the first motion of the same wheel, which afterwards moves the rudder. In other words, I claim the combination of the hub, secured to the wheel, the male and female screws, or their equivalents, and the ratchet and pawls, substantially in the manner and for the purposes described.

To George Faber, of Canton, Ohio, for improved apparatus for indicating the height of water in steam boilers, etc.

I claim the combination of the chamber with the boiler or other vessel, in which the height of fluids is to be measured by means of tubes so formed and attached, as to act as springs, to indicate the weight of the water at any time within said chamber, for the purpose and substantially in the manner herein set forth.

To James M. Clarke, Lancaster, Pa., for improvement in Flouring Apparatus.

I claim, first, the arrangement of the "hopper boy," revolving on the same centre as the stone and the chamber beneath the stone, by which the flour is cooled as it is conveyed to the centre opening of the bolt, substantially as set forth.

Second, I claim the annular or endless conveyors for carrying the flour, &c, in the several annular chambers, to the spouts, the same being operated in the manner described.

Third, I claim, in combination therewith, the air passage for returning the particles of flour which would otherwise escape, to the centre hole of the floor of the bolting chamber, to be drawn in again by the draft, substantially in the manner set forth.

To Ezra Ripley, of Troy, N. Y., for Crane Hinge of doors, shutters, &c.

I claim the crane door-hinge, constructed in the manner and for the purpose substantially as set forth.

To A. F. Ahrens, of Philadelphia, Pa., for improvement in Setting Teeth.

I claim attaching artificial teeth to a plate in the roof of the mouth, by means of a wedge-formed recess in the tooth, and a pivot of corresponding shape, soldered or otherwise, attached to the plate, when the union of the two is effected, by the use of platinum and tin or solder, substantially in the manner and for the purposes specified.

To A. F. Ahrens, of Philadelphia, Pa., for improvement in Setting Teeth.

I claim securing artificial teeth to a plate in the roof of the mouth by means of a rebate in the inner face of the tooth, and a slide fitting the same and soldered or otherwise attached to the plate in the mouth, for the purpose and in the manner described.

To Joseph Grant, of Providence, R. I., for improvement in Brick Presses.

I claim, first, the form of the pressing plates thicker at one edge than the other, as shown, and for the purpose described.

Second, the motion of the followers or plungers (three) by rollers moving in fixed grooved channels (two) and acted upon by revolving cams, (two) producing a drop movement, and operating as herein shown and explained.

Third, propelling the machine forwards by means of wheels keyed on the mould cylinder shaft, for the purpose of depositing the bricks, as made, in regular layers for drying.

To Martin Rich, of Fairfield, Wisconsin, for improvements in Saw Mills.

I claim, first, the tightener and key, and the manner in which they are used in tightening the dogs, as herein set forth.

Second, I claim the movable arm to regulate the thickness to be sawed when changing from one thickness to another in the same log, without taking the dog out of the log, as herein described.

Third, I claim placing the second dog upon the main plate and adjusting it by the bolt and key, constructed in the form and manner, and for the objects and purposes herein set forth.

No other part of the said described dogs do I, in this my specification, claim as new or original, excepting such as above enumerated.

RE-ISSUES.

To G. H. Corliss, of Providence, R. I., for improvement in cut-off and working the valves of Steam Engines. Originally patented March 10, 1849.

I claim, first, the method substantially as described, of operating the slide valves of steam engines by connecting the valves that govern the ports at opposite ends of the cylinder, with separate arms of the rock-shaft, or the mechanical equivalents thereof, so that from the motion thereof the valve that keeps its port or ports closed, shall move over a less space, while its port or ports are closed, than the one that is opening or closing its port or ports, and vice versa, while at the same time the two arms, by which they are operated, have the same range of motion as described, whereby I am enabled to save much of the power heretofore required to work the slide valves of steam engines, and by which, also, I am enabled to give a greater range of motion to the valves, at the periods of opening and closing the ports, to facilitate the induction and eduction of steam, as specified.

And lastly, I claim the method of regulating the motion of steam engines, by means of the regulator, by combining the said regulator with the catches that liberate the steam valves, by means of movable cams, or stops, substantially as described.

To Calvin Adams, of Pittsburgh, Pa., (assignor to J. P. Sherwood, of Sandy Hills, N. Y.,) for improvement in Door Locks. Originally patented Dec. 17, 1842.

I claim making the cases in which the movements of locks and latches for doors are contained, double faced, or so finished that either side may be used for the outside, in order that the same lock, or cased fastening, may answer for a right or left hand door, substantially as described.

I also claim the peculiar construction and double action (upon an inclined and horizontal track or way) of the locking car, as described, and the combination of the locking car and two safety cars, with one another, and with the connecting or vibrating bar and bolt, as described, so as to fasten the bolt securely and prevent its being picked.

To Alex. Calderhead, of Philadelphia, Pa., for improvement in the Jacquard Machinery for weaving all kinds of figured cloth. Originally patented Feb. 3, 1841.

I claim, first, in connection with looms for weaving figured fabrics, depressing the suspension board, or its equivalent, while the corresponding pattern card, acting as a trap-board, or its equivalent, is elevated substantially as described.

Second, I claim working the card prism, by mechanism connected with the loom, and whilst the boards, or their equivalents, for working the harness, are not opening and closing the shed, substantially as described.

DESIGNS.

To M. C. Burleigh, of Great Falls, N. H., for Design for Stove Doors and Panels.

To James Hutchinson, of Troy, N. Y., (assignor to Deborah, A. E., and Nathaniel Powers, of Lansingburgh, N. Y.), for design for Floor Oil Cloth.

To N. A. Batchelor, of New York, N. Y., for design for Clock Frame.

(For the Scientific American.)

Practical Remarks on Illuminating Gas.

[Continued from page 278.]

The production of gas from oil is a continuous process, and accordingly differs from coal gas. According to trustworthy statements, 1 cubic foot equal to about 6¼ gallons of whale oil, will produce on a average 300 cubic feet of gas. Dr. Fife says that it is generally allowed that by cautiously conducted trials, a gallon of whale oil will yield 100 cubic feet of gas; but this is seldom attained in practice, unless the gas is of inferior quality; for it is well known that by a particular mode, a large quantity of poor gas may be procured; he also says, "I am inclined to think, that in practice, there is in the conversion of oil into gas, a loss of about one-half."

Another material from which gas is generated for illuminating purposes, and which is more or less used at the present time, is Rosin!

Resin.—Resinous bodies form a very numerous class of vegetable substances. When volatile oils are exposed to the action of the air, they become thick after a time, and are then found to be converted into resin. The oil absorbs oxygen from the air, and is deprived of part of its carbon, which, combining with the oxygen of the atmosphere forms carbonic acid. Resinous substances therefore are generally considered as volatile oils saturated with oxygen. The resinous substances are divided into numerous species, such as copal, shellac, benzoin, rosin, &c., the latter only will now command our attention, as it is this species that has been made available for illuminating purposes.

Rosin (or colophony).—This substance is extracted from different species of the fir, and the resinous matters obtained have been classified, and have received different appellations. That procured from the "pinus sylvestus" is the common turpentine; from the "pinus larix" Venice turpentine; and from the "pinus balsamea" the balsam of Canada. The turpentine is obtained by stripping the bark off the tree; a liquid juice flows out, which gradually hardens; this juice consists of oil of turpentine and rosin; by distilling, the turpentine passes over, and the rosin remains behind; by distilling to dryness common rosin is obtained. The yellow color is given to rosin, by adding water while it is in a fluid state; it being incorporated with it by agitation.

Rosin Gas.—If rosin was naturally fluid instead of being solid, there would be no difference in the mode of obtaining gas from it to that practiced in the oil gas manufacture; as this, however, is not the case, it becomes necessary to render the rosin fluid by some suitable means, that it may be easily supplied to the retort; for this purpose the flame from the retort fire, before escaping by the chimney, is employed, by being allowed to pass around the reservoir containing it. Gas is generated from rosin in precisely the same manner as from oil, and the apparatus for both are similar in construction. Rosin is composed of carbon, hydrogen, and oxygen, its atomic formula being C10+H7+O. When decomposed these elements form new combinations and yield bi-carburetted, light carburetted hydrogen, carbonic acid, oxygen, and free hydrogen; there is also a large deposition of carbon formed upon the retort. The temperature of the retort should be somewhat higher than that required for the decomposition of oil; if the retort is too cold, a considerable quantity of essential oil is distilled, the vapors of which pass over, while the oil remains behind.

The opening of the retort for the removal of the coke, bricks, or whatever material may be used to increase the heated surface, becomes necessary much oftener in the manufacture of rosin gas than it does in oil gas; and where large quantities are manufactured, the renewal takes place every few hours; this operation is accompanied by an escape of a large quantity of light amorphous carbon, in the form of lampblack, which is conveyed through the air considerable distances, settling upon all contiguous surfaces, and is a constant source of annoyance to the inhabitants residing in the vicinity of such works. Rosin gas has not so high an illuminating power as that generated from oil; nevertheless it is much more desirable, being more free from the obnoxious odor which accompanies the latter, arising from the decomposition of animal matter contained in the oil, and which is brought over with the gas and condenses in the pipes, and not containing so much aqueous vapor which is condensed at common temperatures, and by which much is lost and great inconvenience caused by the clogging up of pipes.

Rosin is oftentimes introduced into coal retorts in a solid state in company with the coal; but this is only done when it is necessary to generate gas in a limited space of time, and more rapidly than can be done with coal alone. In cases of emergency it has been used with advantage, as it becomes decomposed and liberates its gases so quickly.

Rosin gas works have been erected, and companies formed for the purpose of manufacturing and supplying this gas; but they have not been successful; the expense attending the generating is the prime difficulty, and the fluctuating price of the raw material is also a great source of uncertainty. In New York this gas was at one time manufactured upon a large scale, but it has now been entirely given up and coal gas substituted. In Boston likewise for many years this gas was manufactured to a great extent, but is now entirely abandoned. Works were erected in a neighboring city a few years since, and after struggling along for some time, endeavoring to manufacture a gas satisfactory to their consumers, and receiving no remuneration for the investment, they were abandoned, and coal gas works erected in their place, at a great sacrifice of property.

J. B. B.

Blasting Rocks.

Blasting rocks by the old process consists in making holes in a proper spot, by using a heavy iron bar, of which the successive strokes produce the desired effect; the hole then is cylindrical and rather conical, being wider at the top by the friction of the rod bar against its sides. The powder has not then all the effect which it could have, and can never be used in large quantity. A process used with full success, is this: a deep hole is first made in the above manner, then a glass tube is inserted, and strong sulphuric acid mixed with a small proportion of water is poured in; the acid dissolves part of the stone; the sulphite is then extracted and the bottom washed by sending down some water, which is pumped out by any means whatever; this operation is repeated as many times as is necessary to produce at the bottom of the hole a kind of pouch, which is well dried by using rags or anything similar. This pouch is then filled with powder by the common process of ramming, and then blasted. The quantity of powder being as large as it may seem necessary, permits to blow up, with a single charge, as much as with ten of the old process, and to have larger blocks if desired.

TO CORRESPONDENTS.

N. C., of N. Y.—We shall write you in a few days in regard to the mill.

J. P. N., of N. Y.—We have been informed about the removal of the paddles of the Santa Claus, but are told that the boat moved faster and more steady with the curved blades. Now there can be no doubt but the defect was in the mechanical construction, not the principle. We are no advocates of them, however. In answer to your question, we must say that A, as you observe, will move towards C, but then it is just the same as the radial rudder, it would do the same. We still cannot see the benefit of a rudder made with double radius blades.

W. M., of ———.—The boiler iron you speak of means its strength when cold. It is understood that its strength diminishes as it increases in temperature. This was presented in the reports made to Congress on the subject. The gas and the atmosphere, when united and ignited, produce an effect like gunpowder. You are perfectly right about the super-heated metal being so easily torn to pieces. The ratio of decrease in strength according to increase of heat in the metal, has been ascertained by experiment.

R. J. S., of Va.—We have never seen the same plan of wheels proposed for inclines, although cogs on the sides of the wheels have been used; but we believe that it is best to make very little provision for ascending steep inclines; the cheapest way in the end is to dig down the incline to as near a level as possible.

W. E., of Cincinnati.—We have just received the model of your invention and shall proceed with the application in a short time.

G. W. B., of N. Y.—Yours of the 6th May is received, and the advertisement will appear as soon as the patent is issued.

B. P. & P., of London.—Yours, per Franklin, of the 6th inst. is received. Shall remit the bill of exchange per first steamer.

F. G., of Boston.—We shall attend to your call without delay. The sketch will be furnished in time.

W. M., of Wisconsin.—We will answer your inquiry by letter as seon as we can attend to it.

O. P. S., of Ohio.—The amount would be $8 for having the engravings prepared. As soon as the patent is issued you had better transmit the Letters Patent to us for that purpose. Your own experience speaks favorably of such a medium as the Scientific American through which to publish improvements.

F. E. H., of S. C.—We are in correspondence with a practical tanner, and hope to advise you in full in a few days.

W. & P., of N. Y.—Your engravings will appear in our next number.

S. R., of N. Y.—There is no prospect of using the Electro-Magnetic engine so as to compete with the steam engine. We have some very strong facts to back up this opinion.

W. C, of ———.—We have been trying to get some information that would be profitable about the 'diapason scale,' but have not yet been able. We may soon.

J. C. V. D., of N. Y.—We will answer you about the raft and log soon. The question is not a complicated one by any means.

A. R. H., of N. J.—The malleable iron, we believe, is made by submitting the common cast iron to the heat of an air furnace in a melted state for some days, and skimming the impurities as they rise to the surface.

T. McG., of Mass.—All machinery is just means to communicate or transmit power from one point to another. A train of wheels gives out power in a curved line, the section of which is of the same form as a section of the cogs on one wheel. Young mechanics should pay great attention to the lines of direction generated by the motion of wheels, &c. Your ideas about employing air as a motive power will never answer, for this very reason, you wish to use compressed air, and it requires some other power to compress it, there can therefore be nothing but a positive loss sustained.

P. B. C., of Del.—Enough has been said about the Paine-Light to answer for some time. It will end as it began, in assertion.

R. J., of Geo.—The sulphate of iron (common copperas) is a very excellent disinfectant. Dissolve some of it in a pailful of water and throw it among the matters to be disinfected. The plaster of Paris is good, so is ground charcoal.

A. G., of N. Y.—There is no resemblance between your invention and the one to which you have alluded.

S. R., of Md.—You may depend upon it, that you can secure a patent, for your invention is both new and useful. We will do the business at a very reasonable rate. We never wish to overcharge. We profess to do business as it should be done. Our experience enables us to say, we know how it should be done.

T. A. W., of Ill.—The best thing you can do for your own benefit is to get an engraving of your invention published in the Scientific American; it will make money to you.

H. P., of New York.—Your penmanship is so bad that we cannot read your letter. We do not mean bad writing, but careless penmanship, for your handwriting shows practice. We also like short articles.

B. M. H., of Ind.—The dollar forwarded by you has been placed to your account on subscription. Volume 5 we can send in sheets for $2. Those two numbers which you ordered we could not furnish unless you took a complete file.

C. M. D., of Ala.—We have not yet been able to obtain the exact information desired about the water rams.

S. D. H., of Va.—You will find, upon examination of the Scientific American, that we do not undertake the sale of patent rights; this branch of business we have never undertaken, perhaps for the want of proper time to attend to it. You had better send us your Letters Patent and we will publish an engraving of it, which will do much towards bringing it into notice. Your invention for invalids appears to be good, and worthy of a patent. We should think some physician in your section would take hold of it. The incline plane may be new, we have no means of deciding from the description given. The Railroad Gate is probably similar to Coffin's Patent, in 1849. You are advised to do nothing with it, it will not pay.

G. & Co., of Ala.—We wrote you a few days since through Messrs. Jno. G. Winter, Son & Co.; please let us hear from you in reply as soon as convenient, and we shall feel much obliged.

E. E., of Va.—Messrs. Jacob Little & Co. attended to your order promptly and satisfactorily.

J. C. L., of W. T., of N. Y.—We shall be happy to receive the articles from your pen: you are from the right school. You know what we like—short and comprehensive articles, and, if possible, every one its own mirror. We have been very much and unfairly annoyed, lately, from the quarter to which you refer, and we sincerely wish that a change may shortly take place there. You may judge from this how we have oftentimes, for the interest of our clients, to restrain our feelings.

R. J., of Pa.—There is no earthly way of computing the power of a machine when the question of velocity is left out of sight. The idea of a *horse*-power means a unit of comparison, and that is weight and velocity: a horse drawing 200 lbs. at the rate of 220 feet per minute over a pulley.

S. K. B., of Mass.—We are not positive about the experiment showing the rotation of the earth. We will publish an engraving of it next week.

H. R., of Mass.—We could not advise you to make an application for a patent on the Bench Hook, as there is not sufficient novelty to warrant it.

E. A. N., of Ind.—Such a contrivance as you suggest was patented in 1849, by Richard Coffin, of Haverhill, Mass.; we should consider it essentially like yours: the gate opens on the approach of the cars, and closes immediately after they pass through. We doubt the practicability of such a contrivance.

S. C., of N. Y.—C. M. Saxton, No. 152 Fulton st., published Gillespie's work on Plank Roads: price, we believe, $1,50; it is the best work up to this time.

N. G., of N. Y.—We do not see any advantage that could be gained by your arrangement of the levers on the locomotive. It would be of no advantage, we believe, but it is new.

B. G., of Mass.—The sketch of your contrivance for punching leather has been examined and believed not to possess novelty sufficient to warrant an application for letters patent; punching shafts, having spiral springs for throwing them back, have long been in use in different machines. A model of a machine now in this office, for cutting the ears of hoops, has the same essential characteristics as are exhibited in yours; guide rests are common, and any particular application could not be patented. We admit the compactness and utility of the arrangement, but believe it could not be patented.

E. S. H., of N. C.—We have forwarded your letter to one of the parties interested in the machine, who will no doubt respond to your inquiries.

W. H. G., of O.—There is no work published that specially treats of city and street architecture. We should have sent you a copy of Arnott's Architecture, but it could not be obtained in numbers, and the express fees upon a bound copy would cost you more than the book is worth.

Money received on account of Patent Office business since May 13:

W. J. McA., of Ga., $20; B. & H., of N. Y., $30; T. B., of N. Y., $70; G. L. H., of Conn., $20; D. & R. P., of N. Y., $20; R. W. P., of Mass., $30; R. M. W., of Va., $60; E. D., of Ga., $56; A. S. H., of N. Y., $25; C. S. G., of Vt., $10; S. W. K., of Pa., $58.

Specifications and drawings of inventions belonging to parties with the following initials, have been forwarded to the Patent Office since May 13:

J. B., of Mich.; T. B., of N. Y.; A. S. H., of N. Y.; D. & R. P., of N. Y.; D. W. E., of N. Y.

Back Numbers and Volumes.

In reply to many interrogatories as to what back numbers and volumes of the Scientific American can be furnished, we make the following statement:

Of Volumes 1, 2, and 3—none.

Of Volume 4, about 20 Nos., price 50 cts.

Of Volume 5, all, price, in sheets, $2; bound, $2,75.

Of Volume 6, all back Nos., at subscription price.

New Edition of the Patent Laws.

We have just issued another edition of the American Patent Laws, which was delayed until after the adjournment of the last Congress, on account of an expected modification in them. The pamphlet contains not only the laws but all information touching the rules and regulations of the Patent Office We shall continue to furnish them for 12 1-2 cts. per copy.

Patent Claims.

Persons desiring the claims of any invention which has been patented within fourteen years can obtain a copy by addressing a letter to this office; stating the name of the patentee, and enclosing one dollar as fee for copying.

Scientific Museum.

(For the Scientific American.)

American Sponges and Florida Salt.

In your valuable paper of the 12 inst., in an article headed "Bahama Sponges," you make the query, "could not the sponge-fishing be pursued along the coast of Florida?" and knowing your anxiety to keep posted up in relation to the industrial pursuits of the whole country, I take this opportunity to inform you that, within the last nine months, there has been exported from the Port of Key West some $17,000 worth of sponges, and the business is daily increasing here in importance. The first start made at this kind of fishing took place not more than one year ago, and it now occupies the entire attention of that class of the population here that go by the name of "Conks." They are the descendants of refugees or tories who emigrated from North Carolina, during the Revolution, to the Bahamas, and who have been returning continually to the United States since the Emancipation Act began to take effect in the Btitish W. I., in 1833. At this time there are about 1500 of that class on this Island, and they are, in their way, industrious and frugal, but I do not think that they will set the Gulf of Mexico on fire with any extraordinary enterprise; however, they are orderly and quiet, and make the best divers and fishermen that we have here. On the whole, they are among our most useful citizens.

The wrecking vessels, likewise, which belong here, have begun, many of them, to join "sponging" with that of their regular business.

By the way, there is a business pursued on this island which promises to be of considerable importance hereafter: I mean the making of salt by solar evaporation, which is now carried on to a small extent, but could easily be increased a thousand fold, as the natural salt ponds are sufficiently extensive for the purpose.

The business was commenced before the destructive hurricanes of 1845 and 1846, which laid everything in ruin about the ponds, and which so discouraged the proprietors that they sold out; but they had done enough to convince the judicious that the business could be made profitable by the right management, as the salt is of a superior quality, and the solar heat, joined to the Trade Winds, possess great evaporative powers. The present proprietors are making improvements slowly, and of such a character that a hurricane will not be likely to destroy them; and I should think that they now make from 30,000 to 40,000 bushels of salt yearly, which would be sought after if its superior qualities for packing meats were generally known.

The writer of this, two years ago, took some of the "Key West Salt" with him to Alabama, where he resides, and where he had been much troubled to keep meat in the summer, whenever he killed a small hog or beef, and he does not remember of losing a pound of meat while he used this kind of salt.

The kind of salt used at the South or South West, is generally the kind brought from Liverpool, is evaporated by boiling, and which, of course contains all the impurities in both the mineral salt and the sea-water used to dissolve it in the manufacture of the article; except such impurities as epsom and glauber salts, which are more soluble than common salt, and which are easily separated from that article by being drawn off in the form of "bitterns;" but the muriate or sulphate of lime, or the muriate of magnesia is crystalized with the muriate of soda (common salt), or with it hopelessly incorporated. Now, in a table of the constituents of sea-water before me (for its correctness I do not vouch), in some instances the three above named impurities, combined, bear a ratio to common salt of 111 to 285,—nearly 50 per cent. However this may be, it is certain that not a barrel of meat used by the British army or navy, or the commercial marine, for long voyages, is salted with salt made anywhere in the British Islands; "Bay (solar evaporated) Salt" alone is used, which is procured from France or Portugal, and John Bull sends here innumerable cargoes of his impure salt to *taint* our meat, and we are the gulls that buy it.

In Key West great care is taken to get the "pickle" to the strength requisite in the "reservoirs," to deposite all the crystals of those three named impurities there, before it is pumped into the "pans" where the salt is crystalized. This leaves the salt nearly pure, as the bitterns are easily drawn or washed off.

The American Encyclopædia, in the article on "Salt," says that the muriates of lime and magnesia and the sulphate of lime, which are always present in common salt, when evaporated by boiling, not only injure the salt to the amount of the weight of those impurities but that they materially injure the antiseptic powers of the remaining pure salt. Will not some of your numerous correspondents, who are practical chemists, test the antiseptic qualities of different kinds of salt or give us the results through your columns? I think it is of importance to health that we should eat sound instead of tainted meat. By the way, England is very careful not to buy any of the meat salted here with the salt she sends us.

Key West, Fla. D.

For the Scientific American

Hydraulics.

(Continued from page 280.)

Great Powers on High Falls.—We last week presented two engravings of the plan proposed by Mr. Parker for applying his wheels to high falls, and thereby bringing into useful action the immense water powers in some districts of country, where they are now dashing down expending their noisy strength upon crags and jutting rocks. It is a plan which appears to be perfectly practicable, and whereby the mountain torrent may be made to forge an anchor or to shape a pin. We do not present any engravings this week, but will let Mr. Parker give his own opinions upon the engravings we presented last week, to which we would refer our readers as they read the following:

The representations given are the deductions of long experience and much careful investigation; and as the principles upon which they are based have been fully tested in a practice of many years, they may be safely considered as reliable. That this improvement ranks with the best known in regard to economising water, has been fully proved by several carefully made scientific tests, and in many instances in practice, where they have been substituted for gravity wheels; and that they are superior to all others in durability, freedom from accident or disarrangement, steadiness of motion, convenience of management and superintendance, the smallness of the space they occupy, and cheapness of construction and maintenance, particularly where great powers are required, there can be no doubt with such as will investigate the subject.

With the arrangement represented, the transmission of high powers and velocities by belts, so far as tried, has been perfectly successful and satisfactory. A considerable number of mills, so arranged, have been running from two to five years, and in no instance has there been any trouble or expense in maintaining, constantly, their perfect working condition. The capability of a belt of any given strength and tension to transmit mechanical power from one axle to another, being directly as its velocity, the high speed attained in this improved method, enables one of moderate strength and tension to communicate a great amount of power. And as the power may be taken from both ends of the shaft of the wheel, and any number of belts be used, any amount of power that a wheel can be made to give, can be transmitted by this simple and easy method directly from the axis of the water wheel to the several parts of the machinery to be propelled. In regard to the durability of belts used in this way, our experience has now fully proved that when made of good leather, in a proper manner, they will remain in good order in constant use, for years, with a working tension of fifty pounds for each inch of their width; and an increase of speed to any extent yet tried, makes no apparent difference in their durability.

On falls greater than 35 or 40 feet, it will generally be found most convenient to place the axis of the wheel about 24 feet above the surface of the lower level; and for this reason they are so represented in the engravings. It may, however, be placed at any convenient height not exceeding 30 feet; the effect of the whole fall being the same, (if the air is perfectly excluded from the draft-chambers and tube), that it would be if the wheel were at the bottom of the whole descent. When the wheel is thus elevated in a sufficiently capacious cavity, from which the air is entirely excluded, and out of which the water, passing through and from the wheel can freely and slowly pass at the bottom, the pressure of the atmosphere on the surface of the head water becomes effective in giving velocity and force to the water, in its passage into and its action on the wheel, in addition to that due to the actual head above the wheel, to an extent equal to a column of water of a height equal to the elevation of the wheel above the lower level. For example, as the atmospheric pressure on the surfaces of both head and tail water is constantly nearly 15 lbs. for each square inch, which is sufficient to raise a column of water in a vacuum nearly 34 feet high; if the wheel be placed in such a cavity, 17 feet above the surface of the lower level, the atmospheric pressure on the upper level will be made available to the extent of half an atmosphere, or 7½ pounds per square inch, which is equal to a head of water of 17 feet; and this will be in addition to the pressure of so much of the whole fall as there may be above the wheel operating as head. The same rule will hold good till the wheel is placed at a height of 34 feet or more above the lower level,—where the whole atmospheric pressure is made available on the upper level. An elevation of the wheel above this point cannot increase the atmospheric pressure on the upper level; it will therefore cause a loss of so much of the whole descent as there may be between the wheel and the top of the column of water sustained in the vacuum by the pressure of the atmosphere on the lower level: thus, if on a total fall of 64 feet, the wheel were placed 44 feet high, there would be a loss of 10 feet of the fall: because there would then be a height of 10 feet of perfect vacuum, through which the water (even the most minute particles) would fall with the velocity due to falling bodies.

Great advantages in efficiency, durability, and economy are anticipated from making the entire structure (except the walls) of metal; as besides the greater durability and stability of the materials, it will induce a much more perfect style of workmanship in the arrangement and finish of the parts than has hitherto been attainable.

The great statical pressure of the higher heads in the cylinders and on the disc and cover of the penstock, can, with proper attention, be sustained without difficulty, as besides the great strength of the materials of which they are proposed to be made (in the form most favorable for strength), any number of binding rods and bolts may be inserted when required without detriment to the efficiency or convenience of the machine.

The cost of a wheel of 1320 horse-power, and 100 feet fall, as represented last week, will be about $18,592, or at the rate of $14,80 per horse-power.

Sugar Refining Machinery.

At the present moment there are being constructed at the Novelty Works, this city, four copper vacuum pans, the largest ever seen in this country, each weighing over four tons, and being 8 feet 6 in. in diam., and capable of containing 2,000 gallons. They are constructed, also, on a new and improved plan; having double bottoms, and being lined with long coils of pipe, which allow of the application of steam to the boiling of the sugar. An air pump, worked by steam, draws off the vapor arising in the pans; while the sugar itself is dissolved in water. All risk of burning is avoided by the boiling point being obtained at a low temperature. Each pan is provided with a thermometer; a guage to exhibit the extent to which the air has been exhausted; a proof-stick to enable the boiler to test, at any time, the condition of the mass; and an eye-glass which affords a view of the interior of the pan.

LITERARY NOTICES.

Manufacture of Steel: By Frederick Overman, published by A. Hart, Philadelphia.—Mr. Overman is the author of a splendid work on the "Manufacture of Iron," another on "Practical Mineralogy," all published by the same house. He has devoted his attention to metallurgy in all its branches. This work is not only devoted to the manufacture of the steel, but the different methods of working in it, such as forging, making of anvils, fluxes for welding, testing steel, &c. It is a hand-book to the blacksmith and all workers in steel and iron. We consider it to be an exceedingly useful book, and well worthy the patronage of all interested in iron work.

Miller and Millwright's Assistant: Published by C. Baird, of Philadelphia.—The author of this work is Wm. C. Hughes, of Michigan, a practical man. It treats of Water Wheels and the Power of Water, especially as applied to Re-action Wheels. It treats of the *friction* of machinery, &c.; it also treats of the culture of grains and the different kinds of stones for grinding wheat and corn. It is very particular in its directions for dressing and laying the stones. This is the best part of the book, and is exceedingly practical and useful. It is just the book wanted by our millers, and no one in our country should be without it.

Dictionary of Mechanics and Engine Work.—No. 29 of this able work, published by D. Appleton & Co., New York, contains articles on the "Mineral Kingdom," "Moulding Machinery," "Self-Acting Mule," "Nail Machinery," "Needles," and a view of "Byram's Oscillating Engines," and "Paper Machinery;" Byram's English Oscillating Engines are far inferior to some now running in our city--American engines.

Iconographic Encyclopedia.—Part 19 of this useful and beautiful work is now published and ready for sale by Mr. Rudolph Garrigue, No. 2 Barclay st., it contains plates from 18 to 37 of the work, representing the various orders of architecture. The illustrations of this work really entitle it to be named "Iconographic," for it is a book of pictures in every sense of the term.

Peterson's Ladies' National Magazine, for June, is for sale by Messrs. De Witt & Davenport, Tribune Buildings. It contains sprightly engravings of "Ghost Stories," "Fashions," etc. Peterson, Dana, Chivers, Mrs. S. S. Smith, are among the contributors.

The last number of the Dramatic Works of Shakspeare, by Phillips, Sampson & Co., Boston, is issued; it contains the tragedy of "Othello." The publishers announce, in a special notice, that owing to the sickness of the engraver, the portrait of Desdemona could not be executed, and that it will accompany part one of the Poetical Works, which they will issue in about ten days. We commend this work to the attention of our readers as the most complete and valuable edition ever published. Price 25 cents. Dewitt and Davenport, agents.

New York News Letter.—This is the title of a new and very neat little paper, printed on a large sheet of good post, and containing a summary of all the news of the week, state of the markets, and so on. It has one blank side for writing upon, so that it is very convenient for merchants and others writing to their friends. It is published by J. E. Phillips & Co., 120 Water st.