Scientific American.

THE ADVOCATE OF INDUSTRY, AND JOURNAL OF SCIENTIFIC, MECHANICAL AND OTHER IMPROVEMENTS.

Vol. 4. New York, November 11, 1848. No. 8.

THE
SCIENTIFIC AMERICAN:
CIRCULATION 11,500.
PUBLISHED WEEKLY.
At 128 Fulton Street, New York (Sun Building,) and 13 Court Street, Boston, Mass.
By Munn & Company.
The Principal Office being at New York.

TERMS—$2 a year—$1 in advance, and the remainder in 6 months.

☞See advertisement on last page.

Poetry.

PICTURES OF MEMORY.

BY MISS ALICE CAREY.

Among the beautiful pictures
That hang on Memory's wall,
Is one of a dim old forest,
That seemeth the best of all.
Not for his gnarled oaks olden,
Dark with the mistletoe,
Not for the violets golden
That sprinkle the vale below;
Not for the milk-white lilies
That from the fragrant hedge,
Coquetting all day with the sunbeams,
And stealing their golden edge;
Not for the vines on the upland,
Where the bright red berries rest,
Nor the pinks, nor the pale sweet cowslip,
It seemeth to me the best.

I once had a little brother
With eyes that were dark and deep—
In the lap of that old dim forest,
He lieth in peace asleep;
Light as the down of the thistle,
Free as the winds that blow,
We roved there beautitul summers,
The summers of "long ago;"
But his feet on the hill grew weary,
And, one of the autumn eves,
I made for my little brother
A bed of the yellow leaves.

Sweetly his pale arms folded
My neck in a meek embrace,
As the light of immortal beauty
Silently covered his face;
And when the arrows of sunset
Lodged in the tree-tops bright,
He fell in his saint-like beauty,
Asleep by the gates of light.
Therefore, of all the pictures
That hang on Memory's wall,
That one of the dim old forest
Seemeth the best of all.

O THE HEART IS A TREASURE!

BY J. E. CARPENTER.

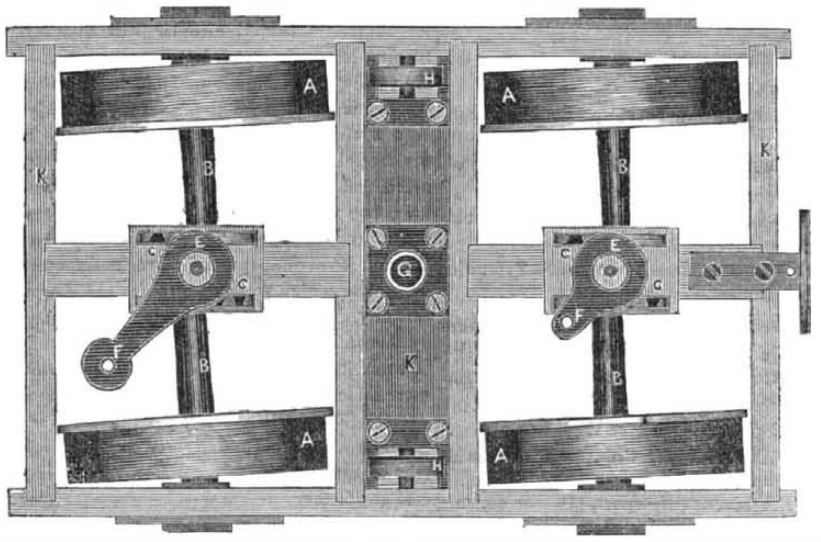
O! the heart it is a treasure
That should not be lightly won,
To be thrown aside at pleasure,
When the festive hour is done:
'Tis a jewel that, to cherish,
Should be still thy dearest boast;
For when all beside it perish,
Will its worth be known the most!

If the heart of thee is beating,
Use it gently lest it break;
Warm and tender be thy greeting,
'Twill grow fonder for thy sake!
And in sickness or in sorrow,
Let thy cares thy solace be;
Then 'twill all its gladness borrow
From its sun of hope, in thee!

O! the heart it is a blessing,
In its freshness and its youth,
Be it thine, mid thy caressing,
To preserve it in its truth.
'Tis no worldly gem, at pleasure
To be worn or cast aside,
But a firm and priceless treasure,
And more valued when 'tis tried!

IMPROVED AXLES FOR TURNING NARROW CURVES.

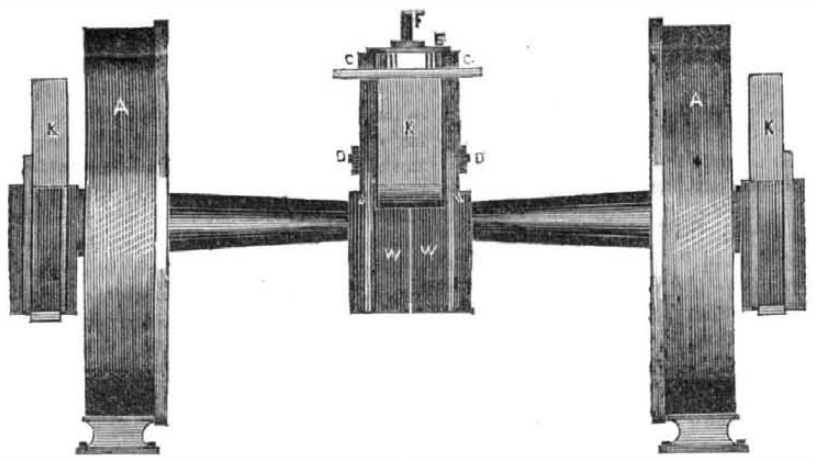
Figure 1.



This is an improvement in the construction of Railroad Car Axles, invented by Messrs. Morse & Mansfield, Machinists, Canton, Mass.

This invention has been effectually tried during the past year on the Boston and Worcester, the Boston and Providence, and several other Railroads in New England, and the valuable practical testimony of the Superintendents and Engineers of these roads is highly favorable—exceedingly so. The saving of tear and wear of the wheels where it has been used, has far exceeded expectation. The nature of the invention consists in having each axle as it were divided and hung in two middle suspension bearings, which are allowed to swing on pivots, whereby the angles of the wheels can be diverged from the straight line for the better turning of narrow curves, than by extended immoveable axles.

Figure 2.



DESCRIPTION.—Fig. 1 is a view looking down upon the truck, and fig. 2 an end elevation. The same letters refer to like parts on both figures, therefore we will describe the engraving collectively.

A A A A, are the wheels. B B B B, are the axles. C C, are pinion and rack coupling. D D, fig. 2, are the pivot axis of W W, the suspended axle bearings. K K K, are the transverse timbers of the truck frame. E, is a pinion crank, and F F, are vertical bolts in the end of the pinion crank to fit into recesses in the bottom beams of the car. G, is an iron socket to receive a vertical bolt fixed on the bottom of the car. H H, are friction pulleys to ease the friction of the car upon the middle of the truck. The bolts F F, and the bolt in the car to fit into socket G, secure the car to the truck. E, we call a pinion crank, from the fact that below its cap plate it has notches that fit into notches on the upper end of the swing axle bearings. These notches coincide about one quarter of the circle on each side of the pinion with the notches in the upper part of W W, therefore the top of W W moves in slots in C C, as will be observed in fig. 1. The operation of these axles is obvious; they prevent torsion, also much wear of the wheels and rails too. To allow the wheels to change with the angle of the axle as seen in fig. 1, the outside journals of the axles are fixed in their boxes in such a manner that both the shoulders and journals move in their boxes and work very nicely.

The inventors have taken measures to secure a patent.

Law and Art.

A Manchester, England, landlord recently levied for rent upon the studio of his tenant, a sculptor of the name of Clark, and sold under hammer about £300 worth of busts for £60. It was proved that the auctioneer sold the head of John Wesley for that of Voltaire: one of Chantrey, as "a bald-headed chap's;" that of Raffælle, as "a long-haired show-boy's," and that of Sir Charles Bell, as Deaf Burke's. The jury indignant at the oppression of the landlord, the ignorance of the auctioneer, and the desecration of arts gave the sculptor £550 damages

Reduction of Wages at Lowell.

Notice has been given at Lowell that a reduction of wages will soon take place. The Boston Republican says it is to commence on the 20th of November on one corporation, and probably at the same time on the others. The reduction is considerable, 25 to 35 per cent. The speed is to be reduced and the girls are to be made to tend more looms.

The hours of labor should be reduced in preference to the reduction of speed. The very system which the Lowell Companies are about to adopt, is a system which they will yet regret having adopted.

RAIL ROAD NEWS.

Baltimore and Harrisburg Railroad.

A committee has been appointed to receive subscriptions to the capital stock of the Columbia, Marietta and Portsmouth Railroad, the object of which is to furnish a continuous Railroad between Baltimore and Harrisburg, and thus connect the former city with the extending railroad in rapid progress between Philadelphia and Pittsburg. The people along the line of road and its vicinity have subscribed $100,000, together with the stock of the Turnpike Companies, $20,000, leaving $100,000 to be raised at Baltimore.

Hudson River Railroad.

The new contractors have commenced work on the upper section of the Hudson River Railroad which passes through Poughkeepsie. All the sections are progressing rapidly; as soon as right of way is obtained for less than one mile the company will have possession of the entire line to New-York. No part of the road will be put in operation this Fall, on account of the deep cut through Fort Washington Point, near New-York. By Spring the road will be nearly complete to Fishkill Landing, and in May the cars will come to Peekskill. Before the first of July they will reach Fishkill Landing, and will probably reach Poughkeepsie before the close of that month. In the Spring the route is also to be put under contract to Hudson, and the cars may reach that place at the close of next season.

New York and New Haven Rail Road.

In New Haven is to be seen a railroad usurping the place where the sluggish water formerly flowed along the Hampshire and Hampden Canal, and for more than a mile in a circuitous route under twelve bridges through the heart of the city, now may be seen firm rails instead of water, and locomotives driving loaded trains rather than horses tugging away at almost empty canal boats. The trains pass nearly twenty feet below the surface of the streets, and over them are being thrown commodious and elegant bridges. A noble Depot is rapidly raising on Chapel st. where both the New-York trains and those from the interior of the State on the Collinsville Road, will receive and distribute their passengers. The latter Road has been in successful operation some months, and a more admirable structure cannot be found. Arrangements have been made by which the trains over this route will, in a few days, run through directly to Bridgeport, offering new facilities for travel and freight from the interior of New-England to New-Haven and New-York.

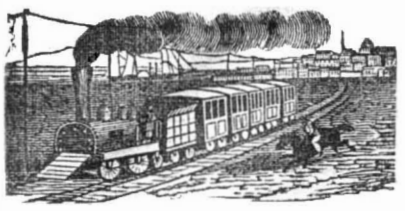
Low Fares Increase Travel and Increase Profits.

When the Lowell and other railroads leading from Providence and Worcester were constructing it was estimated that they would carry forty-five thousand passengers each per annum. By reducing the fare from former prices each road last year carried nearly twelve times as many as the above estimate. This is a very important hint for other roads By reducing the fare you increase the travel and the freight and consequently the profits.

New Rail Road Depot in our City.

It is rumoured that the New-York and New Haven Railroad Company are about to build a splendid depot at the corner of Centre and Canal sts. on the site now copied by the Gas Works. A branch track will be laid down in Centre st. for the use of that road. The property was bought by the company for $75,000.

Passengers for Albany from New York will be able to travel the whole distance by railroad after the first of January next, via Bridgeport, Conn.



The Presidential Election.

Up to the hour of our going to press election returns from over twenty different States had been received in this city by the Electric Telegraph. General Taylor has received overwhelming majorities in almost every State as yet heard from, and his election is unquestionable. The readers of the Scientific American may consider it settled that "Old Zack" is now the President elect. He will be inaugurated on the 4th of March 1849, his term of office expiring in 1853. May he not prove unworthy of the confidence reposed in him!

The Fair of the American Institute.

No. 5.

PREMIUMS AWARDED.

SILVER MEDALS FOR MACHINERY.

Wm. B Leonard, Agent, Matteawan Machine Co. Matteawan, N. Y. for 2d best Steam Engine.

G. W. Fulton, Baltimore, for 2d best Steam Engine and Pump.

Merrick & Towner, Philadelphia, for a Steam Hammer.

Allen & Noyes, Greenbush, N. Y. for best Steam Stuffing Boxes.

West & Thompson, 29 Centre-st. best Steam Coupling Joint.

Nichols & Marsh, Bridgeport, Ct. for 2d best Portable Flour Mills.

Chas. Ross & Co. 38 Broadway, for best Portable Corn Mill.

Chas. Ross & Co. 38 Broadway, for 2d best Portable Mill for Feed.

F. Harris & Son, Brooklyn, for 2d best Smut Machine.

W. B. North, Jersey City, N. J. for best Paint Mill.

C. Jacobs, Brooklyn, for best Rice-Hulling Machine.

O. Snow, Agent, Meriden, Ct. for 2d best Wood-Planing Machine.

G. B. Hartson, 42 Gold-st, for Iron Planing Machine.

G. B. Hartson, 42 Gold-st for best large Slide Lathes.

Harlow Isbill, Meriden, Ct. for best medium size Slide-Lathe.

G. B. Hartson, 42 Gold-st. for best Hand-Lathe.

M. Reynolds, 162 Suffolk-st. for improvement in Drilling-Machine.

S. Mower, Philadelphia, for best Screw-Cutting Machine.

J. A. Fay, New-York, for best Hand-Morticing Machine.

F. & F. R. Taylor, Brasher's Falls, for double acting Smiths' Bellows.

W. & B. Douglass, Middletown, Ct. for improvement in Hydraulic Rams.

James Rice, Pike, Wyoming Co. N. Y. for best Railroad Coupling.

J. Stimpson, Baltimore, for Railroad Coupling.

C. B. Turner, Buffalo, N. Y. for Railroad Brake.

Reese & Hoyt, 69 Frankfort st, for Leather Banding, with improved rivets.

Wm. Kumbel, 33 Ferry-st. for Leather Banding.

J. A. Brush & Co, 83 Pike-st. for 2d best Power Force Pump.

N. Dodge, 634 Broadway, for Balance Pump.

J. A. Brush & Co. 83 Pike-st. for best Hand Force Pump.

New-York Pressed Brick Co. Staten Island, for best Common Brick.

George & Godfrey, Taunton, Mass. for best Fire-Brick.

Judson & Pardee, New-Haven, Ct. for 2d best Stave-dressing Machine.

Wm. B. Leonard, Agent of the Matteawan Machine Co. Matteawan, N. Y. for Shafting, Pullies, &c.

Geo. Page, Baltimore Md. for portable Windmill.

W R. & A. Inslee, Newark, N. J. for Cutting Engine.

E. E. Lewis, 118 East-Twenty-eight-st for Shingle, Heading and Stave Machine.

A. Anson, Waterford, N. Y. for Sash-Moulding Machine.

B. Howard, Brandon, Vt. for Match-Splint Machine.

Thomas J. Wells, N. Y. for Saw-Mill for Slitting Boards.

Evans & Thompson, Paterson, N. J. for Change-Motion for Drawing Head.

Davison, Parks & Woolson, Springfield, Vt. for Cloth-Shearing Machine.

Manhattan Gas Works, 18th-st. for Skeleton Gas Meter.

Solomon Whipple, Albany, for File-Cutting Machine.

Joseph Holmes, Meadville, Pa. for Toggle-Joint Press.

J. S. Foster, New-York, for Rock-Drilling Machine.

W. R. & A. Inslee, Newark, for Tinners' Shears.

S. N. Riseley, 278 Fifth-st, for Dynamical Pulley.

Paul Stillman, Novelty Works, N. Y. for Mc Naught's Indicator.

J. F. Ostrander, 53 Mercer-st. for Machine for making Bullets, Pills. &c.

H. G. Guyon, 97 Thompson-st, for Steam Cotton Press.

Wm. Bennett, N. Y. for Wedge Caulking.

Joseph Dixon, Jersey City, for Black Lead Crucibles.

Fisher & Morris, Newport, Me for an improved Vice.

F. J. Austin, Centre-st. for Book Binders' Shears.

J. B. Carter & Brothers, Boston, for a Coffee Roaster.

Henry Nelson, Third-avenue, for Pavers Tools.

Walter M. Gibson, 349 Broadway, for improvement in Filters.

T. C. Clark, Philadelphia, for Water Filter and Filter Medium.

W. H. Sweet, N. Y. for Croton Filter and Medium.

W. H. Jennison, N. Y. for improved Filter Medium.

Seth Boyden, Newark, N. J. for Rolled Zinc and Spelter.

A. J. Cotheal, 89 Water st, for Zinc.

Joseph Dixon, Jersey City, for Cast-steel.

Rays & Wilcox, Berlin, Conn. for Tinners Tools.

Joseph Dixon, Jersey City, for Pure Iron.

David Pretlove, 24 Thames-st. for Embossing Machine.

W. H. Perry, 82 Canal-st for improved instrument for sweeping circles.

J. Perry, 87 Eldridge-st, for a good Cracker Machine.

Thos. Ledgewood, Brooklyn, for a Side Lever for hoisting and setting large stones.

D. L. Holden, 245 Water-st. for Wright's self-setting Saw Mill block.

N. O. Mitchell, Gardiner, Me. for usefnl machine for turning tree nails.

Chas. Chermock, 54 Cliff-st for improvement in Axletrees.

Chas. S. Collier, Weatherfield, for Self-weighing Scale.

G. W. Coats, Windsor, Conn. for an improved Card Sticking Machine.

Junius Judson, for an improvement applicable to Planing and other Machines.

Joseph E. Andrews, Boston, for an ingenious highly finished Ship's Windlass.

A. Ambruster, 7 Harrison st. for a superior Zilographic Engraving Machine.

Wm. Mariany, Williamsburgh, for superior Sheet Iron Kettles.

J. A. Gawdey & Son, Providence, R. I. for Weavers' Reeds, made by Machinery.

A. T. Williams, for a set of patent Jointless Wire Harness.

Death of Thaddeus B. Wakeman.

On Tuesday last, the 7th inst. Thaddeus B. Wakeman, the Corresponding Secretary of the American Institute departed this life. He was a gentleman of a liberal education, highly respected and beloved by a large circle of acquaintances, who sincerely mourn his death.

Portable Saw Mill.

We have for sale an excellent Portable Saw Mill for more particular description of which see advertising page.

The Best Dog Power.

We saw a few days since at the Cabinet shop of Mr. Joseph Peckover, in this city, a most excellent application of dog power to the propulsion of machinery, which from its simplicity and cheapness of construction could be used to advantage wherever a small power is wanted. It consists of a large wooden drum 11 feet diameter and 15 inches wide, the axle of the drum turning on friction wheels in order to lessen the friction. The dog was placed inside the drum turning it by his weight in the same manner that a squirrel turns a wheel. By the power thus produced Mr. Peckover drives two upright saws for curves, one small circular saw and two turning lathes for wood, but not all at once.—He employs two Newfoundland dogs for his work and has trained them for it admirably. By a word from his master the dog leaps from his kennel in the yard, runs down into the cellar and jumps into the wheel. After working two hours this dog is released by the other, and so alternately through the day. We noticed in our paper a few weeks since the dog power which was exhibiting at the Fair in this city. In that case the dog was fastened by the neck to a circular platform and made to work it around, the operation being much more laborious for the dog and producing less power. By Mr. Peckover's plan the dogs are not fastened and seem delighted at the privilege of turning the drum. At a very trifling cost any farmer can employ his dogs at churning, winnowing, pumping water, turning the grind stone, &c.

Lard Lamps.

We extract the following from a letter from one of our subscribers:—

"I have tried several kinds of lard lamps, but have never been very well satisfied with them. I took a common glass lamp, enlarged the vent hole, and made another one opposite to it, then took a piece of copper wire as large as a large knitting needle bent up like the letter U, and put the ends of the wire through the hole in the top of the lamp (each side of the wick) so as to reach the bottom of the lamp and come up about ½ an inch above the top of the wick where the bow of the wire will be in the blaze of the lamp. This keeps the lard melted nearly to the bottom of the lamp and burns finely, and all the extra cost of the lamp is merely for the wire. Iron wire would answer the purpose but it is not so good a conductor of heat as copper. If this is new or worth publishing, your subscribers are welcome to it. The lard should be partially melted at least when the lamp is first lighted, or it may not burn." Yours truly, L. F. M.

Albion, N. Y.

New Lubricating Oil.

MR. EDITOR.—I take the liberty to inform you that I have discovered and applied for letters patent for a new Oil for Lubricating Machinery, which is far superior to any thing heretofore used, and I am manufacturing it at present. In all the tests that have been made on Railroads and all kinds of machinery it has been found to last in many instances ten times as long as the best sperm oil, and I can and do sell it at about half the cost of the oil now used. They are using it on all the Printing Presses in this city, and is preferred to any oil they ever used. Knowing that you are pleased to hear of any new discovery, and as I consider your valuable paper the Organ of Inventors, I have ventured to inform you of it, and if you wish a few gallons to try on your Press, send me word and I will send it by Express.

Yours very respectfully, P. S. DEVLIN.

Reading, Pa. Oct. 27, 1848.

We should be glad to receive a specimen. ED. SCI. AM.

Low Wages and Short Time.

Speaking of the present depressed condition of American manufactories a reporter of the Dry Goods Market in this city, said in his published report lately, that the manufacturers in order to save themselves, should "reduce the rate of wages and adopt the English system of short time." The dreadful cure, this "English system," is very properly scouted by the working people of America, who rightfully demand that their labor shall not be degraded to the condition of the unfortunate people of despotic countries.

The British West India Mail Line.

This company has declared a dividend of £2 per share for the last six months. From the report made by the stockholders, we learn that the steamers themselves are as good as they were seven years ago, that the loss of profit in the business with the West Indies,—owing to their depressed condition,—has been more than compensated by that with Panama and New Orleans. It is also expected that the New York and Bermuda line will prove profitable. The receipts for the last six months were £216,211. The expenditures, £148,758. The company, in order to get the Pacific trade, have expended $18,000 on the road across the isthmus, and have agreed to spend 3000 more. This sum was to be repaid by a post office privilege granted to the company by the government of New Grenada.

The New York and Panama Line will soon be stepping in for a share of the trade.

Patent Infringement.—Brick Machine.

On the 4th inst., in the U. S. Circuit Court held in this city, Judge Nelson presiding, a suit was brought by Alfred Hall against Nye & Cosgrove and Briggs & Peck, brick makers, Hagerstown, to recover damages for infringement of patent for improvement in the press for making bricks, as to the mode of stopping the machine when obstructions occur. No defence was offered. Verdict for plaintiffs.

It was stated that defendants, since the suit was entered, have become satisfied as to the right of plaintiff, and have ceased the use of the machine, intending to purchase of plaintiff the right to use it in their works. Verdict in each case, therefore, was taken for plaintiff for $50, which established the patent.

Manufacture of Cotton in the Southwest.

An unusual degree of interest is felt just now at the South and Southwest, in the manufacture of cotton. The St. Louis Courier says that a company of stockholders, residing in Kentucky, Indiana, Arkansas, Louisiana and Mississippi, have organized themselves for the purpose of manufacturing cotton at Cannelton, about 120 miles below Louisville. The facilities offered by this location are said to be all that can be asked—land is cheap and abundant, coal exists in almost exhaustless quantities, and there are existing causes that serve to make Cannelton one of the greatest manufacturing points in the Western country, in many other things besides cotton. The capital stock of the company is $500,000 of which it is understood $200,000 will not be put to use, and 20,000 spindles will be started.

The North River Lumber Trade employs about 150 boats and 720 men, and is carried on briskly from the opening of the Canal until the close of navigation. The amount invested therein by New York Lumber Merchants varies greatly. Some use two or three thousand dollars a year and others as much as $150,000 or $200,000. The whole amount taken annually from this city for lumber is between 4 and $5,000.000. A considerable portion is re-shipped to Connecticut, Massachusetts and Rhode Island. In addition to the quantity brought to this city over $1,000,000 worth is annually sold along the River, or sent to different parts of New Jersey and Pennsylvania.

Cheap Postage in France.

The French National Assembly have passed one practical measure which entitles its members to the gratitude of that great people. It has passed a bill for the reduction of postage on inland letters to four sous or cents. The same will go into effect on the 1st of January next. Russia has also established a penny postage throughout her great empire.

The Managers of the American Institute are now looking for a lot of ground suitable for the erection of an Institute building. The Mechanics' Institute will probably unite with the American in the expense and thus have also a permanent location and proper accommodations. Let them purchase a lot in Niblo's Garden.

The Propeller Sarah Sands arrived at this port last Saturday morning from Liverpool, making the passage in 17 days. The time will soon arrive when all our vessels will either be steamships or propellers.

The Electric Telegraph.

No. 4.

In our last we promised to treat of what a "patent covered and what it did not." There are many conflicting opinions respecting what is termed a *result*, that is a certain article made that never was made before. Some believe that a patent for such a result as a *new* shoe or a *new* alphabet, or *new* cloth, is not legally the subject of a patent and that the means only to obtain the same result is valid as the subject of a patent. Our laws however and those of all other civilized countries protect by patent the result as well as the means to obtain it, but this cannot be legally covered in one patent. The result must be a subject of itself and so must the means to obtain it. A result however is very easily obviated for the least change in combination essentially alters the features of a result. Thus the telegraphic alphabet of Morse is the legal subject of a patent, but another person dropping his dash and using the dot, produces a totally different result. We make this remark, because that many have supposed, and it was contended for at the recent trial at Frankfort, Ky. that Prof. Morse could not legally hold his alphabet (*result*) under a patent, Patents are granted for a new principle, and a new combination, to produce certain results. The combination patent is easily avoided, but if the combination is the limit of improvement, a patent for the said combination is just as good as if it was for a principle, for the changes of combination must produce an inferior result, (an inferior article.)

The patent for a principle might be the subject (to no purpose) of a volume. Every patent should clearly specify the principle of invention and for want of this clearness, we have had many law suits. Nothing suits lawyers better than vaguely specified patents—therefore the impropriety of employing that class as agents to make specifications—those murky productions for the honest trade of the gentlemen of the bar.

In respect to different principles of telegraphing we have already specified four that are perfectly distinct, that might legally be held and operated in one country without any just confliction. It is the great fault with many inventors, those that have money, that they are too jealous of inventors in the same field with themselves. This should not be. It is perfectly possible that one might invent something this year, and another invent something in the same line next year that would be altogether superior. Let every one make the most of their invention while it lasts and not be too jealous of being superseded. We express no sympathy for the plunderers of principles by a simple equivalent alteration—these men should be rewarded with a just legal infliction. But inventions essentially different in character to produce like results (results not patented) should not be subjects of angry litigation between different parties.

Prof. Wheatstone in England, and Prof. Morse of America, have been blamed for grasping too much in their claims—claiming in opposition that which they never conceived (*invented*) Prof. Wheatstone has made himself notorious for opposing every electric telegraph for which a patent was requested in England. When Prof. Morse applied for one in London, Wheatstone opposed him—the two Professors were regularly pitted against one another, but Wheatstone the plunderer of poor men's inventions, was victorious and the Professor of painting came off with *flying colors*. We hope that Mr. Morse will not be actuated towards other telegraph inventors, with the same spirit which he justly condemned in Lord Campbell and *Puffer* Wheatstone—that he will in the righteous spirit of equal and exact justice, give sea room to those telegraph inventors which he has calmly declared to be *different* from the *Electro Magnet Telegraph*. Some have endeavoured to detract from the merit of Prof. Morse as the inventor of the Electro Magnet Telegraph, and make him indebted to Dr. Jackson of Boston for all his information, he being a passenger in the Sully with Prof. Morse in 1832, and used to converse with him on the subject. It would have looked more candid if Prof. Morse had mentioned the name of the *passenger* with whom he used to converse on the subject while on his voyage from France in 1832. Yet what of all this, we have no evidence that Dr. Jackson ever constructed an electric telegraph, and although Prof. Henry gives tardy praise to Mr. Morse, the names of great scientific men should not be allowed to weigh as a feather in the balance against a successful inventor but a less distinguished man of science. For more than 30 years Sir Humphrey Davy had the world wide honor of being the first inventor of the Safety Lamp, and it was not till the summer of 1848, that the inventor, Geo. Stevenson the mechanic, was acknowledged before a high Scientific Association. There is another kind of telegraph which we have not yet described, viz. the printing telegraph.—We see that House's has lately occupied much attention—but this is a borrowed invention—essentially so, as we shall prove in another article.

Levelling.

A pole about 10 feet long must be procured and also a staff about 5 feet long, on the top of which is fixed a spirit level, with small sight holes at the ends, so that when the spirit level is perfectly horizontal the eye may view any object before it through the sights in a perfectly horizontal line. If you have to measure the perpendicular distance between the bottom and top of a hill for instance; place the level staff on the side of the hill in such a way that when the level is truly set the top of the hill may be seen through the sights; keep the level in this position and look the contrary way; then cause some person to place the 10 feet staff before the sight further down the hill and looking through the sights to the staff cause the person to move his finger up or down the staff until the finger be seen through the sights and mark the position of the finger on the staff. Keep your 10 feet staff in the same place and carry your level staff down the hill to a convenient distance, then fix it in the same way as before; and looking through the sights at the 10 feet staff, cause the person to bring his finger towards the bottom of the staff and move his finger up or down the staff in the same way until it be seen through the sights and mark the place of the finger. Then the distance between the two fingers' marks, added to the height of the level staff will be the perpendicular distance between the place where the level staff now stands and the top of the hill. The process is perfectly simple, and it will not be difficult to repeat it ottener, if the height of the hill requires it.

This process will give what is called the apparent level, which, however, is not the true level. Two stations are on the same true level when they are equally distant from the centre of the earth. The apparent level gives the objects in the same straight line but the true level gives the line which joins them as a part of a circle whose centre is the centre of the earth. In small distances there is no sensible difference between the true and apparent level of any two objects. When the distance is one mile the true level will be about 8 inches different from the apparent level. This will serve well enough to remember, but more correctly speaking it is 7. 962 inches for 1 mile, and for other distances the difference of the two levels will be as the square of the distance. Thus at the distance of two miles it will be 1+1=2X2=4X8=32 inches.

These circumstances must be strictly observed in the formation of canals, and railways.

Baths in Russia.

In Russia they have Sweating or Vapor Baths which are resorted to by persons of all classes, rich and poor free of expense because these baths are supported and kept up by the government. Here mingle together the beggar, the artisan, the peasant and the nobleman to enjoy the luxuries of a steam or sweating bath in both sickness and health. The method as pursued by them to produce the vapor bath is simply by throwing water on red hot stones in a close room, which raises the heat from 150 to 168 degrees; making when at 168 degrees, above a heat capable of melting wax and only twelve degrees below that for boiling spirit of wine. In this tremendous and excessive heat which on an American would produce suffocation, the Russian enjoys what to him is a comfortable luxury of the vapor-bath, which shows clearly the wonderful force of habit among mankind. In these bath-houses are constructed benches on which they lie naked and continue in a profuse sweat for the lapse of one, and sometimes two hours, occasionally washing or pouring over their bodies warm or cold water. During the sweating stage the body is well rubbed or gently whipped with leafy branches of the birch tree to promote perspiration by opening the pores of the skin. A Russian thinks nothing of rushing from the bath room dissolved in sweat and jumping into the cold and chilling waters of an adjacent river; or, during the most piercing cold to which his country is liable in winter, to roll himself in the snow; and this without the slightest injury. On the contrary he derives many advantages from these sudden changes and abrupt exposures; because by them he always hardens his constitution to all the severities of a climate whose colds and snows seems to paralyze the face of nature. Rheumatisms are seldom known in Russia; which is certainly owing to their habit of thus taking the vapor bath. The great and sudden transition from heat to cold seems to us very dangerous and unnatural; but we have no doubt the Russians owe their longevity their healthy and robust constitutions, their exemption from certain mortal diseases and their cheerful and vivacious tempers, to these baths and their general temperate mode of living.

Oxidation of the Diamond the Liquid in Way.

Professors R. E. and W. B. Rogers, of Virginia, lately published some of the processes by which the diamond may be converted into carbonic acid with only a moderate heat, by the use of simple chemical agents. The processes for oxidizing the diamond hitherto practised was by burning this gem, either in the air or in oxygen gas, or in some substance rich in oxygen, as nitrate of potasa. In all these experimenrs a great heat is required. It is therefore interesting to discover that the diamond may be converted into carbonic acid in the liquid way and at a moderate heat by the reaction of a mixture of bichromate of potassa and sulphuric acid—in other words, by the oxidating power of chromic acid. To succeed in this experiment, it is necessary to reduce the diamond to the most minute state of division A single grain of the gem will suffice for many experiments. In repeated trials more than half a grain has never been used—and clear evidence of the oxidation has been obtained by the evolution of carbonic acid. The bichromate of potash when heated is always found to afford some carbonic acid,—but error is avoided by first heating the acid alone in the retort to above 350°, then adding the bichromate by degrees, and stirring the mixture so as to effect a complete separation of chromic acid A very brisk reaction takes place—much oxygen is disengaged and with it any carbonic acid which the materials themselves are capable of evolving. When no more carbonic acid can be detected by lime water tests, the powdered diamond is carefully added. The evolution of carbonic acid, continues the Professors R., is soon evinced by the growing milkiness of lime water, and this continues slowly to increase as long as there is any free chromic acid in the retort. The chief point of interest in the subject however, is the fact—now published for the first time—that the diamond is capable of being oxidated in the liquid way and at a comparatively moderate temperature—varying between 250 and 440 degrees.

A New Cave Explored.

Professor Carroll, with thirteen pupils of Mercer University explored a second mammoth cave in August last which is entered through Raccoon mountain on the dividing line between Tennessee and Georgia; and which is called the Student's Cave. A communication in the Savannah Republican gives these descriptions:

"The peculiar feature in the cave is that it consists of an irregular passage or entry, with rooms and in some cases suites of rooms, opening at irregular distances on each side. The width of the entry is about twenty feet and the roof varies from five to sixty feet in height. The floor is in some places even though generally it is covered with masses of fallen rock and disfigured by yawning caverns which it required much care to pass over in safety.—The ceiling is in no place smooth, but there hang from it short stalactites, which can be compared to nothing better than a washer-woman's smoothing-irons fastened by the handles to the roof and hanging an inch or two apart.

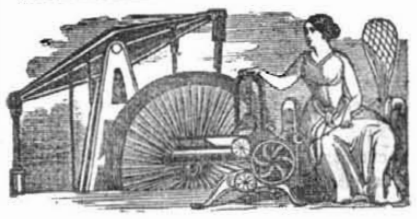
Down this entry this party passed for half a mile until they came to where it swells out to large dimensions and descends very abruptly for quite a hundred feet forming a huge and unsightly chamber. Terminating their exploration in this direction here they retraced their steps. About four hundred yards from the entrance however is to be found the most attractive part of the cave through which they passed. Here a noble and lofty dome with all its proportions perfect spanned the entire passage. On the right to our coming from the entrance and immediately under the dome, about ten feet from the floor, there is a deep recess formed by a bold curve of the wall, on each side. The back ground of this recess is filled up by the appearance of a splendid Grecian temple which would not suffer in comparison with the Parthenon in its best days. Aided a little by the excitement of the visiter and by the shadows cast by the lights the facade is perfect. A little back of the regular line of the wall extends a row of massive fluted columns pediment and all, while in the rear still appears the body of the temple: the door in the right place and of the right dimensions and all the proportions perfect.

On the left of the passage and under the same dome, ascends a regular winding stairway about five feet in width. The walls are of stalactite formation in some places as smooth as glass, in others grooved and in others still plastered, and they glittered in the torchlight light like polished diamonds. When they had ascended this stairway some thirty five feet they came to a wall which closed it up at right angles. In the middle of this wall, and about three feet from the floor, there is an opening about a foot and a half in diameter, through which they crawled. And here they entered into a suite of rooms gorgeous beyond description. The first was a small antechamber about twelve feet in diameter; the walls of stalactite and the floor of stalagmite, and the ceiling so high that with all three of their torches together they could not get a glimpse at it.

On the farther side of the chamber near the entrance to the next room were two splendid columns each about two feet and a half in diameter,—that on the right side seemed to be made of large translucent shell, (resembling those beautiful shells that ornament the mantles of the rich) and so high as to be lost in the darkness above—the one on the left appeared as perfect a Corinthian column, gorgeous capital and all, as art could fashion.—Passing between these and through an arched doorway they entered into another large room; here was almost every variety of stalagmite formation that can be imagined Statues, pyramids and shafts studded the floor in splendid profusion. Gorgeous columns extended up to the ceiling and heavy stalactites terminating below in their curled leaves reached down to within three feet of the floor. One of these when struck sounded like the tolling of a large bell, another gave forth the deep tones of the largest pipes of the organ, not faintly but filling with its loud peal the whole compass of the cavern while its rich note swelled and reverberated in the arches below.

The next chamber seemed to be a regular wardrobe with ladies dresses hanging all around the walls, every fold in the garments being as distinctly marked as if they were veritable dresses. In the fourth room on a smooth place on the wall the party wrote their names and the date of their visit with charcoal, which has doubtless long before this been obliterated. To this suite of rooms they gave the name of Cathedral."

A person describing the absurdity of a man dancing the Polka, appropriately said, that it appeared as if the individual had a hole in his pocket, and was vainly endeavoring to shake a shilling down the leg of his trowsers.



New Inventions.

A New Telegraph.

The Baltimore Clipper says: "Mr. George Mathiot of this city, has made an improvement on the receiving magnet invented by Professor Morse, by two independent and distinct engines or machines at a distant station, using at the same time but a single wire between the places—a result which has been hitherto been supposed impossible to be obtained except by the use of two wires. One of the applications which Mr. Mathiot has made of his invention is the working of two pens on Morse's instrument, by which it is enabled to write nearly twice as fast as with one pen: and instead of the alphabet used by Professor Morse, a symbolical alphabet is formed, quite as distinct and varied as the common English alphabet."

From the above description we would be led to infer that two different messages could be sent upon one wire at the same time, which is an imposibility. Two or three pens can be used with Morse's telegraph and his alphabet is a good one—yet we do not think that his telegraphic invention is the climax, but we would like to know the improvement on the *magnet* spoken of above, which at once doubles the value of Morse's invention.

Improvement in the Manufacture of Iron

Mr. Lorenzo Peibert, of Shenandoah Co. Pennsylvania, has invented a new smelting furnace, which the Winchester Republican says "will make malleable iron from the ore and be a saving of $40 per ton." We are glad to see the attention that is now being paid to improve our iron manufacture. It is time that we were rivalling Europe, if not in the quantity at least in the quality of our iron.

At Harlem in this city, there is an establishment for making steel from iron by a short process—making first good iron from the ore and then converting it into steel. It is said that steel is made cheaper there than in England. We hope this is true, and also that it is better, for it is a fact well known to our mechanics, that the English steel which now is imported here, is not so good as the kind that used to be imported a few years ago Mr. S. Broadmeadow is the gentleman who conducts, and that in a superior manner, the steel establishment at Harlem and he has lately discovered a superlative method of distilling zinc, which must be of great benefit to our country at large.

Improvement in the Deflective Telegraph.

Mr. Holmes, of the Electric Telegraph Co. London, has made an improvement in that kind of Telegraph, which from its extraordinary simplicity connected with its results, is really deserving of notice.

The improvement consists in the substitution of a single small steel lozenge three quarters of an inch long for the two five inch astatic magnetic needles heretofore used and then placing the lozenge between two diamond coils. This form, says the Civil Engineer and Architect's Journal, has the advantage of giving a signal free from the constant vibration of the needle, which is the great fault of the old needle telegraph, and at the same time the battery is reduced to one tenth the number of plates for a circuit of two hundred and fifty miles.

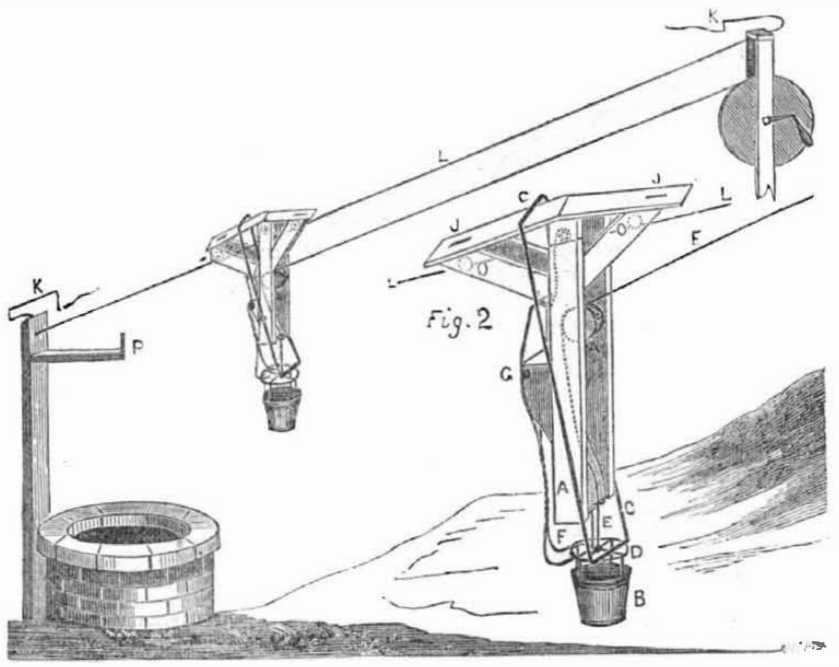
Improved Water Faucet.

George and William Gee, two very enterprising young mechanics of this city have recently invented a Self stopping Faucet, which from its simplicity and cheapness will doubtless come into general use. It can also be applied to Hydrants and is so arranged that no water can remain in the discharge pipe thereby preventing all danger of freezing. Application has been made for a Patent.

THE HYDRAULATOR.

This apparatus is for drawing water from some distance out of a well and bringing it to the dwelling. It is the invention of J. I. & S. P. Cox, Shippinsburg, Pa., and its extreme usefulness will warrant it yet a general employment. By it water can be taken by a female into a house without coming out of doors, and an apparatus of the same kind could as well be used for conveying water from the upper part of a building. Although it looks to be a little complicated in this engraving, yet it is very simple and we believe that after reading the following description any one of our readers will be enabled to make one himself. It can be made very cheap, all the out of the way materials is three pullies, and the rest is a few pieces of wood and some wire.

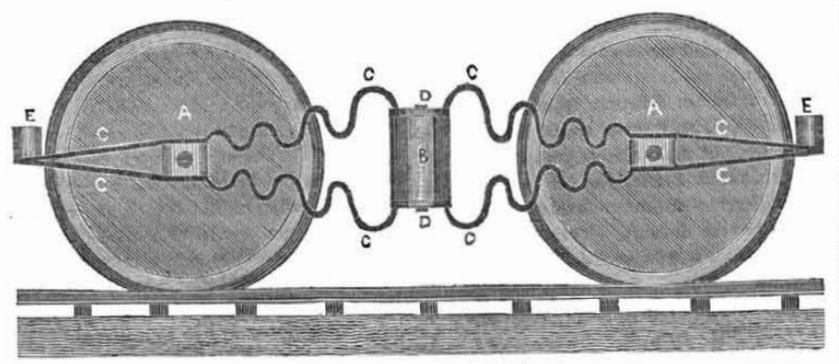
Figure 1.



The principle of this invention is to send the bucket from the house on an inclined rail made of wire or a stout rope, and to have the bucket drop into the well by a cam, and then the bucket to be drawn up to a catch on the sliding frame and the whole apparatus drawn up to the house again by the bucket cord being wound on a pulley. The large pulley and handle to the right above are fixed on a frame placed in any convenient part of the dwelling. Fig. 1 shows the Hydraulator in operation, and fig. 2 is an enlarged view of the moveable carrier parts. L, fig. 1, is a strong wire or rope, fastened into a simple upright pulley frame at the one end and to the top of a post at the back of the well at the lower end. This rope or wire is the inclined rail on which the moveable apparatus travels up and down. K K, are two spring cams, which may be made of wire or wood, to catch into notches J J, see fig. 2, on the top, so as to hold the *carrier* at the top and at the end of L. P, fig. 1, is an upright rod, which throws the bucket catch out of geer with the bucket when the carrier reaches above the well, and the bucket then drops down and is filled with water. A A, is the frame of the carrier. It is made with two pulleys O O, seen by the dotted lines fig. 2. These pulleys run upon L. S, is another pulley for the bucket rope E, B is the bucket over the mouth of which is a slight wicker frame D. C, is a cross rod which moves up and down by the bucket, so as to throw K out of J J, and set the carrier free from the catches. All that is necessary to do this is to turn the pulley above. F, is the bucket catch. It is a prong shaped stick or wire to catch into D, and is fixed on a pivot G, on the frame. This holds the bucket in the carrier, and when it is ungeared by P, the bucket is let down into the well and the carrier held fast by K. When the bucket is lifted up to the bottom of the carrier, one turn more on the pulley lifts C C, throws K out of J, F catches, and away the bucket and carrier comes up the rail. The parts in this engraving are too large drawn in proportion to the size of the apparatus, which can be made slender and neat. The Hydraulator has been used with great satisfaction, and it answers a purpose better than the hydraulic ram.

Measures have been taken to secure a patent.

HYDE'S CURVED SPRING TRUCK.

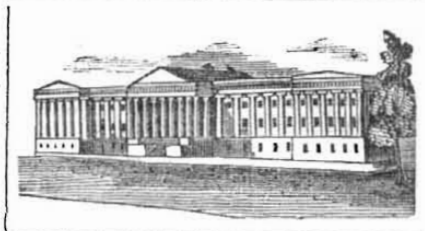


This is a new kind of Truck, invented by Mr. H. T. Hyde, of the city of Troy, N. Y. It presents some new features in principle and construction, well worthy of attention The principle of the invention. is to employ double steel or good iron arch-formed side bearings between the central transverse beam and the journal boxes, so as to accommodate the form of the car itself—the whole body of it—to the turning of narrow curves.

The above engraving is a side elevation.—A A, are the wheels. B, is the central transverse beam. C C C C, are the spring side bearings, and E E, are the front transverse beams.

It is well known that the form of the arch combines the greatest strength with the apparent slenderness of parts, yet from the above we may easily learn that while one of the bearings might be 8 feet long before it was curved, it may be made to be longitudinally on the truck only 4 feet, thus condensing in a most simple manner the lateral strength of 8 feet of iron or steel into 4 feet. A square inch of malleable iron will bear without permanent alteration a pressure of 17,800 pounds. while the direct cohesion of a bar of tilted steel one inch square is 59 tons, therefore a careful attention should be given to this new truck of Mr. Hyde. The springs are broad in comparison to their thickness, so that in the lateral straining when turning a curve they may combine great strength with flexibility.

Measures were taken some time since to secure a patent.



LIST OF PATENTS

ISSUED FROM THE UNITED STATES PATENT OFFICE,

For the week ending Oct. 31, 1848.

To John Turner, of St. Alban's, Me., for improvement in Shingle Machines. Patented Oct. 31, 1848.

To W. W. Riley, of Columbus, Ohio, for improvement in Fastenings for Pantaloon Straps. Patented Oct. 31, 1848.

To Isaac W. Ayres, of New York City, for Water Doors for Steam Boilers. Patented Oct. 31, 1848.

To Livingston, Roggin & Adams, of Pittsburg, Pa., for improvement in Insulating supports for Telegraph Wires. Patented Oct. 31, 1848.

To James Stevens, of Middletown, Md., for improvement in Cooking Utensils for cooking and steaming. Patented Oct. 31, 1848.

To James and John Haworth, of Frankford, Pa. for improvement in Looms. Patented Oct 31, 1848.

To Thomas Marquis, of New York City, for improvement in Fliers for roving, &c. Patented Oct. 31, 1848.

To Nathaniel Oakley, of Babylon, N. Y., for improvements in hanging running stones in Mills. Patented Oct. 31, 1848.

To Stephen B. Cram, assignee of John Johnson, Boston, Mass., for improved Hand Drill. Patented Oct. 31, 1848.

To Timothy D. Jackson, of Brooklyn, N. Y. for improvement in Alloys for Sheet Metals. Patented Oct. 31, 1848.

To Joel Robinson, of Methuen, Mass., for improvement in Shoe Pegging Machines — Patented Oct. 31, 1848.

To Richard A. Tilghman, of Philadelphia, Pa., for improvement in the manufacture of Alkaline Chromates. Patented Oct. 31, 1848.

To William Fink, of Williamsport, Md. for improvement in Saw Mills. Patented Oct. 31, 1848.

To David Hinman, of Brunswick, Ohio, for improvement in apparatus for transmitting Power. Patented Oct. 31, 1848.

To John Mills, of Pitt Township, Pa., for improvement in Wagons. Patented Oct. 31, 1848.

INVENTOR'S CLAIMS.

Metallic Grummet.

E. H. Penfield, Middletown, Conn. Improved metallic Grummet. Patented Sept. 19, 1848. Claims the making a Grummet of a metallic cylindrical tube or ferule, having a solid disk or rim on one edge and a similar shaped solid disk with a ferule made with teeth or points, which two together pass through the cloth and lock in such a manner that the teeth or points may turn over and press upon the cloth to prevent it being strained out and torn or injured by the strain on the sail.

Steam Hammer.

Lewis Kirk, Reading, Pa., for Improved Steam Hammer. Patented Sept. 19, 1848.—Claims combining a horizontal steam engine with the helve of a hammer, by means of an arm and jointed link, or its equivalent substantially as herein described.

Refrigerators.

Thomas B. Smith, Philadelphia, Pa., for Improvement in Refrigerators. Patented Sept. 19,1848. Claims the application to refrigerators of the door-way and non conducting partition, to obtain entrance without affecting the temperature inside, as described, and in combination with said refrigerator, the employment of pipes or valves, to admit cool air into the adjacent rooms.

Railroad Cars.

John F. Randolph, Troy, N. Y. for improvement in Railroad Cars. Patented Sept. 26, 1848. Claims supporting the truck on journals made each side of the wheels on the hubs or short axles, when this is combined with the long axle passing through the hub or short axles substantially as herein described and for the purpose specified.

NEW YORK, NOVEMBER 11, 1848.

Railroad in Broadway.

We perceive that this subject is again brought before the public—and perhaps in a a more tangible form than any heretofore contemplated. It is proposed to lay a double track of cast iron six feet in width, rails and track together, and to run a train up and down every ten minutes. The cars are to be very narrow, and the track is promised not to impede the transit of other vehicles.

We do not see the necessity of having the whole breadth—made of cast iron Broad rails would answer just as well, and could certainly be laid down at far less expence. It seems to us that there is a necessity for some plan of general conveyances to supersede the continual increase of omnibusses which have now become almost a city nuisance. The elevated Railways of Randall and De Witt are objectionable but only on the ground of unnecessary expence and inconvenience in comparison with *terra firma* locomotion. "What is the use" it has been said "of building a road above plain level ground—as reasonable would it be to build a bridge over a level and a dry plain—why not build the railway on the ground?" There is some force in these objections to the elevated railroad, and we cannot perceive any just objections to the laying of two tracks in the centre of Broadway. Carriages and carts would pass up and down on each side of the tracks—those going up on one side, and those coming down on the other. A few years would suffice, in the saving of street repairs alone, to pay for the laying of the tracks.

By such a Railroad the public would be better accommodated and there would not be the jamming and cramming scenes of omnibusses, carts, cabs, and carriages which now so frequently happen in the imperial thoroughfare.

The great difficulty will be in establishing branches. The cost of building a railway in Broadway would be small indeed in comparison with one extending from the Park up Chatham-st. and through the Bowery. The only way to remove this difficulty, would be to have a scale of prices. The main Broadway Road should charge no more than three cents from terminus to terminus, and the branch roads no more either. But we believe it would be about a fair price for the Broadway Line to charge only two cents from Whitehall slip to Canal st. and then the Eastern Lines might charge four cents.

We see no great difficulty in the way of establishing various branch lines of city Railroads connected with some Omnibus branch lines, that would entirely reform (for the benefit of all classes) the whole travelling system of our city. It is certainly no great credit to our city to exhibit the dirtiest streets and heaviest taxation of any other city in the Union. Its expenses for last year were $2,709,452, which allowing our city to contain 400,000 inhabitants amounts to the extraordinary tax of nearly seven dollars per head for every man, woman, and child in Gotham. It is no doubt easy to find fault,—but a different thing to apply a proper remedy, nevertheless it would be saying but little for our city's genius or the spirit of modern improvement, if we conclude to stick in the mud or trudge along to the mill with the corn in one end of the bag and a stone at the other on the balance insurance system. But to our tale—let us have a Railroad in Broadway.

The Planet Neptune.

Two years ago it was announced to the unlettered world that Le Verrier a French astronomer had by the dint of sagacity and calculation alone, discovered a new Planet which was named Neptune. A new planet was discovered, but American astronomers declared that it was not that pointed out by Le Verrier. There has been a controversy on this subject among the astronomers of the two worlds, and various reports have gone abroad which have shorn the French astronomer of no small amount of his sudden and high honors. But we perceive by a discussion that took place at the Paris Academy of Science on the 14th of Sept., that Le Verrier ably confounded Mr. Babinet, another astronomer, who held views opposite to the discoverer of Neptune

The controversy however, is not likely thus to end, but whatever may be the ultimate result, these gentlemen will find that all the rolling spheres are but harmonious instruments that move to praise the Great Architect.

Astronomy is a soul elevating Science. We learn that an effort is making to erect an observatory at Princeton, N. J.; this is a commendable enterprise, and it ought to shame our citizens to adopt some measures to erect one here. The city of Cincinnati is far in advance of New York in this respect—for our own credit this should not be

Prizes at Fairs.---Scientific American.

CAMBRIDGE, Ohio, Oct. 31st, 1848.

MESSRS. MUNN & Co.—Among the premiums awarded by the *Guernsey County Agricultural Society* at its last Annual Fair, were four copies of your valuable paper, the *Scientific American*. You will address them to W. Maynard, James Davis, John Mehaffy and Cyrus Cook, Cambridge, Guernsey Co. Ohio. Enclosed you have $8. Please send from the beginning of vol. 4.

Yours respectfully, C. J. ALBRIGHT.

We publish the above letter for the purpose of making a few remarks on the benefit of awarding such kind of prizes.

A gold medal, a silver medal, a cup, a diploma, may be all very well as prizes in agricultural or mechanical exhibitions, but we confess that in many cases there is no appropriateness in such awards. It is true that they are lasting testimonials of merit, but in fitness they are often of no value. A good book, a periodical of practical and sound knowledge, as awarded in the cases mentioned in the above letter, is of far more real value to many than a medal possibly could be. We do not speak against the awards of medals and cups, by no means, but as our people are a reading people we think that our Agricultural and Mechanical Institutions should at least drop the *diploma*, and award a good book or standard periodical. Although the Scientific American costs only two dollars per annum, yet it is impossible to suppose that among the variety of useful matter contained in our columns, every person who receives a copy will not find something of such personal interest. as will be of more value ten times than the price of the work itself—and beside it is of equal value, yea more, the older it becomes, and we have no doubt but the gentlemen to whom the Guernsey County Agricultural Society awarded copies of our paper, will agree with us in all that we have said.

Mile a Minute Locomotive.

In relation to the splendid Locomotive, the "Camilla," recently built by Messrs. Hinkley Drury & others, Boston, Mass., and which runs 60 miles per hour with ease, we have learned since the notice we published, that the driving wheels are only 6 feet 2 inches in diameter. There is only one pair of them. The Camilla is the first of a new pattern for Locomotives, and it is said will perform still better after having been used for awhile.—Weight with water 20 tons. The establishment of Messrs. Hinkley, Drury & others is one of the largest in the United States, and the work they produce challenges comparison with any in the world.

16 Horse Power Engine and Boiler.

Those of our readers who are in want of a first rate Engine and Boiler of the above power, will do well to read the remarks we made in reference to them under the engraving last week.

Barber's Grist Mill.

In the article which accompanied the cut of this excellent mill illustrated in our last number, we forgot to mention that the mills are made also by the Empire Co. of Troy, and that Messrs. Mathews & Felton of that place, are the sole agents for all territory except the New England States.

For the Scientific American.

Crape Shawls.

The silks, satins and crapes of China are most beautiful; but they are too costly, and too much prized in China, to form articles of any considerable trade with other countries. It is curious, that though the silks and satins surpass the looms of Great Britain and France both for beauty of color and durability of texture, yet the silk velvets are far inferior to those produced in England. The Chinese silk velvets, although possessing much substance, have the peculiarly dead hue of an English cotton velvet, and are totally void of the silky lustre of those manufactured at Genoa and Lyons.

The Canton Crape Shawls are very beautiful, but the real Chinese are not so plenty in our markets as some suppose. Plenty of shawls sold for real Canton crape, are made in Paisley, Scotland, and they successfully rival the best productions of the Oriental loom. There are many who may not know how the Canton crape is made, and a short sketch will not be out of place.

When the crape shawl comes from the weaver's loom, it is perfectly smooth and resembles gum silk cloth. But the threads of which this cloth is formed are made with one thread harder than the other, and for deeper craping the warp is harder twisted than the weft.—The difference of twist in the warp and weft as the crapes are twilled, forms all the crimping of the crape, but not until it undergoes the process of boiling. This is done by boiling the shawls in fine white soap for a considerable time, which removes the gum from the silk and by the warp swelling more than the weft, the shawls come out of the boiler with that fine crisp so much admired. All this crisp can be taken out again by stretching the shawls on stenters—hence in the dressing operation care must be exercised not to stretch them too much.

The embroidery of these shawls is performed after the gum is removed. For this purpose the pattern is printed on the shawls with fugitive blue and the flowers are then wrought with the needle. After this the shawls are sent to the dyer's to be dyed and dressed.—Sometimes they are embroidered before the gum is boiled off, but this is not a good method, as silk is deteriorated in lustre by boiling in soap any longer than merely to remove the gum, and to embroider with spun silk on the gummed fabric, would require the embroidery silk to receive too much boiling, and thus dim its lustre. Dr. Ure in his excellent work, says the shawls are dyed in the *gummy* or *raw state*. This is a mistake—except for a very few colors, it is impossible to dye gummed silk, and besides, the natural lustre of the silk is not exhibited till the gum is removed. More than this, suppose the color to be dyed on the silk in the raw state, the boiling to raise the crisp or crape would destroy all the color on the silk. The whole article in Dr. Ure's Dictionary relating to the dyeing and dressing of Crape, is entirely erroneous.

The use of soap to remove the gum of raw silk cannot be recommended, but it is the best and the cheapest with which we are acquainted. Many of our fair ones will no doubt be surprised to be told, that their crape shawls have been boiled for two or three hours in soap. Many suppose that boiling in soap would utterly destroy any silk fabric. This in a measure is true—the operation is a nice one—but there is not a silk dress worn in our city, that has not in the yarn been boiled in soap.

The reason why the Chinese finished silks have a finer lustre than the English and French, is owing to the gum being removed by a tedious and expensive process of steeping the silks in a cold spirituous liquor. In the raw state, before the gum is removed, the crape is of a dirty yellow color, but the boiling in soap removes the yellow gum and the whitish silk appears. But still it is not yet white. It has to be dyed for this purpose.—Some may think this strange, but it is a practical fact. It takes red, blue and yellow rays of light to form a white ray—a tri-unity, like the great Author who created what Milton terms—

——"Holy light,
Offspring of Heaven's first dawn."

The dyer to make his crape shawls white uses in clean soap for that purpose a little arachil and fine indigo strained through a cloth. These colors mingling with the yellow of the shawl, forms a white, which is further cleared up by the shawl's being washed out of the soap in cold water, and afterwards submitted to the fumes of sulphur in a close room.

Crape veils are very expensive, and containing as they do, so little silk—this seems unreasonable—but the fine crape manufacture is in the hands of a few foreign houses, and the art of dressing the crape is both a tedious and a troublesome process.

In the last volume of the Scientific American, a patent process for dressing fine crape shawls was described. It was to use a small quantity of dissolved gum copal and borax along with liquid glue to stiffen the crape.—This composition, if rightly made and applied, we have reason to know, is good, and is worthy the attention of those in this and other cities of our country whose business is to redress damaged crape.

American Steamers for Liverpool.

There are building in this city at present five steamers of great size to ply between this port and Liverpool. They will all be about as large as the Great Britain and will measure about 3000 tons. It is calculated that two will be ready to commence their trips about the beginning of next summer. The engine for one of the ships now building, is to be made at the Novelty Works, and those for the others at the Allaire Works, and will each cost about $250,000. The cylinders will be 95 inches diameter and have a stroke of 9 feet. The cost of these steamships will exceed $500,000 each. Five steamers of similar dimensions to the above will ultimately complete the line, one being a reserve boat. The keels of the third and fourth will be laid upon the launching of the two now on the stocks.

The whole line will belong to E. K. Collins, Esq. and they are to carry the U. S. Mail.

The Old Cunard Line of Steamers.

It is reported that negotiations are pending for the sale of the four old steamships of the Cunard line to the Austrian Government, and that if the sale be effected these noble ships, which a few years ago opened so important an era in the navigation of the Atlantic and have been so eminently successful in the transmission of the mails as well as thousands of passengers and millions of money between the two continents will be delivered, so soon as four new steamships can be built to supply their places.

Machinery for Mexico.

The entire machinery for two extensive paper mills, one to be located at the city of Mexico and the other at Gaudalaxara, is about to be shipped from Norwich, Ct. A lot of cotton machinery intended for the Gaudalaxara Spinning and Weaving Company is to be sent at the same time.

Back Volumes of Scientific American.

We are constantly receiving orders for the First and Second volumes of the Scientific American, and as we have no complete sets of either on hand we feel it our duty to make a statement to the public, informing them what orders we can fill, and what we cannot, thereby saving them the trouble of ordering what we cannot furnish.

Of the first volume we cannot furnish even a single number.

Of the second Vol. we can furnish all the numbers except 1, 10, 16, and 17 neatly bound for $2,00 or the volume in sheets minus those 4 Nos. for $1,50.

Vol. 3 we are yet able to furnish complete, either in sheets or bound.—Price $2,75 bound or $2 in sheets—accompanied with an index.

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Planing Machines.

(Continued from our last.)

To make, in any piece, a cut of a given depth, which shall not go through, and which I call a score, you have only to adjust to the depth required, the height to which the saw, through its slit, projects above the bench; which is done by making either the bench or the spindle so as to raise or lower at pleasure. If, after having given any such cut, which does not go through the piece, you turn the piece, so as to give it another cut, meeting and making an angle with the former cut, you may thus cut out a portion of the piece altogether, leaving in it the sort of channel which is called a rabbet: by cutting out, on different sides, two such rabbets, you may leave between them a projecting part, such as is called a tongue; and a tenon is, at the end of a piece, the same thing as a tongue on the side.

To cut a parallel sliding groove or channel, you have only to make the circular saw, or (to use the name I call the tool by, wherever its effect depends upon a degree of thickness greater than necessary to give it strength) the circular cutter, of the thickness requisite to form the breadth of the groove; the depth being determined, as before, by the height of so much of the cutter as projects above the bench. If the groove is to be dovetailed, the cutter must be conical at its circumference, that is, the cutter, instead of being square at its edge, must bevel according to the angle of the dovetail; and the bench, or the spindle, must be inclined; or the piece so supported, as that its under surface shall be parallel to the outer edge or circumference of the cutter. If the piece be now advanced against the cutter, one side of the dovetail groove will be formed; to form the other, the piece must be reversed, end for end, and shoved along as before. Another mode of cutting out dovetail gooves may be made by a mandril, turning in a collar, and at the end of it furnished with a conical cutter, the diameter of which, at the farthest end, shall be equal to the breadth of the dovetail, and the sides bevelling according to the angle of the dovetail; suppose the mandril to be placed perpendicularly for example, in which case the cutter itself will be horizontal, with its base parallel to the bench; let that end of the mandril at which the cutter is to be uppermost, the mandril being let through, and the cutter projecting above the bench, and raised to such a height above it as the depth of the dovetail channel to be made requires: the piece now lying flat on the bench, advance it against the cutter, and a dovetail channel will be cut at one operation. It is evident that in this way, whatever be the breadth and length of the groove or channel to be cut in a piece, so much of the stuff by the removal of which the channel is formed is consumed; and the broader the channel, the greater the resistence the cutter meets with, and the greater the force which is required to make it act. To save as much as may be of this force, will be an object in every case; and so it will be to the stuff, where it is of a dear sort, and the breadth of the required channel considerable. To effect both these savings, instead of a thick conical cutter, put on the same mandril a thin saw, forming the base only of the cone. To this thin saw there must of course be a mandril for it to turn upon; which mandril must have some means of making its way through the piece, along with the saw itself, which is mounted on it. This passage may be made by either of two expedients: one is, to give to so much of the length of the mandril as enters the wood, a power of making its way through, for instance, by fluting or forming it into sharp leaves, and thus making it into a cutter in that part; the other expedient is, by a previous operation to form, for the reception of the mandril a preparatory groove or channel, the greater the saving will be in point of stuff, and in point of force; on the other hand, the narrower it is, the weaker the mandril, and the greater the danger of its not being strong and stiff enough to support the saw which turns on it. To obviate this danger, the mandril may be supported by a bar of metal, which by a perforation, transverse in respect to the length of the bar, encloses the mandril up to the very saw, and thus forms a continuation of the collar: this bar may be of any length provided only that its thickness and direction admit of its being received into the preparatory groove, as the piece is advanced against the saw. The bottom of the groove or channel thus being cut, the saw-kerf forming the sides of it may now be made according to the angle required, and two bars or slips will have been cut out entire, one on each side of the preparatory groove; or these two side cuts might have been made at the same time with the middle or preparatory one. A saw or cutter working in this manner, at the end of a mandril, within the substance of a piece, may be called a *root-cutter:* by a root-cutter of this sort, a T shaped channel, used in some cases, particularly in metal, instead of the dovetail groove, may in this manner be formed at once.

Cutting of mouldings.—If the circumference of a circular cutter be formed to the shape of any moulding and projecting above the bench no more than necessary, the piece, by being shoved over the cutter will thus be cut to a moulding corresponding to that of the cutter; that is, the reverse of it, just as a plane iron cuts its reverse; accordingly, teeth of such cutters may be considered as so many plane irons. If a plane cutter, such as that above spoken of for cutting a groove in the breadth of a piece, be made so thick, or, as we might be apt now to say, so broad, or so long, as to cover the whole breadth of the piece, it will present the idea of a roller; I accordingly call it, in this case, a *cutting roller:* it may be employed, and in many cases with great advantage, to perform the office of a plane. The recollection of what has been said of the manner of producing a waving, or winding surface, by a rectilineal reciprocating saw, may be sufficient to suggest the means by which similar effects may be produced, in much greater variety, by a rotary cutter, broad or narrow, plain or formed to a moulding. I shall speak only of the cutting-roller; it will be easy to apply the observations to the other cases. If a roller of this sort be placed with its axis horizontal, and the bench underneath it be made to rise and lower, the bench may be very readily adjusted, so as to determine the thickness to which a piece may be reduced by being passed under the roller. It is to be observed, that where the track of the piece is under the roller, the influence of the rotation, on the advancement of the piece, is the reverse of what it is where the track of the piece is above the roller: therefore if you choose that the advancement of the piece should instead of being performed in a direction the same with that of the rotation, be performed in the opposite direction, the direction of the rotation must be reversed.

Whether the axis be horizontal, perpendicular or oblique, the piece, by being passed against it, so as to perceive its figure, may be made to receive not only a flat and even surface, but any longitudinal curvature or waving, by a compound motion; the bench, during the advancement of the piece, approaching and receding from the cutter; and, by giving at the same time a tilt to the bench, or to the roller, any degree of winding may be given to the surface of the piece. To gain time, cutters may be applied to different sides of a piece at once; and such of them as make parallel cuts, may be mounted on the same spindle; if the cuts meet, a piece of given depth may be slit by cutters of but half the diameter that would otherwise be necessary.

(To be continued.)

Mines of Cinnabar in Upper California.

Rev. C. S. Lyman communicated to the last number of Silliman's Journal a letter dated Pueblo de San Jose, in March last, wherein an account is given of a Cinnabar Mine, situated a few miles from the coast, about midway between San Francisco and Monterey, and in one of the ridges of Sierra Azul Mountain. The mouth of the mine is a few yards down from the summit of the highest hill that has yet been found to contain quicksilver, and is 1,200 feet above the neighbouring plain, and not much more above the ocean.

This mine, known to the aborigines from time immemorial as a "cave of red earth," from which they obtained paint for their bodies, was first discovered to contain quicksilver about four years since, during experiments made by some Mexicans to smelt the ore for the purpose of obtaining gold, which they supposed it to contain. [Several attempts since, to work the mine, have proved futile, until recently.] Mr. Forbes, of the firm of Barron, Forbes & Co, having the present charge of the entire operations, wished to devise some way of extracting the metal without mixing lime with the ore in the 'roasting,' but was unsuccessful. At length a kiln of lime, which occurs in the immediate vicinity, was burned, and mingled with this, the ores yield a vastly larger per centage of metal. In the last three weeks (says Mr. L.) about 10,000 pounds of metal have been extracted with the same apparatus, being a yield of over fifty per cent. Between 15,000 and 20,000 pounds have been extracted in about two months, only six miners have been employed in digging the ore, and the hands of the establishment all told, miners, furnace-men, wood choppers, &c. &c. numbering only a score. The mine is probably yielding a net profit of $100,000 a year, even with its present crude apparatus. With suitable furnaces and iron cylinders or retorts, the mine would easily yield $1,000,000 and upward. The other mines opened in the vicinity have not yet been sufficiently developed to decide upon their character.

SCIENTIFIC MEMORANDA.

FIRE APPARATUS.

A Mr. Phillips, lately exhibited in London in the Vauxhall Gas Company's grounds a gaseous vapor to annihilate fire. A model house and a reservoir of tar were ignited and soon extinguished. A new fire escape was also exhibited whereby a fireman ascended a ladder standing away from a wall, secured the hook of the hose to the topmost round, and then directed a stream of water in any direction

APPARATUS TO MANUFACTURE GAS FROM WATER.

At a recent lecture before the London Polytechnic Institution, a small gas apparatus was exhibited (a patented machine by a Mr. S. White,) for making gas from water and tar or rosin. The invention is considered to be a valuable one. The apparatus consists of three retorts placed in a stove two of which are filled with charcoal and thin pieces of iron, and the other with iron chains hanging from a centre bar. The first two retorts are for the decomposition of water which is regularly supplied by means of a syphon-pipe passing through and into the centre of the retort; the water, in passing through the heated material becomes converted to pure hydrogen and peroxide of carbon. It then passes into the third retort to receive its dose of bi-carburet of hydrogen which is prepared from common tar, or melted rosin or similar substances passing or dropping on the red hot chain from a syphon tube which regulates its supply. This causes the tar, or melted rosin to throw off an abundance of bi-carburet of hydrogen gas.—The gases being mixed in this manner are immediately conveyed into the gasometer for use without any purifying vessels whatever, none being required.

It was stated to the Institute, that gas could be made much cheaper by this apparatus than by the common plans, and we may yet live to see Sir Humphrey Davy's prophecy fulfilled, that "at some future time gas would be generated from water for general purposes, surpassing coal gas in brilliancy and purity."

NEW ELECTRIC LIGHT.

The Electric Light of Mr. Staite, which has already been noticed in the Scientific American, is beginning to come into use in England. Our foreign exchanges say that "a common apparatus will only cost about $100, and it will illuminate the largest and smallest buildings at one-twelfth the price of gas."

This we think must be a favorable calculation. We should like to see this apparatus brought over and tested here. If it is no cheaper than English gas, it would be a great benefit to our citizens The project, however, may be like many others which have come and gone. Experience is the only true judge of value and usefulness.

An elder chap, says the New Orleans Picayune, speaking of his great knowledge of the Western country, the other day, said he had "known the Mississippi river ever since it was a small creek."

Dragon's Blood.

This is a resinous juice obtained by incision from several different plants found between the tropics. It is obtained, in commerce; in three principal parts—in that of oval masses, of the size of a pigeon egg, enveloped with leaves of the pandanus; in cylinders covered with palm leaves; and in irregular masses, marked with impressions of leaves: that in oval masses is the most esteemed. It is often very much adulterated, and other substances are substituted; particularly Arabic and gum Senegal, colored with logwood, &c. Several of these substances may be detected by their dissolving in water, while dragon's blood is nearly insoluble; others require to be submitted to some chemical tests. Madagascar furnishes this resin of a good quality, but so much fixed with foreign substances as to be little used. Dragon's blood is opaque, of a deep redish-brown color, brittle, and has a smooth and shining conchoidal fracture; when in thin laminæ, it is sometimes transparent; when burnt, it gives out an odor somewhat analogous to benzion; its taste is a little astringent; it is soluble in alcohol, and the solution will permanently stain heated marble, for which purpose it is often used, as well as for staining leather and wood. It is also soluble in oil, and enters into the composition of a very brilliant varnish, which is much esteemed by artists. Its quality may be proved by making marks on paper: the best leaves a fine red trace, and commands a pretty high price. It was formerly in high repute as a medicine, but at the present time is very little used.

TO CORRESPONDENTS.

"C. C. of Conn."—You have not stated the question correctly, water will not "move freely" in a canal without a fall or incline—this should be known—but allowing water to run 160 feet and calculating the perpendicular fall 1 foot, it would take 80 seconds, but if the perpendicular fall was 16 feet, it would only take 10 seconds. You must take the square roots from 16 to 1—and use 16 as a centre—thus, if a body falls through a space of 16 feet in one second, how long will it take to fall one foot, allowing the velocities to decrease with the squares of the distance, then divide 160 by the same time of root 1.

"W. M. of N. Y."—You would perceive that we mentioned the crucibles of Mr. J. Dixon, Jersey City. You can get them by writing to the manufacturer.

"J. W. of Ky."—We have received yours and will give it attention.

"M. W. P. of N. Y."—We know of no lecture or course of lectures that was delivered before the N. Y. Mechanics Institute last winter and since published. The lectures delivered last season were not published.

"A. B. of Ohio."—Isinglass is made only from fish. We will in a few weeks endeavour to give you the information.

"E. H. Z. of Pa."—We shall endeavour to publish in the course of a few weeks some articles containing our views upon the subject you mention.

"R. L. T."—We shall send the information you desire in a few days. We are trying to find out the best. $5, all right.

"H. H. T. of Mass."—The Picket machine is sold. We could not give you the name of the correspondent to whom you refer.

"E. G. of Ala."—We intend publishing before long a series of articles of the construction of machinery for grinding grain, &c. which will embrace the information you desire.

"P. S. H. of N. C."—We should have answered your letter before this but have been unable to give you as exact an answer as we desire. You will have a letter from us soon.

"D. W. of La."—We procured a copy of Davis's Munual for you in Boston and sent it to your address by mail last Saturday.

"B. & R. of Mass."—Your letter containing — dollars came safely to hand. We will attend to your request in two weeks.

"D. Wright, Hull Prairie, Perrysburg, Ohio."—Your Scientific American has been sent regularly to Perrysburg. They must be in the P. O. Tell the Postmaster to look them up—7 back numbers. Glad to hear of your welfare.

"D. R. Jr."—We will do what we can for

you though during these hard times you must not expect much. Your inventions seem to be useful, and would be profitable to any one who would engage in their manufacture.

"J. F. H. of Ct."—We do not remember what egg hatching machine you refer to.—There were several here awhile ago, but none now. There is no question as to the practicability of hatching eggs by heat. It was very extensively practised by the Egyptians 3000 years ago. We believe the machines you refer to were warranted, but it took some time for a person to become accustomed to them besides much attention. We like the old plan of brick ovens best, as the bricks retain heat a long time. At Hoboken, near New York, there is a chicken establishment where chicks are hatched by steam at the rate of 300 per day.

"H. W. C. of Mass."—The price you ask is more than we should wish to give for the invention unless the payments could be arranged to suit ourselves. Would you assign one half the whole right for the consideration of having the patent taken out and the prospect of their general introduction.

"M. P. of Mass"—We have an excellent two horse engine and boiler all complete for running, price $210. The amount must be paid down, however. We do not know of any which could be obtained on the terms you mention.

"A. P. F. of N. Y."—Do not think we have forgotten you. Your cuts shall appear very soon—perhaps next week.

"J. G. J. of Me."—We dont know the size wanted. Please send us prices for different sizes as soon as possible.

To Patent Correspondents.

"O. K. of Mass"—Your model will answer as well soldered as if fastened with rods. They will give you a Patent for only what is new, but this does not prevent you using old parts with it. Send the model by Express.

"A. H. of N. J."—When you were in New York a while since to affirm to the Patent papers we made out for you, you will remember you left rough diagrams of three inventions with us. We have since examined them. We like the Blower better than either of the others, though the valve is good. You would not gain much with the engine either in simplicity or cheapness. We should advise you to Patent the Blower.

"M. C. of Pa."—You have no idea how many inventions are lost or rendered valueless by the wrong preparation of the Patent papers. The mere insertion of a single word in the wrong place is sufficient to ruin or so injure an invention as to destroy its worth. Notwithstanding the great number of Patents which we are constantly securing, and with all the experience we have had for years among inventions and machinery, we still make it a point *never to hurry or slight the patent papers of an invention*, no matter how simple Every invention secured by our establishment receives the most deliberate examination—and not until we are thoroughly satisfied that all is *right* do we allow it to go. The result is that inventors have no further trouble and they sell their rights without difficulty.

"L. M. F. of N. Y."—Your contrivance for fastening doors is most useful and convenient. It is better than any thing invented for the same purpose as it occupies less room, is simple and costs but a trifle. We are sorry to say, however, that you cannot Patent it, as a similar thumb screw has long been known. We think a great many could be sold; we have no doubt that we could ourselves dispose of a large quantity. Suppose you make up a gross and try them. They will answer for use about dwellings as for travellers. If our government granted a Patent for an old invention it was through ignorance of its previous discovery.

"J. C. of Pa."—A patent *was* granted to the person you name in 1841. We can send you a copy of his claims for $4. We can obtain for you a copy of his Patent from the Patent Office for about $12, perhaps a little less. This would include copies of the drawings accompanying it. We did not find any description of your invention. You stated in the letter that it was enclosed, but we did not receive it.

"D. D. Y.," "G. & W. G.," "C. E. G." and "A. N. M."—Your specifications, drawings and models were all sent to the Patent Office last Monday.

"S. G. W of N. Y."—Both of your specifications and drawings were finished last Saturday and on Monday were sent to your address by Wells & Co.'s Express. Please make oath to the documents and after signing them as prescribed in the directions sent you, return them to this office as soon as possible.

"G. W. H. of N Y."—Your letter and drawing were duly received. We can do nothing until you send the model. Send $30, the U. S. fee, at the same time.

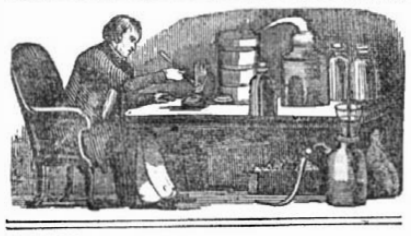
"B. A. of R. I."—You may expect your papers next week.

Machine for Mortising Hubs.

We have enquiries from a Southern gentleman in regard to a machine for the above purpose. Any one having such machines for sale are requested to send us their prices. Letters should be Post Paid.

Engravings on our Front Page.

The angle of the wheels in figure 1, shows the manner in which the wheels can be moved, but while the car is moving on a curve, the front and hind wheels describe (a known mathematical theorum) different angles. This we mention to prevent mistaking the idea of its operation.



For the Scientific American.

New Chemical Law.

No. 8.

It is evident to any one, that if we attempt to classify the elements, by the extension of this law, we must proceed in the same manner that we would to obtain the substances composing an aggregated series in any of the actual examples which we have previously given, admitting that we did not know their composition by analysis, that is, we must arrange into separate classes all substances possessing similar chemical properties, whether they be compounds or not, and then examine the classes, and we will find that they are either aggregated series or their compounds with other substances. In the examples previously given, it may be seen that we have proceeded from the composition of a substance to its chemical properties. Now in order to show the composition of the elements we must proceed exactly the reverse from this, that is, from the properties of substances to their composition. The first thing therefore in order to find the composition of the elements, is to arrange them into classes by the similarity of their chemical properties, and then to take the classes thus arranged and ascertain if their compounds with other substances also possess similar chemical properties. If they do, then the class is complete; but if they do not, then these substances which form the dissimilar compounds must be rejected. After the classes are arranged by this method, we must arrange them in the order of their atomic weights. Their specific gravities, boiling points and all the numerous other conditions required by the law, should then appear in order.

In casting a glance over the list of elementary substances, there are perhaps none whose similarity of chemical properties are more apparent than chlorine, bromine and iodine, which is a fact that no chemist whatever will dispute. In fact there are no substances belonging to the list of elements which possess a closer similarity than these. They must therefore according to the conditions of the law, belong to an aggregated series. Upon examining their oxygen acids, however, another substance will be found belonging to the same series, which is nitrogen; this must evidently belong to the same aggregated series, as every chemist is well aware of the close similarity of chemical properties between the nitric, chloric, bromic and iodic acids. Oxygen in its manner of combination, closely resembles chlorine, bromine and iodine but upon the examination of their similar compounds the similarity is not perfect; but it strongly resembles their hydrogen acids in its combinations. By this method of proceeding we obtain for an aggregated series. the following substances, viz. nitrogen, chlorine, bromine and iodine. If we arrange them therefore in the order of their atomic weights we shall obtain the order of the series. The following example shows them arranged after this order, and also gives their specific gravities, &c. showing that they actually conform to the condition of an aggregated series.

	At. w't.	Sp. G.	B. Pt.	Sp. G. Vap.	
Nitrogen	14.12			.976	gas.
Chlorine	35.42	1.33		2.470	gas.
Bromine	78.40	2.97	116°	5.393	fluid.
Iodine	126.60	4.94	347°	8.707	solid.

What a perfect example of an aggregated series is the one above given! agreeing in every particular with the numerous conditions required by the law. The specific gravities, boiling points, and the specific gravities of their vapors are in a regular increase. By calculation it may be seen that the specific gravities of their vapors are directly proportional to their atomic weights. They also increase in density, the first two being gases; the third a fluid, and the fourth a solid, which is according to the requirements of the law; and all this complete classification derived merely by the similarity of their chemical properties. We know, therefore, that they must all be derived from the aggregation of one radical. By comparing the atomic weights with each other, a simple ratio is found to exist between them; thus the ratio between nitrogen and chlorine is, as 2 is to 5; between nitrogen and bromine as 2 to 11; and between nitrogen and iodine as 1 to 9; by taking therefore the atomic weight of the radical 7.00, we will have the following close agreement between the atomic weights of these substances, the one column calculated by this law, and the others by actual experiment.

	By Calculation.	By Experiment. Kane.	Turner.
Nitrogen	7X2 = 14 00	14.00	14.15
Chlorine	7X5 = 35 00	35.47	35.42
Bromine	7X11= 77.00	78.39	78.40
Iodine	7X18=126.00	126.60	126.30

Thus by proceeding with the elements in exactly an opposite method to the manner of illustrating a series of known composition, we arrive at these results. Thus in organic chemistry we form a series by their analytical composition and which consists of substances possessing properties; but with the elements we infer their composition by a knowledge of the chemical properties which an aggregated series should possess. S. N.

Bridgeport, Conn.

Art of Lackering.

We have seen many receipts for making lackers but the two following are the cheapest and answer all the purposes necessary for brass goods; particularly as they can be used when necessary along with any of the colouring liquids, directions for making which we shall also give. We shall first give a receipt for making.

COMMON LACKER FOR BRASS.

And in order to prepare this properly, it is necessary to select the best seed lac which can be procured, which must be washed in water and then dried and beat in a mortar to a coarse powder. Dissolve six ounces of this powder in two English pints of spirit of wine. They must be both put into a tin or glass bottle, which will hold nearly double the quantity meant to be prepared. Shake the bottle well, and then place it in a warm situation, near a fire or stove, which will hasten the solution. Shake the mixture occasionly, say every three or four hours, for the first and second day; allow it to stand still for twenty-four hours more, when the insoluble portion of the lac will have fallen to the bottom, then gently pour off the pure part into a clean bottle, and it is fit for use. This lacker will answer for all kinds of common brass work, tin plate, block tin, &c. It has a redish yellow colour, which may be heightened at pleasure by laying on two or more coatings. Its colour may likewise be easily varied by the use of the colouring solution to be afterwards described. When this lacker is used as a varnish to bronzed work it gives it a brownish coloured ground. The only other lacker we mean to describe, is a

FINE PALE LACKER,

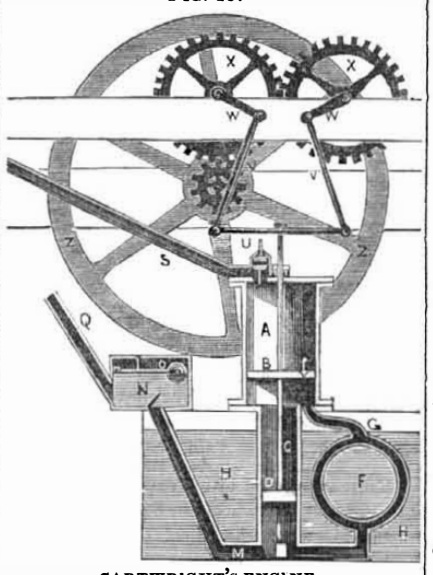
which is prepared with shell lac, instead of seed lac, and with highly rectified spirit of wine. The most transparent part of the shell lac must be selected, and it must be washed in clean water. It is then allowed to dry, and afterwards pounded into a coarse powder. Of which let ten ounces be taken and mixed with two English pints of highly concentrated spirit of wine or alcohol. The mixture is put into a glass bottle, capable of holding as in the former case. about twice the quantity wished to be made. The bottle must then be stopped up, and placed in a warm situation, and shaken, as in the former instance. When the solution is completed the clear part is to be gently poured off, and the remainder filtered through a sheet of strong blotting paper. This must then be added to the portion first poured off, and the residium which remains in the paper is then to be thrown away.

Both lackers must be preserved in a close bottle; and if properly made, and kept from the air, either of them will keep for years, and still be as good as ever. The last described lacker, when used without colouring, is scarcely seen upon varnish or dipped brass, but it will preserve it for many years, and prevent it tarnishing.

History of the Rotary Engine.

Prepared expressly for the Scientific American.

FIG. 15.



CARTWRIGHT'S ENGINE.

This is a most ingenious engine invented by the Rev. E. Cartwright, in 1797. His object was to procure a tight piston and a condenser in which the steam was exposed to a large surface of water.

The condensation is effected by two metal cylinders, placed one within the other, and having cold water flowing through the inner one, and enclosing the other one, and thus the steam is exposed to the greatest possible surface in a thin sheet. Mr. Cartwright likewise has a valve in the piston, by which a constant communication is kept up between the cylinder and condenser, on either side of the piston, so that the condensation is always taking place, whether in the ascending or descending stroke. By this contrivance, steam that may escape past the piston will be immediately condensed, and the vacuum thereby preserved. This was considered to be a decided advantage over the general mode of arranging the valves, which does not always provide for the restoration of a vacuum destroyed by the imperfection of the packing.

"The piston B moving in the cylinder A, has its rod prolonged downwards; another piston D is attached to it, moving in the cylinder B, and which may be also considered as a prolongation of the steam cylinder. The steam cylinder is attached by the pipe G to the condenser by coming in contact with the cold side of the condensing vessel. The water of condensation falls into the pipe E. To the bottom of the cylinder I, a pipe M is carried into a box N having a float-ball O, which opens and shuts the valve P, communicating with the atmosphere: a pipe Q is also fitted to the box. There is a valve placed at I, opening into the cylinder C; another at N, also opening, upwards. The pipe S conveys steam from the boiler into the cylinder, which may be shut by the fall clack R. K is a valve made in the piston B.

"In the figure the piston B is shewn as descending by the elasticity of the steam flowing from the boiler through S: the piston D being attached to the same rod is also descending. When the piston B reaches the bottom of the cylinder A; the tail or spindle of the valve K being pressed upwards, opens the valve, and forms a communication between the upper side of the piston and the condenser; at the same moment the valve R is pressed into its seat by the descent of the cross arm on the piston, which prevents the further admission of steam from the boiler; this allows the piston to be drawn up to the top of the cylinder, by the momentum of the fly-wheel Z, in the non-resisting medium. The piston D is also drawn up to the top of C, and the valve I is raised by the condensed water and the air which have accumulated in E, and in the condenser G. At the moment when the piston has reached the top of the cylinder, the valve K is pressed into its place by the pin or tail striking the cylinder or cover; and at the same time the piston B striking the tail of the valve R, opens it; a communication is again established between the boiler and the piston, and it is forced to the bottom as before. By the descent of the piston D the water and air which were under it in the cylinder C, being prevented from returning into the condensed cylinder by the valve under I, are driven up by the pipe M, in the box N, and are conveyed into the boiler again through the pipe Q. The air rises above the water in A; and, when by its accumulation its pressure is increased, it presses the float O downwards; this opens the valve P, and allows it to escape into the atmosphere."

This machine exhibits much ingenuity and it gave considerable satisfaction when it was tried at Horsleydown, England, but the mode of condensation is not half so good as in the common way of bringing the steam in direct contact with cold water.

Gold in Canada.

Professor B. Silliman, Jr. has published a brief account of his examinations of masses of gold found in the Valley of the Chaudiere, Canada. The lumps are worn smooth, as is usual in alluvial gold, but fragments of quartzose gangue could still be detected in some of them. They were firmly imbedded in what appeared to be slate, but which is probably a concrete of detritus cemented by oxide of iron. Chromic iron, titaniferous iron, serpentine, spinel, rutile, and talcose rocks remind us very strongly of the mineralogical characters of the Russian gold regions, and their occurrence with the gold in Canada certainly affords favorable grounds for the hope that this may become a rich auriferous region. A few tons of gravel has been washed in a rude way with the Berks rocker, which have yielded about $4 of gold to the ton of gravel.

Cholera.

For the cholera and cramp in the stomach, take a piece of saleratus about the size of a large hazelnut, moisten it a little with water, pour upon it a wine glass full of the best vinegar, and drink it while in a state of effervescence. This simple draught it is said cured many violent cases of cholera during its last visit to this country, and recommends itself as being within the reach of all.