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USEFUL RECEIPTS.

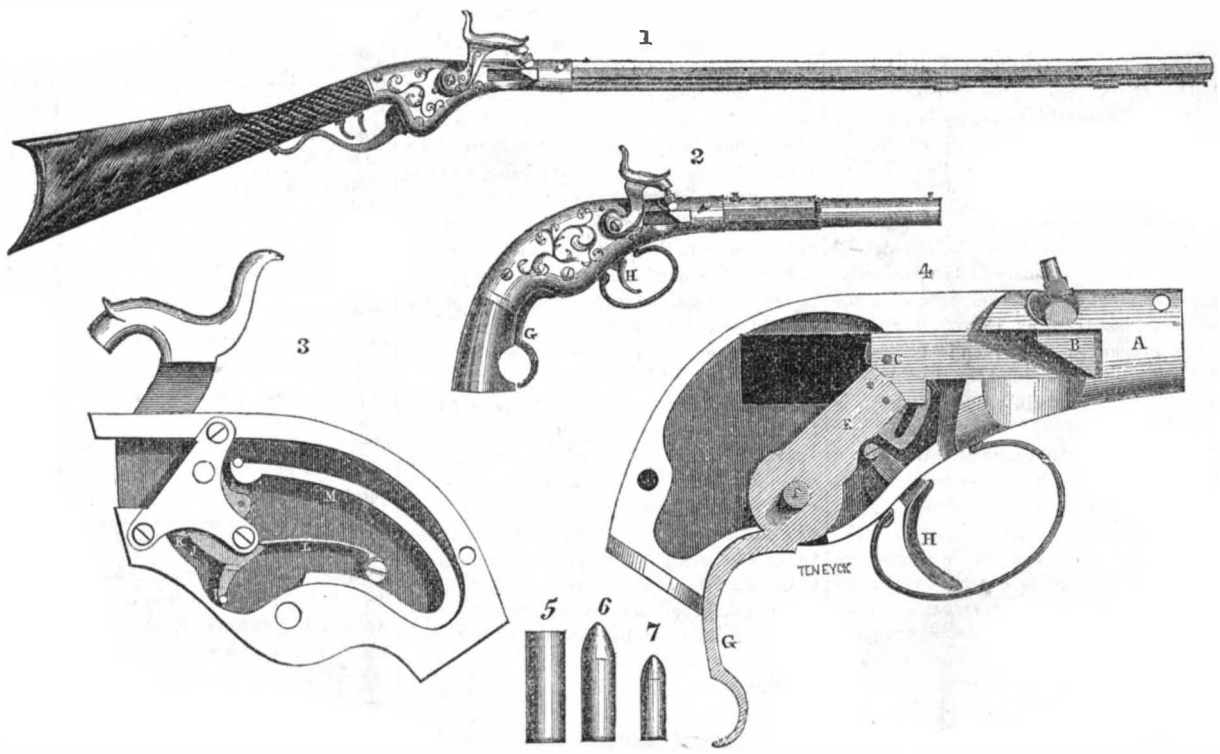
Improvement in the Production of "Bleu de France" on Wool.

The method now employed for producing "bleu de France," consists in boiling the wool in a bath containing ferridcyanide of potassium, an acid and chloride of tin, until a pure blue is produced. During this process a large amount of cyanogen is lost as hydrocyanic acid. To obviate this loss the process has been so modified as to precipitate the whole, or the greater part, of the cyanogen upon the fibres of the wool, in combination with iron. This object may be accomplished by adding a salt of iron to the bath, by preference the sesquichloride. The dyeing is performed as follows:—The ferridcyanide of potassium is first dissolved in the bath, then a small portion of the acid to be used, and lastly the chloride of tin and iron. The liquid is now clear, and has a brownish color. The wool, well washed, is put in while warm, and the bath heated to boiling. The wool at once takes a dark green color, and, after adding the remainder of the acid, becomes, on further boiling, a beautiful blue. In this manner, a given shade of color was produced with 25 per cent. less ferridcyanide than in the usual process. Experiments undertaken to ascertain the best proportions for adding chloride of iron, proved that the maximum effect was given by employing chloride equal to half or three-fourths the weight of the ferrocyanide. A larger amount gave a fainter color. The chloride was solution of iron in muriatic acid, through which chlorine has been passed. Less acid is here required than in the common process, and the tartaric proved most satisfactory. The ferridcyanide used must be perfectly free from ferrocyanide, otherwise the addition of sesquichloride of iron would determine a precipitate of Prussian blue.

[The above is from the "Notes by a Practical Chemist" in the "London Artisan." The author of said notes appears to be well posted up in applied chemistry, and often supplies very excellent articles. The article above is a description of a modification in dyeing the "Royal Blue,"—old Prussian blue. The common method of dyeing this color, is to give about one ounce of the yellow prussiate of potash to one of wool, along with an ounce of tartar and one ounce of the chloride of tin.—These substances are put into the dye kettle at 100° dissolved, and then the wool is put in and the liquor brought up to 212° when the goods are taken out and about the same quantity of the chloride of tin added; when the goods are again entered and the liquor brought to a boil, when the beautiful rich blue soon appears. Logwood added to the liquor makes a dark deep blue. Some recommend preparing the goods by boiling them first in a weak solution of the nitrate of iron, then washing well for the process described.

In Prussia a patent is granted only for six years, and it must be put in operation six months after having been granted.

MARSTON'S BREECH-LOADING FIRE-ARMS AND PATENT CARTRIDGE.



The annexed engravings are views of improvements in breech loading fire-arms invented by Wm. W. Marston, of this city, and for which a patent was granted on the 8th of January (1851,) also the cartridge for such fire arms, invented by Marston & Goodell, patented on the 18th of last May (1852.) Figure 1 is a side view of Marston's breech loading rifle; figure 2 a like view of a breech loading pistol; figure 3 is an inside view of an improved gun-lock; figure 4 is an interior view, showing the patent breech; figure 5 is a side view of the shell of a patent cartridge, and figures 6 and 7 are upright views of two cartridges of different sizes. The same letters refer to like parts.

It is a most superior and convenient breech-loading fire-arm, and a very brief description will explain it to any person. A, figure 4, is the butt of the barrel, which is let into and secured in the stock; B is the breech bolt. It is both ramrod and breech at the same time, and in this consists one of its excellencies. This breech is now pushed close to the butt of the barrel and closes up the orifice of the bore. To load the rifle apply the hand to the lever, G, and push it forward towards the trigger, H, and the breech, which is a sliding bolt, will be drawn back into the end of the dark recess exhibited, and expose the chamber for the reception of the cartridge. The cartridge, figure 6, is simply laid in this chamber (which is then open before, as it is now behind the breech bolt in figure 4,) and the said breech bolt is made to force the cartridge into the bore of the barrel by drawing back the lever, G, into the position shown in all the figures. The rifle or pistol is then loaded, and with a cap on the nipple, is ready to be discharged. This is certainly a very simple mode of loading a rifle or pistol, and can be done nearly in a second of time. The manner in which the breech-bolt is operated and maintained snugly in its place exhibits great skill and ingenuity. The inside of the loading lever, G, is a small arm, E, which forms part of said lever (which works upon the fulcrum or axis, F,) and on its extremity is a cam groove: a pin, C, in the back end of the breech-bolt, B, passes through this groove, therefore, when the said breech-bolt is pressed close up to the ball in the barrel bore, the end of it at C, is in the same position and combination of arrangement, as the keystone of an arch, to receive the backward force of the discharge, in the same manner as pressing upon the apex of the arch. The combination is an ingenious mechanical device and arrangement. A small round part in front of B, fits behind the cartridge and enters the bore of the barrel snugly, so that it is impossible for any leakage of flame or powder to take place. A small hole is drilled through the centre of the breech bolt, which communicates with the priming hole of the cap nipple to ignite the powder in the barrel. This sliding breech bolt along with the loading lever is a very strong arrangement; no charge of powder can move it in the least.—The loading is always uniform without trouble or variation in the result.

CARTRIDGES.—The cartridge is composed of the shell, 5, in which the conical bullet as shown in figure 6 is placed and cemented and the rest filled with powder. The butt of the cartridge is a disc of leather with a small hole in its centre, to let the flash of the priming cap pass through the priming hole into the powder. The edges of the leather disc are greased, and the disc of one cartridge is driven out by the bullet of the next cartridge, as the said part of each cartridge is left behind. Every succeeding cartridge, therefore, by driving out the previous leather, cleans out the barrel, so that rifles using such cartridges never require to be swabbed out, the barrel will shine bright inside after firing a thousand shots.

LOCK.—The lock is of the common, simple, and excellent kind, but as applied to this rifle, it affords the means of strengthening the small three legged brace plate screwed over the tumbler which operates the hammer. M L are the springs abutting on the tumbler, into the the notches, K, of which the trigger latch, I, catches. The two sides of this lock are raised flanges, and thus it differs from the common lock, inasmuch as the springs, &c., are contained in it as in a box; the common lock is let into the stock; this one has but to be screwed to this stock, which differs from any other. The cartridges are an excellent invention, and the principle of thus loading at the breech is certainly the most simple and best yet presented to us.

Rifles, pistols, and shot guns are now manufactured on a large scale, under the eye of the inventor, a practical gunsmith, in the factory on the corner of Washington and Jane streets, this city. No less than 90 hands are employed continually, and rifles from $25 to $100 are constructed. This rifle will no doubt arrest the attention of Mr. J. Chapman, author of "The American Rifle." The question of good fire-arms has been an exciting one for some time, and at the present moment this rifle of Mr. Marston is creating quite a stir in the capital of France, where Mr. Molton has been astonishing the Parisians with its excellent qualities in rapidity of loading, length of reach, and accuracy of aim. We have no doubt but the breech-loading fire-arm will yet supplant the muzzle loading kind entirely; why should the ball be rammed down from the top of the barrel to the bottom to be driven back the old road again? It is not reasonable; no scientific argument can be adduced in its favor, but plenty against it.

These rifles can be seen at the store No. 205 Broadway, this city.

An Extraordinay Lamp.

Among the number of patents recently taken out in England is one by E. Whele, for a candle lamp of very novel character. The lamp has a dial or clock face, and, as the candle burns, the hands mark the hours and minutes correctly, and a hammer strikes the time. As a chamber-light for a sick room, it marks the time, and can be set to strike at any given periods, when the patient requires attention. As a night light, it marks the time on a transparent dial, and rings an alarm at any stated period, and in ten minutes afterward extinguishes the candle, or will continue to strike every second until the party gets out of bed and stops it; and, if a very heavy sleeper requires to be roused, it will fire off a percussion cap. As a table lamp it marks the time and strikes the hours, and has a regulator and index, by which may be ascertained the amount of light and economy of consumption of the various candles of different makers.

Gas Explosion.

A terrible explosion occurred at the Woonsocket gas works, on the 31st ult., by which two men were shockingly burnt, and a portion of the works completely destroyed. There was a leakage of gas in the purifying house, and the watchmen incautiously went to the door with a lantern, and probably entered or were about to do so, when the gas ignited and a terrible explosion ensued. The building, which was of stone, was blown entirely to pieces.

MISCELLANEOUS.

[Reported expressly for the Scientific American.]

Lectures on Chemistry.---No. 3.

[An abstract of a Lecture on the Atmosphere, delivered before the Mechanics' Institute, at Cincinnati, Ohio, by Prof. Chas. W. Wright.]

The following diagram may be taken by representing the average composition of the air:

	By volume.	By weight.
Oxygen,	20·55	22·76
Nitrogen,	78·16	76·15
Vapor of Water,	1·25	1·03
Carbonic Acid,	0·04	0 06
	100 00	100 00

Besides the above-mentioned constant ingredients, the general atmosphere is probably never free from the presence of minute amounts of ammonia, probably the carbonate, iodine, and ozone.

The proportions of oxygen and nitrogen, are generally the same from whatever locality the air is taken for analysis, but from some recent researches on the composition of the atmosphere, instituted by Dewey, it appears that the proportion of oxygen is greater in air taken from the surface ot the sea than it is over the land. The difference, however, is very slight.

The quantity of the vapor of water in the atmosphere varies with the temperature, being greater in summer than in winter. In summer the absolute amount of water in the air may be very great, and yet the atmosphere will appear dry, from its capacity for moisture, being increased by the elevated temperature; and in winter the air may appear moist from its capacity for the vapor of water being diminished by the low temperature; the relative amount of moisture in the last case being great, but the absolute quantity much less than when the temperature is higher. The moisture ot the atmosphere sometimes exists in the form of vesicles, and when at great heights constitutes clouds; when near the surface of the earth it is called fog. The only difference, then, between a cloud and a fog, is, that the latter is in contact with the surface ot the earth, and the former is high up in the atmosphere. These vesicles are formed whenever the air is highly charged with moisture, and has its temperature suddenly reduced. This is seen when the warm moist air of the Gulf Stream is cooled off the Banks of Newfoundland, where probably the tog is more dense than in any other place in the known world. In the fall and spring navigation of our western rivers is frequently interrupted by dense fogs. In the fall the land becomes cold by radiation sooner than the water in the river, and the capacity of the air over it, for moisture, diminishes, consequently it condenses the moisture, which is held in transparent solution over the water, producing a fog. In the spring, on the contrary, the land becomes heated sooner than the water, and heats the air in contact with it, increasing the amount of moisture in it, which, as it comes in contact with the cold water, is condensed as vesicles of tog. Thus we see that the fogs of spring and fall are not produced in the same mannner.

The amount of carbonic acid in the atmosphere varies; thus, it is greater in winter than in summer, it increases in dry weather, and is greater during the night than during the day. On high mountains and elevated situations, it is in greater abundance than in valleys and on plains. After a shower of rain it is less in quantity, being dissolved and carried to the earth. In the summer, when the sun is above the horizon, it is abstracted from the atmosphere by the green matter of the leaves of plants, and an equal volume of oxygen returned to the air in its stead, and hence its didiminution at that season of the year. The carbonic acid is a no less important constituent of the atmosphere than oxygen, for without it plants cannot grow, it being the tood of that class of organized beings.

It becomes a question, as the above-mentioned substances are of different weights or specific gravities, why they do not separate from one another in the order of their densities, forming regular strata—the lighter gas resting upon the heavier? The reason why it does not occur is, because all gases, so to speak, are soluble in one another; in the same manner as alcohol and water, which, when mixed, have no disposition to separate, although water is much the heavier body. This mingling of the gaseous elements, in the atmosphere is called diffusion, aud if it were not for this very important law of the gases, a city like that of Cincinnati would, in the course of a few hours, in the winter time, be entirely submerged in an atmosphere of carbonic acid gas, or "choke-damp," or "the damps," as it is commonly called, which is the gas that suffocates persons descending into wells and coal pits.

The atmosphere possesses within itself the means of its own purification, and converts all decomposing organic matter into carbonic acid, water, ammonia, and nitric acid. Ozone is probably the principal agent which accomplishes these very important transformations, for it is the most powerful oxydizing agent in chemistry, attacking and destroying all organic matter. Thus, then, by the action of the green matter of the leaves of plants, the law of the diffusion of gases, and the oxydizing power of ozone, the atmosphere is kept in a state ot eternal identity of composition.

Hydraulic Rams.

Messrs. Editors—In No. 7, page 53, of the Scientific American, you appeal to your Pennsylvania friends, by whom you doubtless mean Mr. Birkinbine and myself, to answer a communication you received from J. D. Rice, of Philadelphia; I have waited until this time to see what reply Mr. Birkinbine would make to this appeal, but as he has made none, I feel compelled, in self-defence to state how far this commnnication has any reference to me. As to the ram at Naples, N. Y., I never had any thing to do with it, and the first intimation I ever had of its not succeeding, was through the communication of Mr. Rice. All that I had to do with the ram at Girard College, was to calculate and make a draught of the curve of quickest descent for the driving pipe; this I did at the request of Mr. Henry Tatham, who took a deep interest in the concern, and recommended the works to be erected, and through whom I sent the calculations and draught to Mr. Birkinbine, who, I infer from letters I received from him afterwards, laid it out accordingly. I understand, by those who ought to know, that this ram was discontinued only on account of the feed-water becoming too small for the increased demand, and not to anything depending on either Mr. Birkinbine or myself. If I have stated, above, anything incorrect, Mr. Birkinbine can correct me. Joseph C. Strode.

Remarkable Escape.

The Reading (Pa.) Journal states that a young man of that borough, a printer, while paying a visit to certain iron ore mines in that vicinity, undertook to descend a perpendicular shaft, some eighty-five feet to the first landing, by means of a bucket and windlass. When let down, however, about ten feet, the bucket struck an obstruction, and was suddenly overturned, throwing the young man out, but fortunately feet foremost, which position he kept the whole seventy-five feet to the bottom, striking upon some boards covering a deep pit of water, which broke his fall and saved his life. He was slightly scratched and bruised by striking the sides of the shaft, but was otherwise unhurt.

Steam Fire Engine.

The municipal corporation of Cincinnati have just had constructed for use in extinguishing fires, a steam fire-engine; and at a public trial of it it has proved entirely successful. It throws six streams of water by steam power, works constantly, and steam can be generated in five minutes, and kept up without difficulty for any length of time. It is drawn by horses, assisted by the power of the machinery.—[Exchange.

[Mr. Ericsson constructed such an engine for this city years ago: it is illustrated in Ewbank's Hydraulics, and there was one illustrated in our last volume.

The Fire Telegraph of Boston.

The new Fire Alarm System in Boston does not work well at all. The Secretary of the Board of Engineers sent a communication to the Common Council that it is an entire failure, or "a miserable failure," as one of the members termed it. The communication was referred to the Committee on the Fire Department. The system will no doubt be abandoned at once.—[Lowell Courier.

[This is bad news; we are not prepared to say a word in comment, as it is a question of fact. A Police Telegraph—a visual one—is soon to be erected in New York, by Robertson & Miller, upon the principle, we believe, of Bain's Railroad Telegraph.

Manufacture of Iron--- New Process for Making Wrought-Iron Direct from the Ore.

In the process of extracting iron from the ore, although an object of the utmost consequence, the aid of science has never been employed to the high degree that its manufacture would appear to require:—such as it was in the days of our fathers, such it is now, few or no material changes having been made in the mode of making iron from the earliest periods of the art. Considering the vast increase in our knowledge of chemistry during the last half century, it is a great reproach to the iron masters of America and England, that while all other classes have made such rapid strides in the onward progress of improvement they alone have remained quiescent, content to go on in the same hum-drum manner from one generation to another. This apathy, we are glad to find, has been at last broken into, and a new era of iron-making is about to be inaugurated, in which, we are proud to say, our country will take the lead. A new process for making wrought-iron direct from the ore, independently of the usual introductory melting into pigs, has been discovered by Mr. Jas. Renton, of Newark, N. J., who has taken measures to secure a patent for the same. A company, with a capital of $100,000, have been formed for the purpose of carrying on the manufacture, and buildings have been in part erected on the Passaic River, at the foot of Parker street, Newark, where the process has been now in successful operation for several weeks. The results of these experiments have been such as are fully conclusive ot the advantages offered by this new method: a good quality of wrought-iron can be made direct from the ore, by which an immense saving in the ordinary manner of using pig-iron is effected.

The process is founded upon truly scientific principles, and supersedes the necessity of previously melting into pig-iron, as the ore can be made immediately into blooms, an advantage which will be immediately appreciated by all interested in the manufacture of iron. We have personally visited the place and can, therefore, speak more confidently on the subject; during our stay we saw the operation carried on, and marked the time required for making the iron, which was at the rate of a ton per day, of twelve hours,—3 blooms of over 70 lbs. each, having been made in about an hour. An improvement like this, on the old-fashioned slow and expensive process, by which the ore or metal has to undergo two successive exposures in the furnace before it can be made into wrought-iron is a great triumph of American skill, we hasten, therefore, to record the event, aud doubt not that other countries, as well as our own, will vie with each other in laying hold of the benefit conferred upon our times by the consequent economy that is now presented to their notice. Any description of fuel—wood or coal, both anthracite and bituminous, can be indifferently employed for heating the furnace, and with nearly equal advantage. Further particulars may be known by letter or otherwise, addressed to the above-named gentleman.

Letter from China.

Canton, China, Aug. 7, 1852.

Messrs. Editors:—I have seen it stated that daguerreotypes have been taken on glass plates, and wish to ascertain whether the coating renders them opaque, so that they would not answer to be used in the place of paintings in a magic lantern. It they could be so used it would increase the facilities for communicating truth and science to this people, especially in physiology and natural history. I wish, also, to learn the most approved and least expensive method of cleaning rice in the United States; the method here is quite primitive, and leaves the process half completed. Has india rubber ever been tried as a covering for the inking rollers of the printing press, in place of composition? Will it answer?

By answering these queries in your columns you will much oblige one pledged to benefit mankind to the extent of his ability.

Yours, &c. D. Vrooman.

[The daguerreotypes on glass which we have seen, would not answer for the magic lantern.

The Rice Hulling Mills, employed in South Carolina—an improved one being patented by P. McKinlay, of Charleston, last year—are simply beetles working in a close chamber, and made to pound the rice.

India rubber has been tried for printers' rollers, but it does not answer the purpose like the kind made out of molasses and glue.

It is our opinion that the Scientific American finds its way into more families than any other paper (except it may be some religious ones) in the world. We have a subscriber in the capital of Siam—and here is one in Canton; and in many curious nooks and corners of the world, the contents of our columns are discussed weekly by men—the intelligent few—scattered among the people of different nations, kindred and tongues.

Heating Water for Steam Engines.

Two gentlemen in France have patented an apparatus that promises to be of much use in economizing the fuel for high pressure engines. The plan consists in conducting the steam, after its action on the piston, into a close vessel, which likewise holds the cold water intended for the boiler: this latter rapidly acquires, by the condensation, a temperature of 98° or 100° centigrade. The water is then conducted into another vessel, in which it deposits the earthy particles and other extraneous substances, that it may contain before entering the boiler.—This arrangement presents the advantage of forming much less calcareous deposit, and of not obliging the boilers to be so often cleaned

Fire Damp Explosions.

An explosion of fire damp took place last week in Mr. P. Fogarty's colliery, at West Wood, Pa., burning eight persons, several only slightly but three badly, one of them has since died. The explosion, according to the "Pottsville Miners' Journal," was caused by sheer carlessness—the colliery had not been worked for several days, and while in the act of cleansing the breast of the foul air that had been collected, a common lamp was taken directly into the current of foul air which caused the explosion.

The Iron Trade Flourishing.

The Montour Rolling Mill, in Pennsylvania, is now running up to her utmost capacity, on heavy rails. The Rough and Ready Rolling Mill is running on small rails and merchant iron. Three anthracite furnaces are in blast in this region, and two more, lately repaired and enlarged, will be blown in next week. Two others are to be enlarged and repaired, as soon as may be, and put in blast. This will make seven anthracite furnaces in this vicinity, and the hot blast fixtures, lately arranged and to be arranged, are put up with a view to the building of two more furnaces. "When these improvements are completed," says the Danville Intelligencer, "we will have nine anthracite furnaces in this vicinity supposed to be the best location for making iron in the world. The Montour Company are now laying the foundation for another rolling mill, 200 feet long, with a view to doubling their capacity to make railroad iron. These, and other improvements going on here, once completed, it will be idle for any other iron region in the United States to show facilities for the manufacture ot iron equal fo those of Danville."

Salt of Gold.

A double salt of hyposulphite of gold and of soda, known by French daguerreotypists as the "salt of gold," has been lately obtained, says the "Lumiere," by a French chemist, M. Engler, of the greatest purity and perfectly white.

The total loss of property by fires in California during the past three years, is estimated at sixty-six millions of dollars—more than has been destroyed by fire in all the rest of the United States during the last ten years.

Machinery and Tools as they are.---Printing Presses.

(Continued from page 123.)

Power Press—Perhaps no branch of machinery has made more recent progress in improvement than that which is employed by the printer; the liberal patronage of the newspaper press of our country having greatly contributed to this advancement of the mighty promoter of modern civilization. When the printing press is mentioned, the mind of every American instantly reverts to that kind of press which has created so great a revolution in typographical machinery,—we shall, therefore, first direct attention to what may be called "the model press for rapid printing," viz., Hoe's Power-Press.

In every process which may be adopted for printing, we find that there are several distinct operations to be executed: it is necessary to apply the ink to the faces of the type, which must be done in such a manner that the ink shall be spread uniformly; the sheet of paper must be so placed as to receive the impression of the type, and that, too, with a due regard to the appearance of the margin; the paper must be forced down upon the form of type by a pressure sufficiently powerful to enable it to receive the printed characters, but not enough to cause the type to injure it, in the last place, the paper, when printed, must be withdrawn from the form and laid upon a table. The exigency that requires a machine of such wondrous capability as the modern newspaper press is therefore soon explained. The principal item in the expense of printing is the type-setting or composing, hence it is necessary to print the whole of an impression from one form, and consequently only one machine can be used, to print at least one side of a sheet; perhaps this is no very great defect in book-work, but for newspapers which must, in many cases, be all struck off in the course of two or three hours at the utmost, a rapid printing press is of the utmost importance. There is, however, a certain limit to the capability of printing machines which merely increasing the velocity of the movements would not suffice to overcome. What we allude to is the fact that the sheets of paper must be delivered, one by one, to the machine by an attendant, but this manipulation, for a large newspaper, cannot be well done at a faster rate than twenty-five per minute, or fifteen hundred per hour. This apparently insurmountable obstacle is overcome in Hoe's revolving type cylinder press, by causing the type to have a circular motion instead of the usual horizontal reciprocating motion; the same principle has also been adopted by Applegath, an English manufacturer and patentee, in constructing presses for some London journals, but with this difference, that the latter places the axis of the type cylinder in a vertical position, whereas, in those of Hoe, it is horizontal, which is certainly a preferable construction, as all who have had experience in vertical shafts rotating at a great velocity will allow. Besides, Applegath's arrangement entails other defects, as will hereafter be shown; indeed, if we may judge by a very recent patent of that maker, he is himself of this opinion. It is not, however, our intention to enter minutely into the respective merits of these two machines, in their general principles they are manifestly similar, the main difference being in the already-mentioned arrangement. We shall, therefore, resume our subject with a description of Hoe's printing press, to which the claim of superiority must be awarded by every unprejudiced person, over its English competitor. The following is the manner in which it is arranged:—

The columns of type are firmly secured in position upon strong beds, which are then fastened on the circumference of the type cylinder; around this latter are placed the drums or cylinders intended to carry the sheets of paper, and which, in number, vary from four to eight. All the drums are supported in bearings on a substantial frame, and those for the paper are driven, through the agency of geared wheels, by the type cylinder, so that their surfaces revolve at the same velocity as the periphery of the latter. It will now be easily understood that a sheet of paper, being supplied to one of these drums, the latter will seize it as in the ordinary power-presses, and carrying the paper around, encounter in its course the type-form on the large drum which is likewise revolving, and the two being thus in close contact, the paper is impressed. The sheet is then released from the paper cylinder and carried away by a series of endless tapes, which conduct it to a self-acting flyer, this latter receives the paper, and, at the proper moment, by the impulse of the machinery, folds down and places it on a board, to be removed at the leisure of the attendant. The contrivance of the flyer is another material point in which Hoe's press is superior to that of Applegath, who employs a fly-boy for each paper cylinder, to take charge of the printed sheet and lay it down smoothly with the others—a duty that, as we have just explained, is performed by Hoe's press itself, without any attendant.

We have described the action of one paper cylinder, but, as a matter of course, there are several of these, and it is evident that they all will have a similar action during the revolution of the type drum, so that from 4 to 8 copies, according to the number of cylinders, will be printed on one side during a revolution of the form. Such is a brief description of this part of the machinery, but it is needless to mention that there is also a variety of details which are necessary to insure the correct working of the cylinders. For although the paper drums revolve constantly, and therefore make several revolutions during one revolution of the type, yet they must not be allowed to grasp the paper until the form approaches them, for it must be observed that the beds on which the type are placed occupy only a portion of the cylinder's periphery. Again, in the feeding process, Applegath's press is inferior to Hoe's, the vertical arrangement involving the necessity of expensive feeding machinery for the attendant standing at a sloping desk in the usual manner, pushes forward the paper, sheet by sheet, towards the fingers of the machine, which seize upon the paper; and with horizontal cylinders this is done by delivering the paper to the drums, except when there are eight cylinders in which case the feeding apparatus is rather more complex, in order that the pressmen may not be in each other's way. Contrast this arrangement with the vertical mode of construction, and you find that, in the latter, the paper must be first drawn down in a vertical direction between tapes, until its edges correspond with the position of the form of type on the printing cylinder, when arrived at this position, its vertical motion is stopped by a self-acting feeding apparatus, and it begins to move horizontally, and is thus carried towards the type.

The difficulty of preventing the type from being displaced by the rapidity with which the form is whirled round must occur to every one, this apparent defect is surmounted in Hoe's improved power-press by an ingenious device. The ordinary chase is not at all used, but the type is placed on stout iron beds, which are turned so as to form segments of the type cylinder with broad slots cut in them; in these latter slide pieces of brass, so that when the columns of type are placed on the bed they are firmly held by the column rules, which are of steel and so made as to act like wedges, the lower part also fitting in the slots between the brass pieces, so that when the whole is tightened up by set screws it is impossible for the form to shift. Not the least original part of this machine is the arrangement for inking, the ink fountain, and the usual inking apparatus are fixed at the lower part of the frame, and on that part of the type cylinder which is not occupied by the form are placed inking beds, which make a "distributing table," so that as the cylinder revolves, a roller transfers the ink on to this distributing bed, which, continuing its rotation, imparts the ink to rollers disposed around the framing. The inking rollers are forced against the type when it approaches their locality, so that the form receives a fresh supply of ink, previously to impressing each sheet. It is obvious that the distributing surface must be of less diameter than the type surface, and also that the roller which supplies the former with ink from the fountain, must be depressed when the type is about to pass it, so that they may not come in contact.

(To be Continued.)

Observations Relative to the Electro-Chemical Properties of Hydrogen.

The following paper was lately read before the French Academy of Science:

It is known that when two sheets of platinum have been previously placed in contact, one with hydrogen gas and the other with oxygen, and are immersed in water mixed with sulphuric acid, they constitute, momentarily, a voltaic pair—the sheet covered with hydrogen serving as the zinc side of an ordinary pair. By arranging on the conducting liquid two tubes, half filled, one with hydrogen the other with oxygen, and immersing the sheets of platinum partly in the liquid and partly in one of the gases, the pair gives out electricity until there is no more gas in the tubes. By uniting several pairs, there is formed what has been called a gas battery; it is worthy of notice that in this battery, when the circuit is closed, the gases contained in the tubes of each pair diminish in volume, the hydrogen twice as rapidly as the oxygen, so that the re-composition of water is operated in each element Many eminent philosophers—Faraday among others—have directed their attention to this subject, and their experiments prove that the probable cause of the disengagement of electricity is the combination of the oxygen dissolved in the liquid with the hydrogen adhering to the platinum by the intervention of this metal. The oxygen adhering to the second sheet is therefore only opposed to the polarization that would be produced by carrying over this sheet, the hydrogen that proceeds from the decomposition of the conducting liquid. Therefore the platinum, like other solid bodies employed under some circumstances, instead of this metal, is only the medium that determines the combination of the gases, and permits the circulation of electricity. It appears from this that the nature of the conducting liquids, must have an influence on the development of electricity, and the new results that are found mentioned in that part of the treatise of M. Edmond Becquerel, which speaks of the action of hydrogen on the chloride of gold as well as in that entitled "electric current developed," confirm the truth of this assertion. The following experiment is corroborative of the first:—If a tube of very small diameter, filled with hydrogen gas, be placed in a vessel containing a concentrated solution of chloride of gold, at the end of a few days the temperature not having sensibly varied the level of the chloride of gold, inside, the tube will be very little different from what it was at first. Then introduce a piece of platinum wire, one part in the gas and the other part with its extremity, immersed in the chloride of gold; the gas is seen slowly to diminish in volume, and even at the end of a certain time to disappear completely, when the platinum wire rises to the top, but at the same time as the hydrogen gas disappeared, gold is precipitated in the metallic state on that part of the platinum wire immersed in the chloride. It is to be observed that the liquid does not contain, in solution, any platinum, therefore it is not acted upon by the neutral chloride of gold, at least as far as analysis proves; moreover, the exterior air is not an agent in the manifestation of the phenomenon, since it is produced likewise in close vessels. To be able to judge of the different results obtained. M. Becquerel gives the following conclusions:—

1st. Platinum wire that does not reduce a neutral solution of chloride of gold, may acquire this property when the solution is placed in contact with hydrogen gas, and the wire immersed partly in the gas and partly in the solution; gold is precipitated in the metallic state on that part of the wire immersed in the liquid, and the gas is absorbed while the deposit is going on.

2nd. This action is manifested equally in close vessels not exposed to atmospheric influence. As the liquid, after the re-action, does not contain any platinum in the solution, it results that the metal undergoes no alteration—that it only serves as a conductor, and it acts only by its pressure. These experiments appear to prove that in this circumstance there is produced, between a liquid and a gas (the chloride of gold and hydrogen), when platinum is present, an action of the same kind as between oxygen and hydrogen, under the influence of the same metal.

3rd. A piece of wire, with a sheet of gold under the same conditions, does not furnish any noticeable effect.

4. A voltaic pair may be formed with a single liquid, two sheets of platinum and one gas (hydrogen), but this latter to be in contact with one of the sheets and the liquid; by uniting several pairs there is then a gas battery composed of a single gas, one metal and one liquid. Hitherto it had been laid down as a law, that with the platinum and acid solution, two gases (oxygen and hydrogen) were necessary to obtain this result; only the elements of the battery formed with the chloride of gold, have a feebler intensity of action than the usual gas pairs.

5th. The solution of chloride of gold, chemically pure, may therefore be considered definitively as superseding the acid solution and oxygen in the gas battery. The remarkable effects that are manifested in this circumstance should not be confounded with those that would be produced by certain gaseous solutions or liquids, such as nitric acid absorbing hydrogen at the ordinary temperature, without the appliance of platinum.

For the Scientific American
Heat—Some of its Effects—Aerial and Ocean Currents.

It is a remarkable fact that when a room is well heated, and a door is opened leading into a cold room, that there will be two opposite currents of air produced—the warm will form the upper and the cold the lower one. To this we may have an ocular demonstration by holding a lighted candle at the top of the door, upon which we shall discover that the flame is drawn along with the warm current into the cold room; and by holding the candle at the bottom of the door, the flame will be drawn along with the cold current into the warm room.

But what seems to be, indeed, the most remarkable of all, is, that the same cause seems to produce the same effect upon the vast oceans of our globe. Almost every school-boy has heard about that wonderful stream, some distance from our eastern shores, called the Gulf Stream; similar streams are found in nearly all parts of each ocean in the world, being formed at the equator, and flowing north in the northern hemisphere, or south in the southern hemisphere, the water being always the warmest at the surface; some of these streams have been traced as far north as latitude 67°, near Icy Cape. The warm equatorial streams are flowing towards the north and the cold polar streams towards the equator, the cold ones immediately under the warm ones, in an opposite direction; and hence the body of cold water lying at depths, in the regions of the equator, which cannot be accounted for in any other way than by submarine currents from the polar seas. I close by giving the following extract from one of our most celebrated navigators:

"We may see the admirable provisions of nature, by which the Creator has regulated the fluid mass of the ocean, in its endless gyrations, seeking to attain a state of equilibrium, which it never reaches, at the same time and by the same cause distributing the excess of tropical heat throughout the whole surface of the globe, and bringing to the equator the icy masses, which would otherwise accumulate in the frozen zones."

Abraham Rudisill.

Carlisle, Pa, Dec. 14, 1852.

A Large Mass of Iron.

It is said that the largest mass of wrought iron ever manufactured in Great Britain is a hammered shaft lately completed at the extensive engine factory of Mr. Nevil, at Llannelly, in Wales. This piece of iron is sixteen inches in diameter, more than twelve feet in length, and weighs four tons. It is intended for a steam engine of two hundred horse-power.

Stealing Calico Patterns.

In a case of theft which came before the court at New Bedford recently, it appeared that Miller, the defendant, charged with stealing a new pattern of calico, was employed to steal by a calico manufacturer in Haverstraw, and witnesses testified that it was a common thing for workmen to steal new patterns, and sell them to rival establishments. One witness said that he had received $100 per year

NEW INVENTIONS.

Machinery for Dressing Flax.

E. L. Norfolk, of Salem, Mass., has taken measures to secure a patent for various improvements in machinery for dressing flax. To effect the operation of separating, cleaning, and drawing out the fibres, the inventor uses one or more toothed cylinders, similar to the breaking or heckling cylinders used in flax mills. They are placed singly between a pair of feeding and a pair of drawing rollers and are made to revolve at a greater speed than the former; they are, moreover, so arranged that their teeth will draw the fibres forward in the direction of these same feed rollers. It is possible to employ this combination of cylinders and rollers so multiplied and arranged that "doubling" may be performed repeatedly in the same machine, and the operations of drawing and heckling practiced after every doubling. The mechanism employed effects the various requisite processes with an extraordinary degree of perfection and rapidity, especially by separating the feed which supplies the machine in the first instance, and then by drawing and afterwards doubling repeatedly. The "sliver" thus produced is comparatively uniform as to thickness, but to make it more perfect, it is necessary to equalize as much as possible the feed from each set of rollers, which end is attained by attaching a trunk to each set, which is placed in close proximity before the rollers, and open at the back and front, to allow a free passage to the flax. A movable mouth-piece is attached to each trunk, and the whole is so arranged that any increase or decrease in the quantity of feed will cause an inversely corresponding decrease or increase in the distance of the said movements.

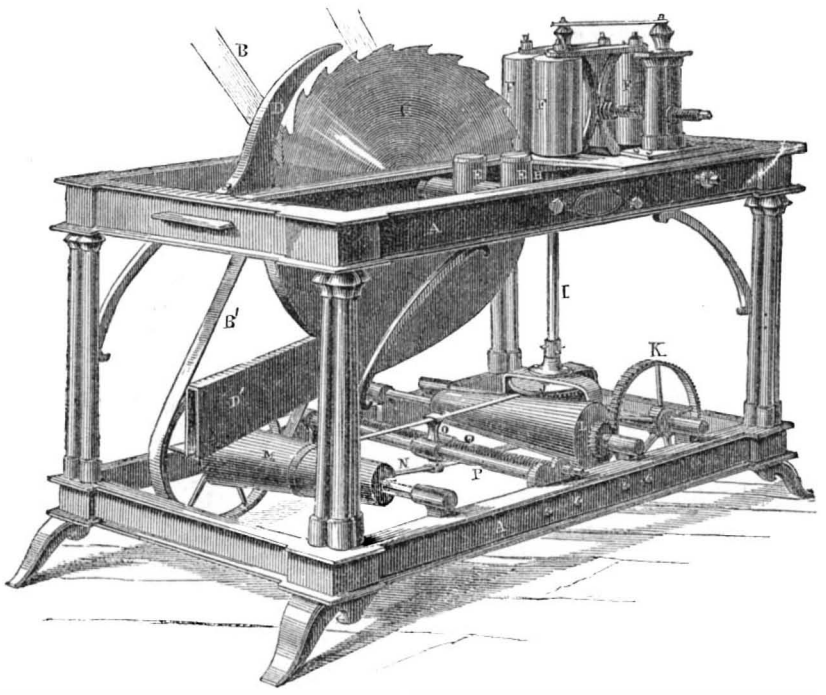
Sediment in Boilers.

The above is one of the material disadvantages in steam boilers, to obviate which an improved apparatus has been lately invented by Samuel B. Howd, of Syracuse, N. Y., who has taken measures to secure a patent. This invention is intended to keep the boiler clear from sediment and mud, an accumulation of which, as every one knows, is exceedingly detrimental to its efficiency. The idea followed out in this plan is to excite a continual circulating current, which will carry the mud into a receptacle, whence it can be withdrawn at will. The manner in which this end is attained is to allow no communication between the water chamber and the steam chamber, except through a cylinder, so that when the boiler is in operation the water chamber and cylinder, will be filled with water and the constant upward current caused by the steam rising through the water, will enable the latter to flow over the cylinder into the steam chamber, in which the level will be always below that in the cylinder. This is occasioned from the circumstance that, instead of an upward, there is always a downward current, which is caused by the water flowing back through two tubes. The impurities brought to the top of the cylinder by the upward tendency of the steam, will thus flow over and be carried by the downward current through the tubes into the mud receptacle, where by greater specific gravity, the sediment will sink to the bottom. The mud receiver is formed in the water-space by means of a partition that extends from the front of the boiler to nearly the back, leaving only an opening at that part, to permit the upward flow of the water.

Replacing Railroad Cars.

Measures to secure a patent for a new and improved apparatus for replacing railroad cars upon the track have been taken by Lucian B. Flanders, of Dunkirk, N. Y. It is necessary to observe that this is a contrivance intended to supersede the use of the ordinary jack, for replacing cars when run off the rails, and is far superior to the present inefficient mode. The apparatus employed can be as easily carried as the jack, and is adjusted for use in a moment of time. It consists of two iron pieces which the inventor terms flanges, and which are placed one upon each rail, their construction being such that they clasp these latter, and are thus held firm. Each flange has, at the end an inclined plane so that the wheels coming in contact with the lower part of these planes can be moved up along them, and in order that they may take the proper direction a guide is so placed as to be operated by one of the wheels while it is moved forward. The apparatus will be found efficient for replacing the car on the rail no matter in what position the car may happen to be placed after running off the track.

IMPROVEMENTS IN SAWING MACHINES.



The annexed engraving is a perspective view of an improvement in Sawing Machinery, invented by Pearson Crosby, of Fredonia, N. Y., to whom a patent was granted for the same in April, 1851, but which has not yet been brought prominently before the public. The nature of the invention consists in making a circular saw with both faces convex, so that it will present a thin edge, where the teeth are cut, to avoid waste of the lumber, and reduce the resistance in cutting, and be gradually thicker towards the shaft to give the requisite thickness, to prevent "buckling" and insure a steady motion at the periphery, when this is combined with a fixed gauge placed near the periphery of the saw on that side of the shaft opposite to where the lumber is presented to the teeth, so that the said gauge shall separate or spread the two parts of the planks, while they are being sawed, and thus prevent them from binding against the faces of the saw.

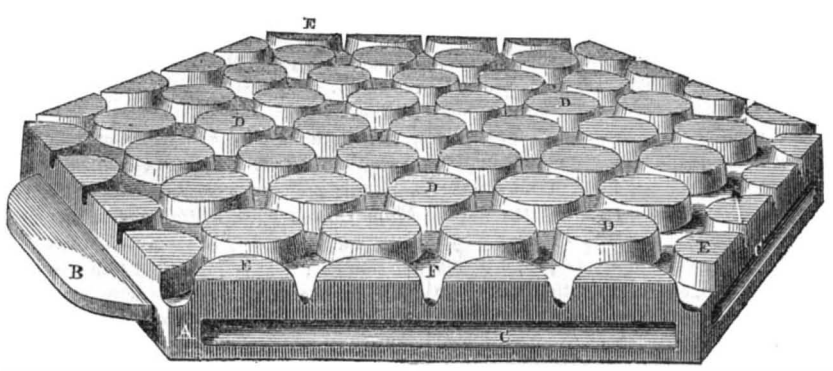
A is a neat strong saw frame; B is the driving belt communicating from the shaft of a steam engine or water wheel. It gives rotation to the shaft of the saw, C. D is the fixed bevelled gauge; B′ is a belt running from a small pulley on the spindle of the saw around a pulley on the shaft of the cone pulley, M. N is a belt running from the cone pulley to the one, L. O is a shipper for moving the said belt from the least diameter of M to its greatest, and vice versa, so as to vary the speed of the cone pulley, L. The shipper slides on a rod, P, and is moved when required by turning the screw, Q. The pulley, L, has a pinion on its spindle which gears into the wheel, K, and moves it. On the shaft of said wheel is a bevel pinion (unseen) which gears into the bevel wheel, J, and gives motion to the vertical shaft, I, on the upper end of which is a cog wheel, which meshes into similar wheels on the base of the spindles of the back feed rollers, F F. These rollers take in the planks at the front, F′ F′. There is a knuckle or loose collar at the neck of spindle I, to allow for the vibration of the feed rollers for planks having irregularities. The feed roller can also be set further from, or nearer to, one another, for thick and thin planks—there are slots in the bottom plate to allow the spindles of said rollers to be so moved, and the screw, G, working in the side plate of the roller frame, graduates the play of said rollers. D′ is a trunk to carry off the saw-dust. The screw, G, has a spring on it of sufficient tension to allow the rollers to play, and yet bend out the warpings in a plank, and insure its presentation in a proper manner to the edge of the saw, so that the part of the plank slit will be of equal and uniform thickness.

The following is the claim of this patent, viz.:—

"Making the saw with both faces convex when combined with the guide, D." This is a very excellent combination for slitting planks by a circular saw, and must commend itself to all concerned.

More information may be obtained by letter addressed to the patentee.

CAST-IRON PAVEMENTS.



To supersede the ordinary Russ paving for streets, a new arrangement by means of cast-iron blocks has been invented by L. Colwell, of New York City, who has taken measures to secure a patent. The above engraving is a perspective view of one of the blocks forming a section of the paving and displays the structure and arrangement of this new method Each of these blocks is six-sided, being in shape a regular hexagon, so that they are easily fitted one to another.

A represents one of these six sides with a mortice or groove, C, let into it, into which fits a projection corresponding to the tongue, B, of another block, and in similar manner the tongue B, fits into a groove or mortice let into the side of another block corresponding to the groove, C. Of these grooves and tongues there are three to each block, which thus make up the six sides; F is the iron plate on which there are several projections, D D, of a suitable size, as shown in the figure, and which, on the under side, are hollow, E E are semi-projections of the same kind along the sides of each block, so that when one block is fitted to another, a similar series of these said semi-projections unite with the others to form the same shape as in those already described. A pavement of this sort has many advantages over both wood and stone; in the first place it forms a more compact mass, as from the arrangement of mortices and grooves a block cannot possibly be disarranged from its place; then, in addition to the greater durability, the expense would be much less, for even when worn out the old material would be worth at least 50 per cent. of the original cost, and could be re-cast for the same purpose again. Moreover, the construction is so simple that no preparatory labor is required previously to laying the blocks, as is the case with every description of paving material now employed. All that is required to be done before laying the blocks, is merely to level the earth when the blocks are forced down, and thus imbedded in it without any need of all those preliminary steps which were required in the other plans of paving, and which form so great an item in the cost.

Contrast this with the Russ pavement, and the saving to the city would be incalculably vast. The expense for laying the Russ pavement is $6 per square yard, and the consequent inconvenience of stopping up the thoroughfare almost as detrimental to the traffic as the pecuniary outlay is large. Our principal streets, particularly Broadway, are for one-half the year entirely useless for the purposes of transit in some part or other of their length, and we absolutely despair of ever seeing them well-paved. We therefore hail with satisfaction any improvement upon our present method which cannot be too much decried, as a most clumsy, unscientific, and costly mode of procedure. We have no doubt that iron will yet be generally used for paving the streets, not only of our own cities, but also those of London, Paris, and other capitals of European countries.

Further information may be obtained of Messrs. Colwell & Co., West 27th st., near Eleventh Avenue, N. Y.

Improved Journal Box.

Measures to secure a patent for an improved journal box have been taken by George Pierce, of Norwich, Ct. This is an invention intended to prevent the over-heating of the journals of shafts and axles, by insuring to the bearings an ample and constant supply of oil, a point which all practical men know is often sadly neglected, though no machinery can work with ease when the journals are not well lubricated. In this instance the journal box is inserted within a fountain or reservoir of semi-cylindrical shape, containing the oil, which is conveyed to the journal and box by a conductor of cotton—flanges on both sides of the journal box, fitting over the sides of the fountain, serve to prevent the escape of the oil. By this arrangement, should the journal become hot, it will evidently effect its own cure, from the heat rendering the oil more fluid.

New Steering Apparatus.

An improved apparatus of the above kind has been lately invented by Andrew Lee, of Millville, N. J., who has taken measures to secure a patent. It differs from the ordinary arrangement, as employed on board of ships, in the use of geared wheels, which are so constructed as to make the rudder more efficient in steering a vessel. The great desideratum, in this part of a ship, is to communicate the motion of the steering wheel to the rudder in such a manner that the latter shall move at the turning of the wheel as rapidly as possible. To effect this purpose, the inventor uses a spur wheel fixed to the shaft of the steering wheel, which gears into a pinion at the end of a drum on which the tiller rope is wound. From the fact of the spur wheel being much larger than the pinion, a more rapid motion is conveyed to the latter, and consequentiy to the drum on which it is fixed, so that the tiller is made to operate more quickly than it could possibly do by the usual steering apparatus.

The Russian law grants patents on the sole condition that the inventions, whether indigenous or foreign, have never been made known in that country.

Scientific American

NEW-YORK, JANUARY 8, 1853.

Progress of Discovery and Invention During 1852.

Since the first of January, 1852, no startling discovery has burst upon the world; no striking nor very extraordinary invention has been made, yet for all this, the march of improvement has been steadily onward. As peace is necessary to nations for consolidation and quiet developement, like the ripening of corn in warm, mellow moonlight nights, so the same law prevails in respect to progress in the arts and sciences.

At this time, we believe, it will not be unprofitable to our readers to listen to us while we briefly speak of what we have done in discussing and introducing improvements in machinery, and bringing more prominently before our people useful information about things new and old, from many storehouses of knowledge.

From the commencement of the past year, to the close of our last volume, we presented a greater amount of information, well illustrated, about boilers, furnaces, and smoke apparatus, than is to be found in any single book, periodical, or in any encyclopedia ever published in this or any other country, and as standard information, inventors will have to refer to those articles for years to come. A great amount of useful information about circular saws from practical men, in different parts of our country was also presented in a number of letters; much reliable and useful information was also presented about rifle shooting, and a series of articles on the "Geology of the Lead Mines," by an able and scientific gentleman in Galena, Ill., stand out as standard information, for reference to all interested in geology and mining. Those who wish to know what has been done among our tailors in the shape of inventions, will find McGinnis' Geometric Measurer illustrated on page 148, and Wells' measurer on page 308, and a pair of improved shears on page 253. There is an aerial bridge on page 167; for those who wish to know how to transport railroad trains above the masts of the tallest ships; and those who desire to make their own gas—the real bona-fide—in a small way, will find an apparatus for that purpose on page 172. Our millwrights will find Finlay's governor for wheels on page 196, and a new overshot wheel on page 308. But here we must stop, or we will have to fill columns merely in refering to the several pages where useful machines are illustrated. We hope our readers will turn over those pages and take a retrospective view for themselves. We can safely say that many very useful improvements have been made during the past year, and we expect that our inventors will add many more this year. The experience of the past illumines our pathway for the future; Hope stands on tip-toe pointing her finger to the sunlight breaking upon distant spires and glittering domes, to wreaths of laurel and crowns of gold.

It is stated that Archimedes asserted he could elevate the world with his lever if he had a fulcrum whereon to place it. Our inventors are the worthy descendants of the Grecian sage and mechanic; they have already, by their inventions, elevated our world, from its barbarism in Art to its present advanced and noble position in all that relates to real science and practical mechanics. We look upon all inventors and discoverers as reformers according to the value of the new treasures which they bring into the storehouse of art. The usefulness of the mechanical classes is universally acknowledged; we are determined to toil and labor more ardently to make them exert an influence in proportion to their usefulness.

We hope that every one of our readers has made up his mind to do better during the present than the past year. It should be the ambition of every man to leave his mark—a good one—on the pages of time.

"In the world's broad field of battle,
In the bivouac of life,
Be not like dumb driven cattle,
Be a hero in the strife."

The Ray Premiums Again.

It is well known to our readers, that F. M. Ray, of this city, offered $3,000 to be divided into four premiums for railroad improvements. We published *his* advertisement on page 159, of our last volume, where all the conditions are set forth. The improvements were exhibited (that being one of the conditions) at the last Fair of the American Institute held at Castle Garden, this city. The Committee of Examination was appointed by the American Institute, in whose charge the whole matter was left; they were to examine, report, and award the prizes. The offer of these prizes drew out an amount of talent which was exhibited in the greatest amount of railroad inventions ever brought together since railroads were invented, and we are sure that those offered prizes were the means of drawing many to the fair, both as exhibitors and spectators, who otherwise would not have gone there; perhaps the American Institute drew no less than five or six thousand dollars extra on that very account. We hoped and said that those prizes would be the means of doing good, and no doubt they would, if the business had been conducted honorably by an Institute governed by verity and manly dignity. But the manner in which the whole affair has been conducted by the American Institute deserves the scorn and contempt of all honorable men. Not a report on those railroad inventions which competed for the respective prizes has yet been made, and not a single prize awarded. We have received a great number of letters from exhibitors who live in different parts of our country, and one now before us says:—"I travelled 1,200 miles, and was detained in New York under heavy expenses for one month as a competitor, in the expectation of winning a prize, or of being satisfied (as I would have been) to see a better invention get it." Was Mr. Ray made a dupe himself in offering these prizes, and was it intended to dupe the exhibiting inventors? If not, why have those exhibitors been treated and are now treated like dupes by the American Institute? We make no charges, we only state facts and ask questions which naturally arise from the circumstances of the case. As the Scientific American is the defender of our inventor's rights, we dare not be silent in such a case as this; the rights, the honor, and the integrity of our country is involved in the public, broad, and extensive principle of a public award offered to a competing public through a chartered institution which pretends to be founded on, and governed by the principle of encouraging American industry. The fair fame of Mr. Ray is also involved, and the public demands some explanation about the conduct of the American Institute, in whose charge he placed the whole business. We cannot charge any person with fraud, because no evidence of this has been presented, but we cannot speak truth and use less strong language than to say, "the business has not been justly nor honorably performed by the American Institute."—We do not call upon that body of men to do anything; they know their duty but they do it not.

Critical Dissertation on Steam, Air, and Gas Engines.

In our last article on this subject we pointed out the reasons why the gas engines which had been invented to supersede steam had all failed to compete with it. We will now proceed to give the reasons why *Hot Air* has hitherto failed and must continue to fail in competing with steam as a force to move machinery.

All bodies in nature exist in either of three conditions, viz., solids, liquids, and gases. Different laws govern these three different conditions of matter, and many bodies can be easily converted into any of these three conditions. A certain amount of heat applied to ice will change it into a liquid, and the application of a greater amount of heat will change it into vapor—steam. All bodies suffer a temporary increase of dimensions when heated, and contract again into their original volume on cooling. It is this feature of the expansion of bodies by heat, which enables man to employ them to move machinery. Thus by heating bars of iron the walls of a building in Paris were brought straight—thrust from an incline to a perpendicular;—thus by heating air in a balloon, Montgolfier was enabled to force his way upwards against the pressure of the atmosphere, and by heating water till it became steam, Hero was enabled to whirl round his primitive rotary engine. Now the question which we are to discuss, is what body in nature is the most economical as a motive force, whether a solid, liquid, or gas.—There is no use in losing time speaking of the solid, therefore we will speak only of liquids and gases, and only of one liquid and one gas—water and air.

The principle of any chemical force to propel machinery depends on the nature of the substance employed; thus water by heat being applied to it, expands to 1,728 times its bulk; it is this elastic force—water combined with heat—which moves the piston in the cylinder of an engine. Air by having heat applied to it also expands, and this expansive force admitted under the piston of an engine, will also move it. Now, if water and air expanded equally with the same amount of heat applied, and were otherwise alike easily condensed to their original bulk no one could doubt the propriety and economy of using air in place of steam as a motive power, but this is not the case. *Steam* and *air* alike, come under the law of Mariotte in expanding their bulk equally with the same amount of heat applied, namely, doubling their volume for every 491° of heat applied. A cubic foot of air at 32° cannot move the piston of a cylinder, but if 491° of heat are applied it will occupy double the space and lift 2,160 lbs. one foot high at the pressure of the amosphere, that is exerting a pressure of 15 lbs. on every square inch of a piston of 144 inches area. But a cubic foot of water at 212° sensible heat converted into steam at the same pressure will lift 3,732,480 lbs. one foot high. Air is not for a moment then to be compared to water, bulk for bulk, to exert elastic force by the application of heat; this is evident, for the latent and specific heat of steam is only 1,184°. Allowing it to be safe to employ heated air (but it would not) about 491° to double its original volume, it will require 864 cubic inches of air, at 32°, to which 491° have been applied, to equal one cubic inch of water raised into steam from 32°. Thus there is a vast difference between a liquid and a gas to which heat have been applied, in the expansion of their bulks—their elastic force. To make air triple its volume, it would require to be heated to 982°—a low red heat. In its very nature, steam seems to have been designed by a Wise Providence, as a mighty power suited for the propelling of machinery, for while it contains 1181° of heat (latent and specific combined) yet it has only 212° of sensible heat, and in this respect combines a heat (and consequently a force) of an intensity and in such a form as dare not be applied to air.

The boilers of the steamship Atlantic evaporate 7½ lbs. of water by one of coal, that is 207·36 cubic inches of water, which by such a small amount of coal is converted into 358,-318·08 cubic inches of steam. Will one pound of coal thus expand 207 cubic inches of air to 1,728 times its original bulk at 32°? Unless it does it is more expensive than steam, and besides steam can be condensed at an expence of only three fifteenths of the power of atmospheric resistance, and air cannot be condensed at all to its original volume, until the whole of its heat is abstracted. Thus from its very nature water has many advantages over heated air—the fluid over the gas. No wonder all the Hot Air Engines hitherto invented have failed to compete with it.

We have not said anything yet about the exhaustion of expanded gases from engines, the principle and cause by which they are enabled to act; we will do so next week. It would extend this article to an undue length, to add what we have to say now, every article, however, is complete in itself.

Mechanics' Lectures.

On Tuesday evening of last week (28th ult.,) Gen. John Dix delivered a most able and appropriate lecture before the Mechanics Institute of this city. The subject was, "The Influence of Government upon the Industrial Classes." Our New York Mechanics did themselves no great credit by having so many empty seats in the lecture room.—Gen. Dix is one of the most chaste and clear speakers in our country. He sketched the history—the rise and progress—of the mechanical classes from the days of Athens' fame and Rome's glory up to the present day. He showed the importance of our mechanics having a knowledge of law and political economy, but we regret to say the intelligent few only were there to appreciate. The mechanics in New York City are not united, their efforts are conflicting, separate, and therefore feeble. If they were united in one thing, they could support one of the finest Institutes in the world.

Mechanical Papers---A Deceased Cotemporary.

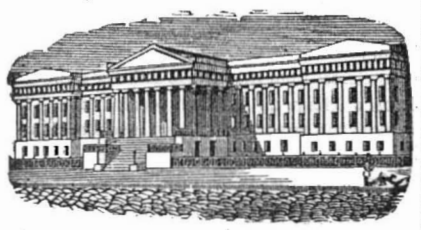
We have this week to chronicle the decease of our old cotemporary, the "Farmer and Mechanic," at the end of the tenth volume. As it was of old so it is now, "the house of Saul waxed weaker and weaker, while the house of David waxed stronger and stronger." We experience no feeling of joy and none of regret in seeing that paper wrapt in the habiliments of "that sleep which knows no waking." It offers a theme to say a few words about the difficulty of sustaining periodicals devoted to any department of mechanics.—Since the Scientific American was ushered into the world, a great number of mechanical papers have come and gone. Our cotemporary just named, The Eureka, The Engineer, the Scientific Mechanic, and a number of other such papers in this city alone, have come into existence and gone out of it. "The Mirror of the Patent Office," the "Mechanics Advocate," and a number of other periodicals of the same fraternity in other places have come into being and gone out of it within the same period. It is no easy matter to establish and maintain a periodical devoted to science and mechanics, the readers of such papers are a select class—a special few in large communities. They are generally intelligent, and possess logical minds, they are the judges of what is sound and what is worthless in science, hence we have a clue to one cause why so many periodicals professedly devoted to such subjects have partially succeeded, then failed. It requires capital, talent, and great industry to make such periodicals successful. A manly dignity, independence, fearless honesty, and fairness are also characteristics which should distinguish such papers, for readers of a scientific taste cannot be fed on husks, they must have choice food or none at all. It has been our custom to pursue the even tenor of our way, without regard to what was said about us; we have never attacked a cotemporary, nor have we ever published a single letter reflecting on one of them, although we have received many to that effect; to do so would have been ungentlemanly, and we have always felt strong enough to fight our own battles. This course, with scarcely a single exception, was not pursued by our cotemporaries towards us; they seemed to gloat over a communication reflecting upon us, and always seemed to rejoice in giving the same (and they were universally false or incorrect,) a prominent place in their columns. This was oftentimes done by our deceased cotemporary, and done by an editor of a magazine who has recently vacated such a position. These things, however, never moved us, and we hope never will. We are gratified for our success, and we would have rejoiced at the success of any of our deceased cotemporaries, if they had been well conducted, but as they were conducted, they advanced no useful interest, and could not compete with superior intelligence, enterprise, and assiduity, hence they have gone down to the grave without a friend who walked by their cradles to weep over their tombs.

Reports of the Commissioner of Patents.

We are obliged to Mr. Ewbank, ex-Commissioner of patents, for copies of his reports—mechanical and agricultural—for 1851 and 1852. We have not space to notice their principal points this week, but they will afford subjects for more than one future article.

Geographical Society.

Five hundred dollars have been voted by the Board of Underwriters to the Geographical Society, at its solicitation, to be devoted to a series of magnetic observations to be made under the direction of Dr. Kane, the Arctic Explorer on his next expedition.



Reported Officially for the Scientific American

LIST OF PATENT CLAIMS

Issued from the United States Patent Office

FOR THE WEEK ENDING DECEMBER 28, 1852.

PARCEL FOR YARDS OF VESSELS—By D. S. Bayles, of Brooklyn, N. Y.: I do not claim the rocker, simply by itself, a saddle or slide having been heretofore used, and fastened into the swallow-tail of the gaft and boom of sailing vessels, applicable to fore-and-aft sails only.

But I claim the combination of the rocker in front of the mast, and capable of a motion in two planes, with the rockers at the side of the same, said rockers being arranged, with respect to each other and the yoke, as described.

EXTRACTING GOLD, &c., BY AMALGAMATION—By M. A. Bertolet, L. Kirk & A. M. De Hart, of Reading, Pa.: We claim bringing the ore, in a heated state, into contact with mercury, during the process, as set forth.

Also the method of heating pulverized ore, by causing it to pass in a shower through a current of some heated fluid, preparatory to bringing it into contact with the mercury, as set forth.

Also, the method of heating the apparatus, the mercury, and the ore, by means of a current of heated fluid, circulated through chambers and pipes, substantially as described, whereby a single current of a suitably heated fluid, and a single system of circulating pipes of simple construction and compact arrangement, are made to heat the whole of the apparatus that requires to be heated, and to heat the ore in the process of feeding, and the mercury, in the process of amalgamating, as specified.

WINNOWING MACHINES—By Samuel Canby, of Ellicott's Mills, Md.: I claim the combination of the piston, rack rod, pinion, valves, and eccentric pulley, in connection with a conducting chest, and blower, for the automatic graduation or government of the blast through the spouts, of a winnowing machine, arranged and operating in the manner and for the purpose set forth.

ILLUMINATING GAS—By Geo. Danre, Pascal Nicolas, and Felix Lopez, of Marseilles, France. Patented in France, Sept., 27, 1851: We claim the combination of woody and fatty substances in gas generators, as described, so that the excess of hydrogen in the former may combine with the excess of carbon in the latter, and produce a rich carburetted gas of any required density, and free from sulphurous fumes.

TEMPLES FOR LOOMS—By Elihu and Warren W. Dutcher, of North Bennington, Vt.: We claim the arrangement of parts, so that the temples have a reciprocating action, corresponding with the motion given to the cloth, by the beat of the lay, substantially as set forth.

CUTTING PAPER—By J. P. Farnum, (assignor to himself, J. Jenkins & C. B. Clark), of Andover Mass. I do not confine my invention to the precise form or arrangement of its parts, as represented, but intend, to vary the same to any extent, while I do not change the character of the machine.

What I claim is the combination of a press, or its equivalent, for holding the book or paper to be cut, with one or more cutters or knives for trimming the front or one edge, and one or more cutters for trimming one or both of the other edges of the book, the different sets of cutters being simultaneously operated, while the paper or press is moved towards them all, substantially as specified.

And in combination with such cutters or knives for trimming one or the front, and other edge or edges of a book, at one operation or time, I claim the improvement of combining with them, or either of them, one or more polishing surfaces, or their equivalents, whereby the edges of the sheets of paper are cut and polished, or smoothed, ready for gilding, as specified.

CUTTERS OF PLANING MACHINES—By Pierce Saulnier (assignor to J. T. Bruen), of New York City: I do not limit myself to the special mode of construction specified, as this may be changed at pleasure, so long as the principle or character of my invention is retained.

What I claim is hanging the cutters to the stock by means of a joint pin, or its equivalent, whose axis is diagonal to the line of cutting motion, and in a plane parallel with the surface being cut, for the purpose of relieving the cutting edge in two directions, when the cutter stock is set perpendicular to the plane of the surface to be produced.

Also combining together in one cutter stock, two cutters, hung substantially as specified, and with the angle of the axis of the two joint pins reversed, as specified for the purpose of relieving both cutters from the two surfaces, when cutting in both directions.

MAGNETIC PRINTING TELEGRAPH—By Royal E. House, of New York City: I claim, first, the employment of electro-magnetic force, in combination with the force of a current of air or other fluid, so that the action of the former governs or controls the action of the latter, for the purpose described.

Second, the construction of the electro magnet, as described, that is to say, a series of fixed magnets, in combination with a series of movable magnets, arranged upon a central axis, which axis plays between or through the line of fixed magnets, so as to effect a vibratory movement of said axis by a force multiplied by the number of magnets of both kinds.

Third, the combination of the electro-magnet with the valve, for regulating and directing the force of a current of air or other fluid, acting as a motive power upon the piston, or other analogous device for producing a vibratory motion, as described

Fourth, the endless band, in combination with the cylinder, as an inking machine for conveying and applying the coloring matter to the paper, at the moment of receiving the impression from the types, as described.

Fifth, the combination of the regulating bar, with the type wheel, for the purpose of regulating the proper position said wheel should have, in connection with a given position of the key shaft, at the moment of printing any letters or characters.

HEADING BOLTS, ETC.—By Edward Page, of Albany, N. Y.: I claim, first, the combination of the stationary die and die pivot with the sliding hammers, actuated by the rotary grooved cams, or cam collar, as described.

Second, the revolving ring or cam collar, provided with cams or their equivalents, on its inner and outer surfaces, when arranged with radial compressing and sliding upsetting hammers, in the manner described.

SHUTTERS FOR LOOMS—By Wm. Tucker, of Blackstone, Mass.: I claim the combination of the elevator, bent spring, platform, and its recess, passage, and slot, as applied to the shuttle and cop spindle, and made to operate together, substantially in manner and for the purpose of causing the filling thread to be broken, so that no filling thread shall be woven into the warps under circumstances, as stated.

HEADING SCREW BLANKS, RIVETS, &c.—By Wm. E. Ward, of Rochester, N. Y.: I claim, in combination with the swedge header and die plate, the giving of a back or receding movement at the end of the heading operation to the follower, against which the point of the rod rests during the heading operation, that the rod or wire may be upset, outside of the die, whilst resistance is made by the follower against the end of the rod, and then as the follower retires, cause the part so upset to be griped between the surface of the die and the swedge to complete the form of the head, the surplus metal being thereby forced into the blank, as set forth.

STEAM BOILERS—By Henry Waterman, of Williamsburgh, N Y.: I claim, first, the safety chamber and safety plate, combined with the boiler in any way substantially as described, whereby the bursting of the plate, by the too high pressure in the boiler, causes the chamber to be filled, and the pressure in the boiler to be reduced by the expansion of the steam.

Second, the plate placed between the boiler and safety plate, having one or more small openings, through which the steam is allowed to pass to act on the safety plate, and fill the safety chamber, whereby the water is prevented from priming or foaming, and being carried up by the steam when the safety plate bursts.

RAILROAD CHAIRS—By J. F. Winslow & J. Snyder, of Troy, N. Y.: We claim the movable cutter for making the cuts in the edges of the plate, substantially as described, in combination with the slides, which answer the purpose of stationary cutters and rests, to effect the partial bending of the lips, and which afterwards complete the beading of the lips, as described.

Also, in combination with the cutter, as described, the making of the mould or former, to slide therein, for discharging the chair, after it has been formed, as described.

Also the dies for upsetting and giving additional thickness to the lips, as described, in combination with the bending slides and cutter, substantially as described.

DAGUERREOTYPING—By Wm. Garnall, of Newark, Ohio: I claim producing ornamental borders and designs of different shades and forms, and singly or in numbers, around any photographic image, by the method of irregular chemicalization combined with the use of pattern slides or chemical cut-offs, all of which is described.

DESIGN.

GIRANDOLE—By R. E. Dietz, of New York City.

Reform of the Patent Laws.

FEES OF FOREIGNERS.—All foreigners pay large patent fees to our government in comparison with our own citizens. The citizens of Great Britain pay $500, and those of all other nations $300. The reason why such high fees were charged to the citizens of Great Britain was "because that government charged such enormous patent fees to all applicants for patents." A great deal of meanness was displayed by those who made such a distinction in the patent fees charged to foreigners. We have been told by a native of Britain that he had an active share in getting such a clause inserted—not a very democratic work—but one which takes considerable odium off the Americans, who were active in bringing about the reformed patent code of 1836. When we consider that a patent for a machine is more valuable in England, if it is a good improvement, than in any other country, and when we consider that a patent for Belgium and all the foreign countries in Europe, except France, is of little consequence, the fact of high patent fees being charged in England to all applicants, should, if the enactors of our code had discriminated justly, placed all foreigners upon an equal footing. As the patent fees by the late reform in the British Patent Laws, have been greatly reduced in that country, we hope, as we have mentioned before, that the patent fees for natives of Britain will be reduced from $500 to $300. England makes no distinction in her patent fees; she charges her own citizens as much as ours—all are placed on an equality in respect to patents for improvements.

There is another reform which we advocate, viz., a reduction of the fees retained by the Patent Office for examining the application of a foreigner when his petition is rejected. For example, if an Englishman, Irishman, or Scot applies for a patent, and after examination at the Patent Office, it is found that something of the kind has been invented before, the petition is rejected, and by law the Patent Office retains one-third of the fees, $166,66; if he is a native of any other foreign country he is charged $66,66 less. Now it requires no more time nor talents to examine the applications of foreigners than those of our own citizens, yet only $10 is retained for our own inventors, while ten times ten dollars are retained for Frenchmen, &c., and about seventeen times as much for Englishmen. Now, is this just, is it honorable or republican-like? It is not; we confer no favor upon these foreign rejected applicants, we grant them no privileges; ten dollars will pay all the expense of Patent Office trouble, and yet we charge them speckled high fees. It may be said, "these men should ascertain before they make application, whether such an improvement has been or has not been patented in America. This is an impossibility in many cases, owing to the way business used to be conducted in the Patent Office. And owing to the fire in 1836, it is not possible, without much practice to obtain the desired information. The corps of Examiners in the Patent Office, were appointed for the purpose of giving such information to applicants, and it is unreasonable and wrong to charge immoderate fees when an application is rejected. Experienced patent agents, no doubt, are very competent judges of what has been patented, what is new and what is not, indeed some of them must possess information beyond that of some examiners in the Patent Office, and they can give inventors very sound advice about whether their inventions are new or not, but then this does not mend the matter, while the law is wrong. No unjust statute should exist in our country, and we think this is one which has existed long enough and should be abolished.

The fees for subjects of Great Britain should be reduced to $300, and the fees for the rejected petitions of all foreigners should be reduced to $30 or $50. This reform we advocate, because we believe it is a just and reasonable one.

The Bill for reforming the Patent Laws is now before Congress; we hope these two reforms, and the returning of models to rejected applicants will be added to it. We hope our Senators will not be in too great a hurry to pass the bill, but give it further consideration; there are some clauses in it which should be stricken out, and those we have suggested inserted. Mr. Burke, while Commissioner of Patents, was an advocate for reducing the fees to foreign inventors, and the reasons given by him for suggesting such a reform of our patent laws, were sound and republican.

White's Patent Railroad Truck---A Defence.

In the Scientific American of Nov. 27, I find an article by Mr. W. G. Hudson, in which he takes considerable pains to convince the public that the cup eccentric, used on my truck, is anything but a scientific remedy to make a locomotive engine track square, and says that "if required to move much, to make the driving wheels track, it would cause the truck to run to one side and mount the rail, thereby causing the result it is meant to avoid," &c. I am, perhaps, as well aware as Mr. H. of the difficulty that would arise if the forward end of the locomotive should be moved very much to one side. I am also aware that it would not be prudent to carry a pressure of five hundred pounds to the square inch in a locomotive boiler; but it does not follow that because five hundred pounds pressure would tend to burst the boiler, that ninety or one hundred pounds pressure to the square inch may not be used with safety. I never intended to move the forward end of the locomotive much to one side, and would prefer to have the locomotive built so that it would track perfectly square, but I know that locomotives frequently run to one side in consequence of their being out of line, and it is frequently the case that they have wedges only on one side of the driving or pedestal boxes, and often have no wedges in the pedestals whatever. In cases like the above, a contrivance by which the head of the locomotive can be slightly moved without moving the stationary centre of the truck, must appear to every practical man to be of value, insomuch that when the flanges of the driving wheels are found to be wearing to one side more than to the other, the moving over of perhaps one-fourth of an inch to one side, which may be effected by the cup eccentric in a few minutes, would save the necessity of taking the locomotive into the shop to make an alteration, and thereby miss one or more trips, causing a loss of from one to perhaps five hundred dollars. The arrangement of my truck is such, that the centre plate or axis on which the forward end of the locomotive rests, is not movable, and is never out of the centre of the truck frame, the distance always being the same, from the sides of the frame to the centre of said plate, whether the eccentric be turned to one side or not. The lower wearing surface or part of the centre-joint that comes in immediate contact with the truck frame is bolted firmly to the centre of said frame, and cannot move, consequently the truck would not run to one side, as predicted by Mr. Hudson. When used for eight-wheeled cars, or tenders, the eccentric would be useless, and in such cases I do not use it. It adds nothing to the self-adjusting or flexible qualities of the truck, and is only, as before said, a convenience for locomotives when the driving wheels do not track square. Mr. Hudson, no doubt, built a locomotive for the Buffalo and Attica Railroad; I have understood that he did, and it may have had a centre-bearing truck; but since reading his article on my truck, I have talked with a gentleman who is well acquainted with both Mr. H. and his truck alluded to, and he says that it differs very much from mine.

JOHN L. WHITE.

Corning, N. Y., Dec. 15, 1852.

[We have also received a letter under the signature of Hiram W. Bostwick, Esq., President of the Corning and Blossburg, and of the Buffalo, Corning, and New York Railroad companies, who says he "has used White's Equalizing and Self-adjusting Truck for about three years, under the engines of the Corning and Blossburg Railroad, and the Buffalo, Corning, and New York Railroad, and he is well satisfied that they are the best trucks in use." Before he used them the engines were frequently getting off the track, but during three years using they have not run off the track once, while the cars have done so a number of times—the locomotive still keeping the track. They carry, he says, "the forward end of the locomotive finely, and turn curves in a beautiful and easy manner. He is going to put them under every engine on the railroads of which he is President."

We have also received a letter from W. M. Mallory, of Corning, N. Y., who meets the objection of Mr. Hudson about the "eccentric," and says it is only there of a necessity, to be used when builders of locomotives neglect to make them as perfect as they should be—when they do not centre in the proper place, which any one, engaged on railroads, knows to be a not uncommon occurrence. "In such cases," he says, "the engine man, by a slight movement, can do in a few minutes what it would take some hours to do with the men in the shop." We present the rest of his letter entire:—

"But the eccentric cup part is by no means the most important part of Mr. White's valuable improvement, it is so arranged as to give an equal bearing upon each journal, under all circumstances, and it adapts itself to any unevenness of the road, and I have known this truck used for nearly three years upon the Corning and Blossburg Railroad, which, at the time, was very uneven, and it was never thrown from the track, while locomotives, with trucks like those in common use, were often thrown off. I have been engaged in the practical part of the railroad business for the past twelve years, and consider this one of the most important improvements in railway carriages that has ever come to my knowledge."

Large Printing Presses.

The Philadelphia "Ledger" is getting in a large eight-cylinder Hoe Press. The Ledger has a large circulation, and deserves it, and the public, we are glad to see, know and appreciate its ability and spirit, hence the happy necessity of printing more copies, and doing so faster and better.

Climate of Minnesota.

Although the cold in Minnesota is so severe in winter, those who have lived a length of time assert that it is far from being unfavorable to health, there being no wind stirring, even when the thermometer has fallen 35° below zero before breakfast, as it does sometimes, or when even the mercury congeals.

TO CORRESPONDENTS.

J: C., of N. Y.—We have never known a tidal mill constructed as you have described, but it is quite common to have tidal wheels in floating arks. In Germany such tidal mills are numerous, they are employed for sawing and grinding.

E. B., of Mass.—A long crank does not double the power; there is no power in the crank; the steam is the power. We prefer the 12 inch cylinder, it will work smoother. See our last volume for an engraving of the hot air engine.

J. T. D., of N. Y.—Steam brakes have been applied in England to locomotives but not to cars, in the United States there have been some patents taken out for the purpose. With respect to the one exhibited at the Fair of the American Institute for last year to which you allude, what was the exact manner of applying the steam we cannot call to mind.

Practical Machinist, of Mass.—The atmospheric railroad would be very expensive, because very difficult to keep in repair, especially the tubes, which are so subject to leakage. It would be much cheaper to propel the cars by an underground chain going down one way and up another over pulleys, whereby a car could unhook and hook on in a moment.—This endless chain could be driven by a stationary engine. The atmospheric railroad has been tried more than once.

R. C. B., of Ill.—It is indeed true that it would be an advantage if we could get the force of the piston rod applied in a direct line, but this cannot be done, in converting a reciprocating into a rotary motion, for which purpose the crank is the best device known, and so far as the time is an item we can only take the space travelled over by the crank; at every point the power or force is less than that of the piston in line, but then the whole rotation gives out just as much force as the whole stroke in line,—It cannot be otherwise. The only loss is friction on the crank pin,

W. W. H, of Phila.—Yours has been received.

W. C. D., of Fla.—In a short time we will be able to give yours a place in our columns.

C. B. F., of Pa.—Baker's is the best where a slow motion alone can be given, but for a very rapid motion we prefer the other. Mr. H. cannot get a patent for pumping up water by a steam engine to drive a wheel; this was done when mechanics were living in darkness, it is an old plan and a poor one.

E. B. P., of Tenn.—Yours will receive due attention by-and-by.

J. O., of N. Y.—We will in a short time proceed with the engravings, but we would like to get a few more articles as a stock to commence, No. 2 has been received.

W. K. P., of Mass.—On page 265, Vol. 6, Sci. Am. you will find a boiler described, in which the wire, gauze is employed. We invite your attention to it.

G. V. A., of N. Y—We understand the principle of your alleged improvement in pumps perfectly well. It embraces nothing new or patentable, but is old and well known.

R. C., of Pa.—If a jet of the gaseous hydro-carbon be allowed to escape into the air, and a red hot coil of platinum be introduced into it, the wire will be maintained at a red heat, and the gas will be consumed invisibly; but if the temperature of the wire be raised to a white heat, the gas will immediately burst into flame.

E. E. S., of Mass.—There are machines for the purpose you name in use in England. We are not aware of any here unless Mr. Daniels uses them.

W. H. B., of N. Y.—It is not probable that you can obtain the back numbers of Vol. 8, from any source. We should like to procure a thousand sets and would pay a premium for them over the regular price.

R. B., of N. Y.—The plan you suggest as an improvement in steam navigation is old and well known. Several references might be given if deemed necessary.

J. M. Barr of Middletown, Del., wishes to purhase a machine for making shoe pegs, and knows of no one to whom he can address for information.

J. A., of Conn.—The main idea is good and we consider that you are fairly entitled to a patent on two or three points, of course we cannot here enter into the particulars, as it would be prejudicial to your interest.

A. C., of Ohio.—You had better solicit the member of Congress from your district to present your case to the war department.

J. V. S., of N. Y.—We think Benj. Pike, Jr., 294 Broadway, can supply you with the glasses.

M. K., of Ind.—If you can prevent boilers and flues from bursting and collapsing, you would certainly accomplish something worthy of the highest consideration.

J. W., of Ohio.—We are not aware of gutta percha tubes having been used for the purpose you speak of.

A. B. B., of N. Y.—If you will address B Pike & Sons, this city, they will give you better information on the subject of your enquiry than we are able to.

S. B., of Mass.—We think your chances for a patent are good. You can send the model, fee, &c., by express.

J. B. S., of Pa.—Your subscription is now paid to No. 46, present volume.

A. B, of Ala.—The back numbers of the Sci. Am., which were ordered by you were sent. Please remit 44 cts. in post office stamps.

T. W. of pa.—The first 43 numbers of Vol. 7, we will send you on receipt of $1,72.

W. M. M,—Mountains have an attraction for clouds, &c., as is well known to all men acquainted with natural philosophy, but upon your principle of reasoning, the springs would ascend to instead of descending from elevations. It is indeed true as you say, that the moon has an influence on the waters of the earth, but when the influence is passed the water sinks to the depth from whence they were raised.

T. T., of Boston.—We hope you will yet be able to send an electric message across the Atlantic without the necessity of laying down a cable.

Money received on account of Patent Office business for the week ending Saturday Jan. 1:—

S. & L, of Mass, $25; R. W. & Co., of Pa., $30; A. B., of Miss., $10; M. R., of Me., $10; G. D., of N. Y., $30; N. C. T, of N. Y., $35; J. E., of N. Y., $27; J. C. S., of Pa, $30; S. K., of N. Y., $20; G. B. R., of N. Y., $20; D. W., of N. J, $35.

Specifications and drawings belonging to parties with the following initials have been forwarded to the Patent Office during the week ending Saturday, Jan 1:

M. J E., of S. C.; S. K., of N. Y.; J. B., of Ill.; J. A., of Pa.; M. R., of Me.; C. W G., of N. Y.; H. F. R., of Pa.; G. B. R, of N. Y., E. B., of N. Y.; C. S. B., of N. Y.; D. W., of N. J.

V. P. & B. K., of N. Y.; S. C. M., of Ind.; M. & P of Vt.; H. G. R., of Pa; G. P., of Ct., and A. L. F., of Conn.:—The engravings of your several inventions are executed, and will appear in the Sci. Am., part in the next, and the balance in the following number.

A Chapter of Suggestions, &c.

ALL GONE, ALL GONE.—At the commencement of the present volume, we printed 5,000 extra copies, which we concluded would be sufficient for the subsequent demand.

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

PATENTEES—Remember we are always willing to execute and publish engravings of your inventions, provided they are on interesting subjects, and have never appeared in any other publication. No engravings are inserted in our columns that have appeared in any other journal in this country, and we must be permitted to have the engraving executed to suit our own columns in size and style. Barely the expense of the engraving is charged by us, and the wood-cuts may be claimed by the inventor, and subsequently used to advantage in other journals.

BACK NUMBERS AND VOLUMES—In reply to many interrogatories as to what back numbers and volumes of the Scientific American can be furnished, we make the following statement:—Of Volumes 1, 2 and 3—none. Of Volume 4, about 20 Nos., price 50 cts. Of Volume 5, all but four numbers, price, in sheets, $1. Of Volume 6, all; price in sheets, $2; bound, $2,75 Of Vol. 7, all; price in sheets, $2; bound, $2,75. Of Vol. 8, all the back numbers to January 1st (No. 16), but none previou.

GIVE INTELLIGIBLE DIRECTIONS—We often receive letters with money enclosed, requesting the paper sent for the amount of the enclosure, but no name of State given, and often with the name of the post office also omitted. Persons should be careful to write their names plainly when they address publishers, and to name the post office at which they wish to receive their paper, and the State in which the post office is located.

PATENT LAWS, AND GUIDE TO INVENTORS.—We publish, and have for sale, the Patent Laws of the United States. The pamphlet contains not only the laws but all information touching the rules and regulation of the Patent Office. Price 12 1-2 cts. per copy.

SCIENTIFIC MUSEUM.

Books for Mechanics.

Since we penned the article on "Intelligent Mechanics," we have received communications making enquiries respecting the most appropriate books for reading and study. It is no easy matter to point out from among a great number of authors the best works for a small library. There is Tredgold, on the steam engine for engineers, and Scott's Millwright and Machinist Assistant, both very excellent works, but expensive, the latter being $24, and the former much higher. There is a small work of Evans' on Millwrighting, (we do not know who is its publisher) and there is another by Hughes, published by H. C. Baird, of Philadelphia a very excellent little work; it is however, more a millers' book than a millwright's. A *first rate* book for millwrights is still wanting. Lardner's Mechanical Philosophy is a good work, as it is written in an interesting style. Mahan, on Civil Engineering, published by J. Wylie, N. Y., is a good work on that subject, and Prof. Bartlett's Philosophy of Mechanics, published by Barnes & Co., this city, is the best work on the subject extant.

The best way for every mechanic and artisan to do in selecting a good library, is to choose works treating of the peculiar trade or calling of each one. In speaking of intelligent mechanics, we want it distinctly understood that each one should endeavor to possess a great amount of *general* information. A man cannot be intelligent who merely knows *one thing* well; he should be acquainted with our standard authors of English literature, such as the works of the best English poets, historians, and men of science, also with the best authors of our own country, our divines, poets, and historians, and let us add, with the profoundest feeling of respect, our great law-authors.

We want our mechanics to be men of profound intelligence respecting the processes and workings of their own particular trades, and to possess a general, sound, intelligence on other useful subjects.

One branch of science and art is enough for each one, and along with that, general information. We are quite willing to give any correspondent all the information we possess about the best works relating to any branch of philosophy and science, but to specify all the books which we think should belong to every mechanics' library would occupy too much room in our columns. In our literary notices of books, when we say, "this is a *useful* book for mechanics," we mean it, when we do not say this, it may or may not be useful for mechanics.

Our Textile Manufactures.

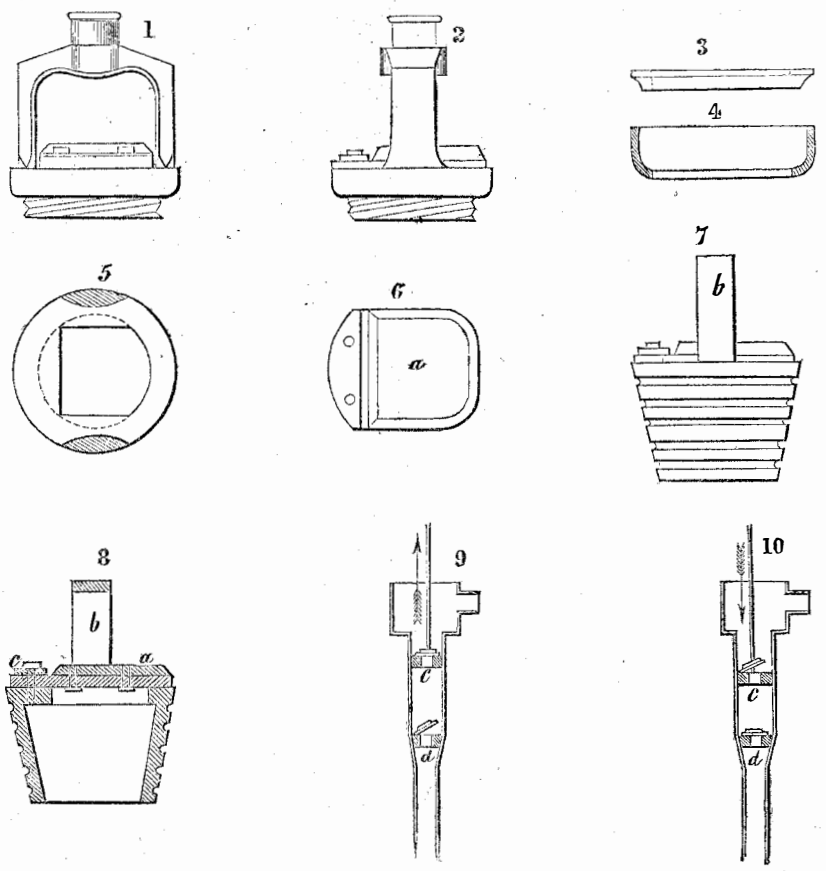
The forests of chimneys which, in Lancashire, Yorkshire, and some parts of Scotland, tell so plainly of the immensity of our factory system, usually impress the casual observer with the idea that manufacturing enterprize has outgrown itself, and even become a mere unmanageable excrescence. But what does M. Leonard Horner tell us? Why, that, in place of any diminution in the means of production, not fewer than 81 new factories were set to work last year (up to October) in the limited district of Manchester alone. And to work these new mills, 2,240 steam horse-power were required, besides 1,477 horse power to work the machinery consequent upon the enlargement of old mills. This gives a total increase in the district of 3,717 horse power, affording additional employment to somewhere about 14,000 hands. The still greater abundance of capital since this time shows itself with even greater results, and we now learn that new factories of extraordinary magnitude are springing up on every side. We should exhaust the space of a page of our print were we to attempt the bare recapitulation of these new concerns; but of the more notable ones we may mention that of Mr. Titus Salt, of Bradford, for the manufacture of alpaca. This mill will cover six acres, the principal building being a fine stone edifice, containing a single room 540 feet long.—Messrs. Fairbairn are engaged in the construction of the engines, of 1,200 horse-power, and the gas works, rivalling those of a moderately-sized town, are being erected by White's hydro-carbon gas company; they will cost £4,000, supplying 5,000 lights, the power of production being 100,000 feet of gas per day. Mr. Salt is also colonizing the place by building 700 workmen's cottages. The total cost of this unrivalled undertaking is calculated at £500,000. Great Britain must prosper whilst her textile manufactures flourish.—[London Expositor.

Wells, Artesian---Raising Water.

(Continued from page 128)

Artesian wells require no pumps, their principle, as differing from other wells is, that they overflow, while the water has to be raised from other wells by machinery of some kind. Many different machines have been and are employed to elevate water. The common bucket and windlass is the most simple arrangement for raising water; this we represented in our last, and the apparatus is so well known that no words were required for explanation. There are other machines, however, and the number is neither few nor far between, and some of these we intend to present to our readers. The number and variety of pumps is not small, indeed it is legion.

The principle of the common pump is very simple, it consists merely of a barrel or cylinder into which is fitted a light bucket or plunger with a valve in it as represented in the annexed figures, where the sections and



the whole of a pump are represented in two working positions; the sections are on a larger scale than the pumps. Figures 9 and 10 are sections of the same pump; *c* is the bucket; it has a valve in it opening upwards. A similar valve, *d*,—opening upwards also—is situated at the bottom of the handle, and is termed the sucker. The action of the pump is as follows, when the bucket is drawn up in the barrel as represented by the arrow, a partial vacuum is formed under it, as it works air tight. The valve in the bucket is kept close by the pressure of air above it, while the sucker valve, *d*, is opened by the water following up after the vacuum created by the act of the bucket or plunger as shown in figure 9. The water is forced through the barrel upwards, by the pressure of air on the water in the well, while the pressure of air has been removed from the surface of the water in the barrel by the act of the bucket.—When the up stroke of the bucket is complete, and the space under it in the barrel filled with water, the water cannot turn downwards through the sucker valve, when the down stroke is commenced, for that action closes the sucker valve, the downward pressure on the bucket—water being incompressible—forces open the valve in *c*, and the water then gushes through it, and thus the water passes above the bucket. On the next up-stroke of the bucket, *c*, it is evident that the water which is above it will be lifted up and forced out of the spout. This is the principle of the common pump's action, and there is not a single handy mechanic in the world but can make one for himself. The details of such a pump as that described—a good one—are shown in the sections above. Figs. 1 & 2 are elevations of the bucket, and for a first rate one are made of brass. The screw at the bottom is for leather packing, shown by figure 4. Fig. 3 is a ring, the cup leather packing can be removed or refixed, by screwing or unscrewing said ring over it. Figures 7 and 8 are an elevation and section of the lower clack valve or sucker, the grooves are for hemp packing. To remove this sucker, a hook is inserted in the pump barrel to catch part of it; the clack (really the valve) is of leather, with a plate of lead, or brass, or iron screwed to the upper side, as shown in figures 6 and 8; *a* is the brass or metal plate, and *c* is a metal strip to screw the clack to its seat. Figure 5 is the sucker valve seat. The hinge of the valve is formed by the elasticity of the leather itself. The body of the pump may be of cast iron, or a hollow log.

The Caloric Steamship.

Many of our newspapers do great injury to community by publishing flaming accounts of projects with which they are not acquainted, and attempting criticisms about machines in a way calculated to deceive the public. It requires a mass of scientific historical information about inventions, and great reflection to form a correct judgment about new inventions and discoveries. The public has had occasion to know that within three years some professors of chemistry, and editors of *some reputation* were deceived, and did deceive the public about the decomposition of water and the formation of a new light.

At the present moment there is a new ship at one of our docks getting in very large engines, which are to be operated by hot air. The hull of this ship is very fine; independent of any power but wind, she must sail well, but there is a grand furor among the press (because it is something singular) to give the best and most flourishing accounts about it. One day recently the wheels of this steamer moved, and straightway every daily paper in our city noticed the important event next day. Here is the substance of the language used by them all: "Fire was applied to the furnaces for the first time yesterday afternoon, and resulted in the triumphant success of the experiment. At the start the wheels made three turns per minute, and shortly afterwards reached five turns per minute, at which speed she continued working for several hours, and would be kept in motion the whole of the night. This is much more than the most ardent friends of the invention had reason to expect."

In respect to news, some of our newspapers do very well, but when they touch upon scientific matters, inventions and new discoveries in mechanics and engineering, they utter, as the above quoted lines show, the most consummate nonsense. Those who reported the wonderful event must have been a long time headed up in barrels; surely they had never seen a steamboat in all their lives. We thus judge because the paddle wheels of a steamboat *sometimes move*, and to our knowledge we have never seen a record made of the *same* as an important event. If the moving of the wheels of the "caloric ship" "is much more than the most ardent friends of the invention had reason to expect," why in the name of common sense did they build it, for a mule could have turned them; but the proprietors expect a great deal more, and will no doubt obtain it; time, however, will try all, better far than tongue can tell.

LITERARY NOTICES.

HINTS TOWARDS REFORMS—By Horace Greeley; Fowler & Wells, New York: 12mo., pp. 425; price $1. The volume before us is the second edition of a work, by our well-known contemporary, the Editor of the Tribune newspaper. It consists, principally, of political and social disquisitions in the shape of lectures and addresses delivered at various periods, by the author, expressive of his sentiments upon those subjects. Many of the ideas broached are original, but the main fault of Greeley, as a Reformer, is in the visionary character of his plans, or rather in their want of practical details, which are usually overlooked as of none or of only secondary importance. The present edition is somewhat enlarged, with an appendix, containing the "Crystal Palace and its Lessons." We were, however, disappointed on reading his account, which is very meagre, and contains but little information on the subject. The "Lessons" are not worth much, and, on the last page, Horace Greeley has proved himself a false seer, for his phrophecies of what was to take place, in 1852, have not turned out as he had anticipated—Europe has remained in tranquil repose, Kossuth lives quietly in London, and the "false juggler of the Elysee Bourbon," instead of dreading "the ides of May," to quote the words of the Author, is now Napoleon III, by the votes of the French people.

LIFE AND MEMORIALS OF DANIEL WEBSTER—2 vols., 12mo.; price 50 cents: Appleton & Co., New York. These volumes, which form a part of the series of "Appleton's Popular Library," contain a biography of the late Daniel Webster, with personal memorials of the departed statesman, and other original and interesting memoranda, respecting him while alive. A part of the contents have already appeared in the "New York Daily Times," from which they are now re-printed under the author's supervision, but additional information has been gleaned from other sources. The second volume is particularly interesting and well worthy of perusal.

Graham's Magazine for January is one of the most beautiful numbers yet issued of this sterling serial. In point of beauty of illustrations typographical appearance, and with al its choice array of contents, it has never been equalled by any other publication of the kind.

MEYER'S UNIVERSUM—Part 11 contains four beautiful steel engravings and descriptive text. The present number commences a new volume. Price of each part 25cts.: H. J. Meyer, 164 William street, N. Y., publishers.