Scientific American.

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

VOLUME VIII.] NEW-YORK, MAY 7, 1853. [NUMBER 34.

ATMOSPHERIC TUBE TELEGRAPH AND RAILWAY---Figure 1.

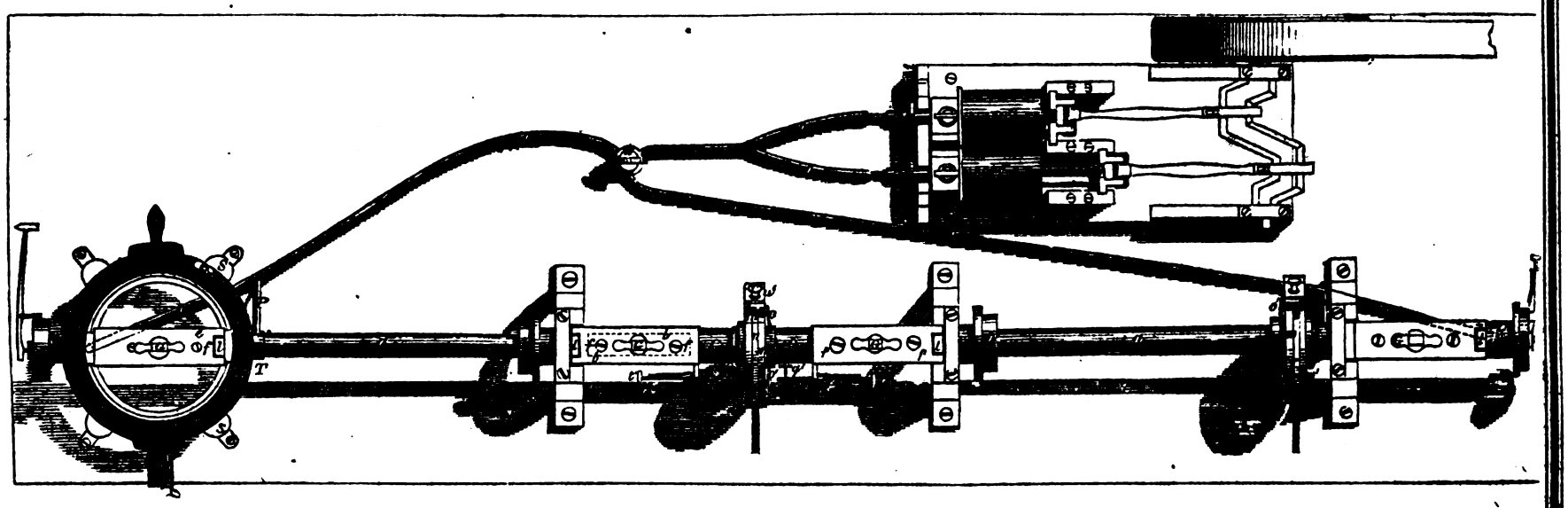
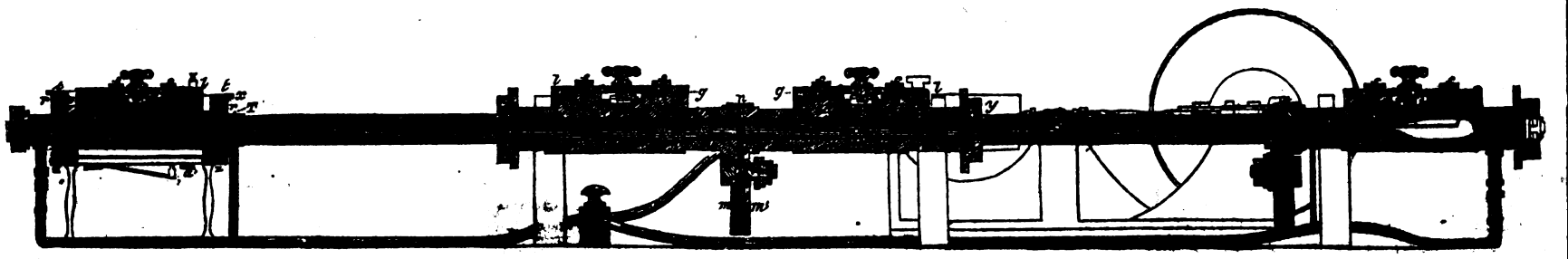


Figure 2.

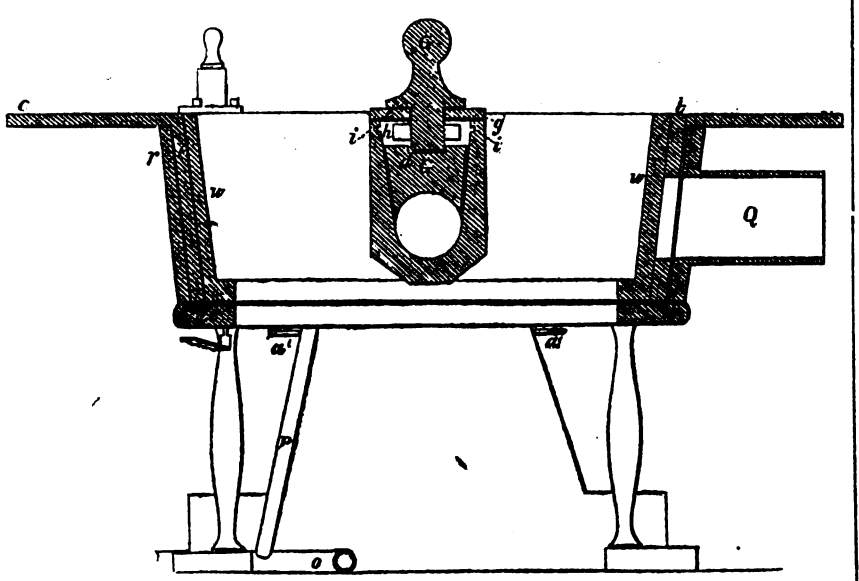


The annexed engravings are views of the atmospheric telegraph invented by Ithiel S. Richardson, of Boston, Mass, the object of which is to transport packages and letters through tubes from city to city with great velocity by exhausting the tubes of their air and making the packages move in the vacuum thus produced. This is the atmospheric telegraph about which so much has been said, and ignorantly too, in many of our daily papers. The idea of sending packages through air-tight tubes is not new, nor is this the first attempt to carry out the idea; no claim is set up for it in this light. All plans heretofore tried, have from principle or mechanical defect in their construction proved abortive. The philosophic principle involved in thus transmitting packages, &c., is correct, the difficulties in the way of carrying it out, have been mechanical ones, which Mr. Richardson is believed to have overcome. His improvements are certainly ingenious, and promise, so far as they have been tried, good results—the accomplishment of something long desired, and much needed in the present state of science and commercial progress.

Figure 1 is a plan view showing the main cylinder, air pumps, air tubes, and station boxes: figure 2 is a vertical longitudinal section of figure 1; figure 3 is a transverse section; figures 4 and 5 are plan views of parts of the station boxes for receiving and transmitting messages along the main and way lines. The same letters refer to like parts.

a a, figures 1 and 2, is the main cylinder through which the packages are transmitted; it is laid either above or below the surface, of the ground, and laid as evenly and directly from one point of the country to another. The main tube may pass through various cities and villages on the main route, and stations are formed at any or all of these places for transmitting packages, &c., along the main line, and at these stations branch lines may intersect the main line, the whole working harmoniously together. At the termini of the line and at the way stations, air tight station boxes, T, are placed for introducing and receiving the packages, &c. They are constructed as follows. An opening, *b b*, seen in dotted lines, figure 1, is cut in the top or side of the main cylinder or tube. At the point where the opening is made the cylinder is enlarged as seen at C, and the valve which closes the above opening is hinged to this enlargement or box. This valve is made in two parts, firmly rivited together by screws, the lower part, *d*, fits closely into the opening in box, C, and corresponds to the opening in the cylinder. The part, *d*, is grooved beneath as seen in figures 2 and 3, to form an unbroken cylinder for the passage of the plunger. The upper portion of the valve is firmly united together by screws, *f*, the part below fits air tight around the edge of box, as seen at points, *g g*, and the valve is held firmly in place by the catch, *h*, attached to handle, G. On the handle being turned this catch enters into the groove, *i*, in box, C, figure 3, the shank of the handle being so united to the catch by screw, *k*, that after the catch has entered the groove another turn, more or less, of the handle, forces the screw upon the latter into the catch and thus brings down the cover firmly upon the sides of the box. Along the point of contact of the box and cover, india rubber may be introduced for the purpose of procuring an air tight joint; this valve or cover is

Figure 3.



united to the box by the hinge, *l*. When it becomes necessary to arrest the progress of the plunger at an intermediate station between the point from which it is started and where the air pump is located, a check plate is used; *m m'* are two circular metal plates firmly secured to the main cylinder; they have circular openings in them corresponding in size and position to the bore of the tube; between these two plates is placed the check plate, *n*, figure 4. There is a screw bolt, *o*, by which the plates, *m m'*, and *n*, are all secured, and around which the plate, *n*, is allowed to revolve. The nut of this bolt has its bearings upon springs, *o' o'*, which bear upon one of the plates, thus securing a pressure upon the check plate, *n*. In this check plate, *p*, is an opening corresponding in size to the bore of the main cylinder. When plate, *n*, is so revolved upon its centre that the opening, *p*, corresponds with the bore of the cylinder, plunger, and its load of packages, &c., are permitted to pass on to the next station. When, however, it is required to arrest the plunger on its arrival at a particular station, the check, plate, *n*, at that station, is turned until the small opening, *q*, is opposite to the bore of the cylinder. This opening is large enough to permit the continued exhaustion of air through it, but not large enough to admit the passage of the plunger, which is thereby arrested at the station as required. The smallness of this hole does not allow all the air to escape before the plunger, but leaves a portion behind, which acts as an elastic air cushion to prevent the violent concussion of the plunger. Other modifications of the check plate may be used, but the one represented in figures 1, 4, and 5 is preferred. At stations where transverse way lines diverge, the station box is made to act like a turn table; *r*, in figure 3, is a metal stationary ring, with lugs, S, figure 1, to which supports are attached. From this ring emanates the branch pipe, Q, which has a corresponding opening to that of the main pipe; *t* is a movable metallic ring fitting closely into *r*, and revolving freely within it. This ring has an opening, corresponding to the bore of the main cylinder, and a small one, opposite to it; there are also two other circular holes in this ring, a quadrant distant from these; *x* is a ring attached to ring *t*, resting upon the top of ring, *r*; *y y* are handles attached to plate, *x*, for revolving it. Within *t* is a third ring, *w*, which is movable, and carries box, *c*, into which the plunger and its load of packages, &c., are received on their arrival, and in which they are placed preparatory to being sent off. The ring, *w*, is secured to the horizontal plate, Z, by screws, *a'*, and thus the rings, *t* and *w*, are held in place, within the stationary one, while they are permitted to revolve as may be required.

It is positively necessary that for an atmospheric telegraph to succeed, the carriage which carries the packages must move perfectly air tight. This has been an insupera-

ble difficulty with *ball carriages* of metal and india rubber, which have been employed heretofore. Mr. Richardson does not use a ball but a plunger of a peculiar construction, which always fits air tight in his tube, forming his carriage to carry packages, &c., and which moves with a great reduction of friction, and is capable of being very easily repaired at any time. Fig. 6 is an enlarged view of this plunger or carriage with a bag attached: *b* is a metal shaft having two or more disks of soft leather, *d'*, confined between metal discs, C', these leather discs are made a little larger than the interior bore of the cylinder, and when the pressure of the atmosphere is exerted upon the rear side of them, they fill up the inequalities—if there are any—of the cylinder, and an air tight joint is formed. At the advance end of the shaft is a buffer, *f'*, of leather, to prevent injury to the surface of the check plate by the metal end of the plunger coming in contact with it. A nut, *h'*, and screw, *g'*, serve to tighten up the discs when necessary; *k'*, is the bag for carrying parcels and letters. This plunger is placed in the main tube at any of the station boxes, and as the air is exhausted from the main pipe, before the plunger by the air pumps, P' P', the said plunger fills up the pipe air tight and rushes onward with its bag in the vacuum with great velocity. The air pumps are to be worked by a steam engine, and a way is provided to lubricate the interior of the tube as the plunger with its load is rushing through. As the air is exhausted from before the plunger, it is evident that the plunger is driven with atmospheric pressure at the rate that air rushes into a vacuum, barring the loss of velocity by friction. In all the atmospheric telegraphs heretofore proposed, the motion of a long column of air behind the ball or carriage has presented an insuperable obstacle to its operation on a long line. To obviate the evil of working on a long column of air behind the piston, new air is admitted at different stations along the line behind the plunger, and the long column is cut off so that the action is like a succession of short effectual efforts. This is done in an ingenious manner,—by valves hanging in the main tube connected with the atmosphere, which are acted upon by the plunger as it rushes through the tube, when the air is cut off a short distance behind the plunger, and a new column commences to act, to force the carriage through. This arrangement is not shown, but it is an important and ingenious one, and its principle of action will be understood.

Figure 4.

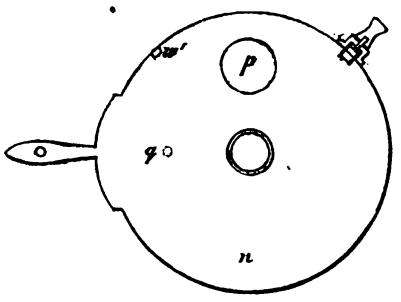


Figure 5.

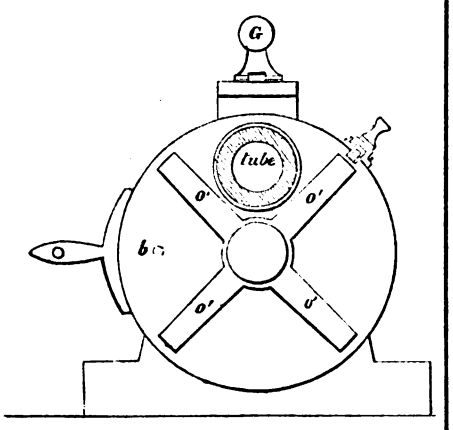
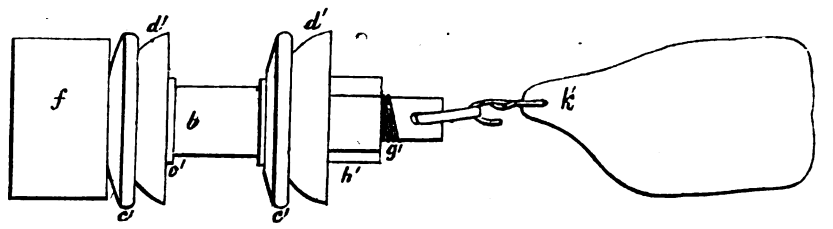


Figure 6.



Operation—The check plate, *n*, is turned so as to close the cylinder at the point, *l*; the air pumps then exhaust the cylinder. The station box, C, is opened by raising cover *e* on its hinge, and the plunger (fig. 6) is introduced with its freight bag; the station box is then closed as described, and the check plate turned to bring the exhausted portion of the tube in communication with the station box, through the small hole, *q*, the valve being first closed, to prevent the pressure of the air. The air of the station box and cylinder are now of the same density, and the check plate is turned to bring the large hole, *p*, in correspondence with the bore of the cylinder. If the valve behind the plunger is now opened the atmosphere presses behind the plunger, and it then starts with its bag of letters and packages on its long journey in tube *a*. At whatever station the plunger is to be stopped, the check plate at that station is turned to check its progress. The station box is then opened, the parcels taken out, and a new one sent along, or part of the old load, to its destination, performing the like operations to those already described. When the plunger is to pass clear through a station box, the one formed with interior ring, *w*, and box, C, is disposed as in figs. 1 and 2. When the plunger is to be detained at a turn-table station the ring, *t*, is turned to present the large hole to the advancing plunger and the small hole opposed to it, is then at *x*, which operates similarly to the small hole of the check plate; the ring, *t*, operating like the check plate, *n*.

Figure 1 will give a very correct general idea of the nature and mode of operating this new Atmospheric Telegraph. The turn-table boxes, the check plates, the mode of packing the plunger, the mode of cutting off a long column of air, and letting on a new column, are entirely different from any other plan ever tried before to convey packages in an air-exhausted tube,

A correspondent of the "New York Daily Times" asserts that this Atmospheric Telegraph is similar to one laid down a few years ago between London and Windsor Castle. This, we say, is not correct—assertion is no proof; give us the proof for the assertion. We have the testimony in print, proposing a line of this kind in 1823, but the principle, as we have stated before, and the *modus operandi* for carrying it out are two different things. In 1833, a Mr. Spicer, of Philadelphia, exhibited an Atmospheric Telegraph before the Franklin Institute; the minutiæ of his plan we are not acquainted with; we have seen two or three models of different plans, that is, of apparatus to carry out the idea, but none similar to this in its details.

By reference to fig. 1, where the air pumps are shown in connection, and the mode exhibited of forming the vacuum in either end of tube *a a*, by the valve, W, of pipes, *o o*, also the turn-table box with its branch pipe, Q; likewise the station boxes on the middle of the figure, for putting in and taking out packages, a good idea of the general features of the plan will be obtained by any one; as every person knows, that a package can be carried through a tube in which a vacuum has been formed when the air is admitted behind it, and none suffered to pass into the vacuum.

A company is now formed in Boston to construct a line of this Telegraph, between that city and New York, and the stock is being fast taken up. A Bill is now before the Colonial Parliament at Quebec, for a charter to construct a line in Canada. The cost of laying down a line is estimated at $2000 per mile; the object sought to be accomplished is certainly a desirable one, and against which we can urge no objections respecting its principle. The difficulties, as we said before, are mechanical; the present plan is so ingenious, and so full of originality, that it promises success.

More information may be obtained by letter addressed to the Atmospheric Telegraph Co., I. S. Richardson, agent, 24 Merchant's Exchange, Boston, Mass.

Franconi's Hippodrome.

Not one of the least interesting accompaniments of the approaching New York World's Fair, is the above-named novel exhibition, which is now located in the vicinity of Madison Square and Fifth Avenue, in this city, and forms a striking object of attention even in its exterior, from its large proportions. It is intended for a Circus, to exhibit feats of horsemanship, gymnastics, and other similar amusements, on a grander scale than has ever before been attempted in America. The exterior of the building is very plain and unpretending, consisting simply of a wall of brick, about 20 feet high, with two wooden towers on the side facing Broadway, which, at this point, intersects the Fifth Avenue, and forms the boundary of Madison Square. A wooden roof extends from this wall immediately over the seats in the interior, which will defend the spectators from exposure to the weather, but the roofing mainly consists of canvas, which covers an area of 90,000 square feet, and is supported by five poles, each 80 feet high. Some idea of its size may be formed when we state that it is capable of containing at least nine thousand persons comfortably seated, and that there is room for three thousand more in the passages.

The interior, which is of an oval shape, is three hundred feet long, by two hundred wide, and the course is about one-sixth of a mile round. The middle of this vast area is laid out in beautiful parterres, the verdure of which presents an admirable and striking contrast to the dull brown of the course. These parterres are ornamented with illuminated fountains and handsome flower vases. The stadium, which contains these attractions, is separated from the course by a slight fence, and is entered by four gates. The course itself is about forty feet wide, and is covered over with loose earth. The whole interior is most imposing in appearance, and when illuminated by its one thousand gas lights the spectacle it presents is brilliant beyond description. The seats for the spectators are very well arranged for both comfort and strength, and due regard has been paid to the ventilation which will be a very important desideratum during the hot weather. The company of performers under the superintendance of Franconi the proprietor are numerous consisting of both sexes, as well as horses and other animals not often included in the *Circus Troupe*. The amusements are of the most varied character, imaginable and will attract myriads of visitors during the summer to behold them.

A New Country.

The "Washington Union" contains a communication from Henry R. Schoolcraft, Esq., descriptive of a section of country which is known by the name of Alharra. He says it is an attractive, well timbered, and fertile area of country lying immediately west of the Rocky Mountains, in mild temperate latitudes, to which, for the purpose of distinct allusion, he applies the above aboriginal term. This area is about 50 miles broad, and lies parallel to the Rocky Mountains for a distance of several hundred miles. It gives rise to both of the main and numerous sub-affluents of the Columbia River. It is a high plain, which is cut through by the affluents, of a most fertile character, bearing trees, and in some places high grass; and while the streams create abundant water-power for lumber and grain mills and machinery, they are free, or nearly free, from inundation of their banks. This district probably comprehends twenty-five thousand square miles, and if its capacities of production have been correctly estimated, would sustain a population greater than some of the Eastern and Atlantic States. According to the recent act of organizing the Territory of Washington, it lies chiefly, if not wholly, within the boundaries of this new Government. It is altogether a genial country, and seems destined to form a link of connection, by ordinary means of transit, with Missouri Valley, through the Yellow Stone. It may be noticed that while the eastern foot of the Rocky Mountains presents vast sand deserts and buffalo plains, the fertile lands in this area reach to the very tops of its western eminences.

The Crystal Palace.

The most attractive building in the vicinity of the Palace is the Latting Observatory, now in course of completion. It is situated on the highest part of the Island in full view of all the surrounding country, and will reach the height of 350 feet. The structure is an octagon form, with a base of seventy five feet in diameter, and will accommodate 2,000 people at one time on its various landings. It is of timber well braced with iron and anchored at each of the eight angles with about forty tons of stone and timber. At distances of 100, 200, and 300 feet, passengers will be lifted by a steam car to landings.

At the highest point will be placed a telescope of great power, which will be the largest in the country, with a 16 inch glass, or a glass one inch larger than the Cambridge telescope. The glass is now manufacturing in Europe, and until it is completed, a 10 inch glass will be used. The instrument will cost about $24,000. At the lower landings, the vision will be aided by chromatic telescopes, with four inch openings. From the second landing, the ascent, to those who do not choose to ayail themselves of the steam car, will be by means of a spiral stairway. The Observatory will cost about $75,000.

Breaking Telegraph Wires.

For many months past the managers of the Eastern line of telegraph, the press and the public have been greatly inconvenienced by the malicious breakage of the wires at about the time the steamers were due at Halifax. It has frequently happened that within the twenty hours next succeeding the announcement of a steamer of Halifax, the wires have been cut or otherwise tampered with as many as six times; and on some occasions the Eastern agents have been compelled to resort to horse expresses to transmit the usual reports between different telegraph stations. On Friday last week, after about fifty words of the Canada's news from Halifax had passed over the wires, they were interrupted, and remained so for several hours. During the afternoon the line was mended, but no sooner had the operator got to work than the line was again interrupted, under circumstances which leave no doubt but that it was the work of some miscreant. We hope that the guilty party will soon be discovered.—There is an object in all this, and it would be good for community to find out who were behind those employed to cut the wires.

The village of Cohoes, N. Y., on the lower Falls of the Mohawk has greatly increased of late. There are two axe factories there, making about 2,200 axes and tools every day. There are four large cotton mills employing about twelve hundred operatives; three extensive knitting mills, giving employment to about six hundred hands. There is one linen thread factory on a very extensive scale; one mill for making carpet and other yarns, manufacturing 1,000 lbs. of wool per day; one bobbin and spool factory; one large mill for sawing veneering; one extensive bedstead factory; one mill for manufacturing omnibus wheels; two machine shops; one furnace; one marble yard and works; one flouring mill. The population of the place is estimated at one thousand, and the capital invested at two millions of dollars and over.

A tree of the Sierras, which rises to the height of four hundred feet, and is of immense diameter, exudes juice that when crystallized, takes the name of pine sugar; it is almost as white as the best refined loaf sugar, and has a delicious aromatic taste.

(For the Scientific American.)

Effect of Alkalies on the Human System.

It is well understood that at the present ıy alkalies are used, not only alone, but ore frequently in combination with acids in .e manufacture of various summer drinks, ıd in many other domestic purposes, and ıld to the public under a multiplicity of ımes, rendering the pointing out of any parcular one entirely useless, sometimes as an fervescing draught, at others to produce arficial fermentation, for the quick and cerin raising of cakes, bread and all kinds of ıstry; now I firmly believe that the continued use ot articles, so prepared, is highly jurious to the coats of the stomach and bows, and I think that opinion may in some ıeasure admit of demonstration, for wherever we find these articles of diet so prepared ı frequent or constant use, there we find the reatest amount of weakness of the digestive rgans, dyspepsia, &c., with their long train f concomitant evils, thus producing, from ıeir continued use, the very ills they are said) prevent. I do not mean to say that a glass t soda-water, or any other effervescent mixure, taken now and then, may not be useful n correcting acidity of the stomach, but that ıs frequent repetitions, as a beverage, does the njury by stimulating first to increased action ;he digestive powers, and then like all ›ther stimulants leaving them in a greater degree of languor and torpidity than they were .t first. I mean by stimulating that they first rritate the inner membrane or coat of the ıtomach, and then produce in it a state of morbid sensibility, and not unfrequently ending in ılceration. I also think that these means inure the gastric fluid, both in quantity and quality, if so, then no perfect digestion can be carried on, and these remarks apply with equal force, if not more so, when such articles as saleratus, bi-carb. soda, tartaric acid, &c., are used in producing artificial fermentation in making bread, pastry, &c. I use the term artificial, considering it to differ essentially from what is generally held to be true fermentation inasmuch as no heat is evolved but rather to the contrary, neither can be produced in the vinous or saccharine; the acetous stage under certain circumstances may be such, as for instance, combining such mixtures with flour and allowing it to stand or to be kept some time without being used. I account for this from the well known affinity and absorbing power of all alkaline substances for moisture from atmospheric air, and this taking place would unite with the gluten of the flour and thus produce the acetous stage, or in plain terms, render it sour, and totally unfit for human food. The only point, I think, in which the true and artificial agree is, that in both instances carbonic acid gas is set free, but suppose these mixtures are only added to the flour, a few minutes before placing in the oven, it does not make the matter much better, I admit any thing so prepared may look very nice and light, but I firmly believe that articles so prepared and continually used would be attended with all the evil consequences, I have stated. I look upon free discussion as one great means of eliciting the truth on any subject, and surely where the health of a community is at stake, it is a momentous one, and should not be trifled with. What I have said has been, in a great measure, derived from my own experience ot the effects of such mixtures upon others, and I have heard similar remarks from eminent physicians, both in this country and in Europe.

Brooklyn, 1853. J. H. Montague, M. D.

The New Arctic Expedition.

A second expedition in search of Sir John Franklin is about to leave our shores under the charge of Dr. Kane. It is to be an overland and aquatic expedition. A condensed and valuable stock of provisions have been laid in, which, in many respects, is better calculated to sustain those composing the expedition than any that has ever been laid up for such purpose. The celebrated Meat Biscuit of Mr. Borden, for which a Council Medal was granted at the World's Fair, forms part of the provision cargo. The meat biscuit has after careful experiment, been adopted by Dr. Kane for his sledge journeys. It combines the essential elements of flour and beef, and six ounces a day have been proved to be sufficient to sustain life while in active exercise. Sir Lyon Playfair, who analyzed this article at the World's Fair, reports in unqualified terms as to its value. There are lots of pemican, dessicated vegetables, preserved milk, and everything suggestive of good, to sustain the hardy and determined explorers.

The pemican ot the expedition was prepared on a large scale from beef, and the whole process was superintended by Mr. Borden—the inventor of the meat biscuit—who had been selected by Mr. Grinnell to carry out his instructions. We were told that four thousand pounds of meat and one of lard would make two thousand of this concentrated diet, and that the scale ot Dr. Kane's rations for his final sledge journey over the Polar ice, would be limited to two pounds per man per diem of this novel compound of beef and grease. The pemican was prepared in a large kiln of some twenty-five feet square, heated to a temperature of about 140 degs. Fah. The steak, when dried to one-fourth of its original weight, was ground to the size of pounded hominy, and then mixed with an equal weight of pure lard.

Locomotive Boilers.

An excellent paper on "the Principles of Locomotive Boilers," was recently read by D. K. Clark, before the Institution of Civil Engineers, London. It was agreed that the combustion of coke in the fire-box was in practice very completely effected, and was independent of the strength of the draft, and that expedients for producing combustion were useless. The combustion of coal might be perfected in practice by a judicious use of the ash-pan, damper, and door. In the laboratory it was found that 12 lbs. ot water were evaporated by one of coke; in the best ordinary practice of boilers, it was found that 9 lbs. of water or 75 per cent. was obtained from the fuel, the balance being lost by leakage, &c. A minute analysis was made of the results of numerous authenticated experiments on the evaporative power ot locomotive boilers of various proportions. It was concluded that the economical evaporative power of boilers was materially affected by the area of the fire grate and by its ratio to the whole heating surface. An enlargement of the grate had the effect of reducing the economical evaporative power, not necessarily affecting the quality of combustion in any way, but governing the absorbing power of the boiler as the lower rate of combustion, per square foot of grate due to a larger area, in burning the same total quantity of fuel per hour, was accompanied with a reduced intensity of combustion, and by a less rapid transmission of heat to the water, in consequence of which a greater quantity of unabsorbed heat escaped up the chimney. An increase of heating surface again, reduced the waste of heat and promoted economy of fuel, thereby greatly adding to economical evaporative power. His conclusions were:—1st, That the economical evaporative power of locomotive boilers decreased directly as the area of the grate was increased while the heating surface remained the same.

2nd, That it increased directly as the square of the heating surface, when the grate remained the same.

3d, That the necessary heating surface increased only as the square root of the economical evaporative power.

4th, That the heating surface must be increased as the square root of the grate area, for a given economical evaporative power. It is generally considered that large grates were an unmixed good, and were so recommended and adopted, still they could be made too large. Concentrated and rapid combustion was the true practice for the largest and smallest boilers, and in locomotives where lightness, compactness, and efficiency were the primary objects, the boilers should be designed for the highest rates of evaporation per foot of grate. For every square foot ot grate surface no less than 85 times that amount of heating surface should be employed. It was also shown that the clearance between the tubes for the circulation of water and steam was too small in many boilers.

Locomotive Furnaces.

The following remarks on Locomotive Furnaces are by Zerah Colburn—good authority on the subject—and taken from the "American Railway Times," (Boston) of the 21st ult.; they will tend to confirm the views of D. K. Clark. The dimensions of locomotive furnaces are to be fixed from their required evaporative power, although a majority of engines are of such arrangement, for adaptation to a narrow gauge of track, that the furnace does not have the sizes which are due to its task. The proportions of the arrangement known as the furnace are its cubical contents, its inner surface, and particularly the surface of the crown or top sheet, the opening for the entrance of air, and the opening for the escape of the heated gases.

In the fire-boxes of the engines built by Hinkley in the years 1847, 1848, and 1849, a majority had 33 cubic feet of content; 50 square feet of inner surface in contact with water, of which 8·3 were crown surface; 8·3 square feet of grate, ot which 2 4 were air openings (being 29 per cent. only of the whole surface). The opening of tubes inside of thimbles being 125, and of 1 3-8 diameter, is 1·64 square feet. The engines furnished with these fire-boxes would evaporate about 180 cubic feet of water per hour, when doing good work. For the amount of evaporation, these engines have quite small furnace proportions, when compared with recent engines from the same and other builders, and yet these furnaces would make steam very fast. To furnish the draught for these furnaces 2,500 cubic feet of steam, at the working pressure, were discharged in each mile run, through two round openings of 1 7-8 inch diameter each. The relative efficacy of furnace surface is often stated, on the strength of experiments made by Stephenson, as being three to one of tube surface. And, from experiments made by Armstrong, the crown of a furnace has twice the generative power ot its sides with equal extent ot surface. It cannot seem entirely the best plan to adopt depth for length of fire-box, and yet many do not learn to make any distinction. Hinkley has furnaces on the Erie road of a depth of 5 feet 4 inches, from crown to grate. The water spaces are seldom made any too wide.—Many Boston built engines have wide grates, obtained by a reduction of the water spaces to 1 1-2 inches. Three inches would be better, and the inner sheets should have an inclination inwards, so as to give a better chance for the steam to rise through the space.

Where the door is placed very near the top of the furnace there is always a great deal of cold air rushing through the tubes when firing. The door is usually carried as high as it can be for convenience in firing, but if dropped some inches, its opening will not affect the pressure of the steam as readily as otherwise.

It is a practice not always observed, of fitting a grate closely to the sides of a furnace, and of closing up the front ends. There is a saving of fuel in this, which rewards the pains taken to do it. It should be a point to take the air directly through the fire, instead of allowing it to enter upon and ascend the walls of the furnace.

It is known that thin iron has less chance for becoming blistered than thick iron.—Many furnaces made of 3·8 inch iron, become badly blistered after a short wear, and 1-4 inch iron stands extremely well in the New York and Erie engines. With increased durability it has the advantage also in having less weight. Crown sheets ot this thickness need extra-staying to support their load. If the stay bars rest upon the sheet near its edge, the sheet may, if thin, collapse downwards. This was the form of explosion which disabled the engine "100" upon the Erie road. This engine had a crown sheet ot 16 square feet, carrying a load under the maximum pressure of 150 pounds per inch, of 172 tons! The stay bars should rest at their ends upon the upper edges of the side sheets.

Copper, from its extra soundness and durability, and extra conducting power (2 1-2 times that of iron) is sometimes preferred for furnaces. A copper furnace is, however, an expensive article, and should be used with pure water, which should be often blown out. The boilers provided with it should have ample steam room, and a good depth of water on the crown sheet. By observation among a large number of engines it is undeniable that those having copper tube sheets show the tightest tubes. Every engine on the Boston and Providence road has a copper tube sheet, and six engines have entire furnaces of copper. All these engines receive their feed water at a distance of six or seven feet from the tube sheet. It is customary to blow off the boilers twice a week, and leaky tubes are almost unknown on the road.

Anthracite for Steamers.

We clip from the "European Times," the following paragraph, reciting an instance in which anthracite had been used with great advantage, in lieu of bituminous coal, in a late voyage of one of the English steamers. This testimony in favor of the substitution of anthracite for the coal now commonly employed for fuel in the propulsion of steam vessels has special interest for our readers, and we, therefore, invite attention to it. The "Times" says:

"At the banquet which followed the trial trip for testing the Boomerang propeller, on Tuesday, Mr. Lamont, the chairman, referred to the use of English anthracite in lieu of other coal. They had tried it with complete success in the last voyage ot the Livorno, having found that it was more serviceable, and took up much less space. In her previous voyages the Livorno required 17 tons of coal, whereas she had only consumed 12 tons 5 cwt. of anthracite. He thought this would create as great a revolution as the Boomerang, because, if they could save a quarter of the consumption of fuel, much inconvenience and delay would be prevented. If the Great Britain, for instance, instead of consuming 1,500 tons of coals on her passage to Australia, only required 1,000 tons, she could accomplish the whole distance without touching at St. Helena for coal. The gain by anthracite instead of coal, would, in his opinion, be about 35 per cent., besides having the gratifying fact that anthracite was not liable to spontaneous combustion."

In England the anthracite coal fields have scarcely been touched, and they are somewhat extensive. In Britain and Ireland there are 3,720 square miles of anthracite and culm; the bituminous coal fields are 8,139 square miles in extent. No other coal but the bituminous has ever been used in that country for steamboats; the substitution of anthracite for the bituminous would certainly be a great improvement both as it regards cleanliness and economy. The Pennsylvania anthracite coal field extends over 437 square miles of area; they are therefore much smaller than those of Britain. There are 133,132 square miles of bituminous coal fields in America; the anthracite coal, that which is almost exclusively used in Pennsylvania and in our eastern and northern cities, is found only in Pennsylvania, and is the most valuable deposit for its size in our country. The Collin's steamers use anthracite going to Liverpool, and Welsh subbituminous coming back. This Welsh coal is excellent for steam navigation; in fact, it is allowed to be the best in the world, and it has appeared to us that the Cunard Company by using such abominable stuff as that which they take in at Jersey City, do not show much sagacity so far as quality is concerned; but as Mr. Cunard, Sr., is chief of the Cape Breton and Nova Scotia Mining Co., he no doubt consults his own interests.—The bituminous coal district ot British North America, is 18,000 square miles area, or one half more than in Great Britain. These immense coal deposits were leased out in 1827 for 60 years, for £3,000 per annum to a single company. The grant was one of the most unrighteous ever made by the minions of a despotic government; it was granted to the Duke of York, and obtained, it is said, to pay off the debts of some of his mistresses. The people ot Nova Scotia should try and get this grant broken up in some way. No government should grant mines and minerals to any favoured individual or company.

Nutmegs grow spontaneously in the mountains of California, longer and more tapering in shape than the nutmegs of commerce, and superior in pungent flavor.

The steamboat Ocean Wave was destroyed by fire on the night of the 29th ult., on Lake Ontario. 28 persons lost their lives.

NEW INVENTIONS.

Sewing Machine.

Measures to secure a patent for the above have been taken by Charles Miller, assignor to J. A. Ross, of St. Louis, Missouri. This machine is of that description which forms the stitches by the interlacing of two threads, one of which is passed through the cloth, and left protruding in the form of a loop, through which the other is carried by a shuttle. It is well adapted for the formation of what are technically called the button hole, the whip and herring bone stitches. The improvement in this respect consists in giving the cloth a movement which is in a direction lateral to that of the same. Another improvement is in the use of a friction roller, which presses the cloth firmly against the feed drum, so as to secure the effective action of the latter. The needle is secured to a vertical rod which is moved by a beam whose vibration is due to a cam. The shuttle works in a raceway sunk in the bed-plate, and is impelled by means of an eccentric. The cloth is fed by a drum turning loosely on a fixed axle below the bed plate, and which is made to move at proper intervals by a band from a ratchet wheel. The drum is capable of moving a short distance in the line of its axis, at the back end of the latter is a shoulder and in front of the drum is a spring which tends to push it against the shoulder, and a cam, by the intervention of levers and rods, impels the drum forwards, but on remitting its pressure it is pushed back by the spring. These changes of position occur about the same period as the rotary feed motion, that is, whilst the needle is not in the cloth.

Improved Fluid Burner.

Measures to secure a patent for improvements in the above have been taken by Samuel F. Allen, of New York City. The improvement consists in employing, in place of the ordinary lamp, a large fluid vessel or reservoir, which is to be filled with sufficient fluid to last a long time, and set at some suitable and safe distance from the place where the combustion of the fluid takes place and in such a position that the fluid, in finding its level in the wick tube will not rise higher than the top of the horizontal flame tube. The communication between the two is maintained by a flexible tube which thus supplies the latter with fluid for combustion, and a screw nut is fitted at the bottom of the wick tube which serves as a stand for the latter, and can be taken off when a fresh wick is required. To prevent the wick from burning away too quickly it is encased in a wire gauze which also serves to render the light more brilliant by supplying the fluid in a broader jet or stream.

Inside Door Fastener.

Measures to secure a patent for the above have been taken by Duncan E. McDougall, of Troy, N. Y. A plate is bent at a right-angle, so that a part can be inserted under the door whilst the upper portion presses against the face. On the back of this plate there is a bar whose back edge is formed with ratchet teeth, and also having a series of holes cut through its face. To this bar are secured two curved levers, which can be adjusted to suit the threshhold,—one lever is set below the other, and is attached by one end to a floor plate, having a number of sharp spikes for catching in the floor. The other lever forces the first-named plate against the door, and also gives it a downward thrust, it also acts upon the lever which presses horizontally against the door plate, the two levers being forced apart by a set screw, and the position of the first lever being ensured by the ratchet.

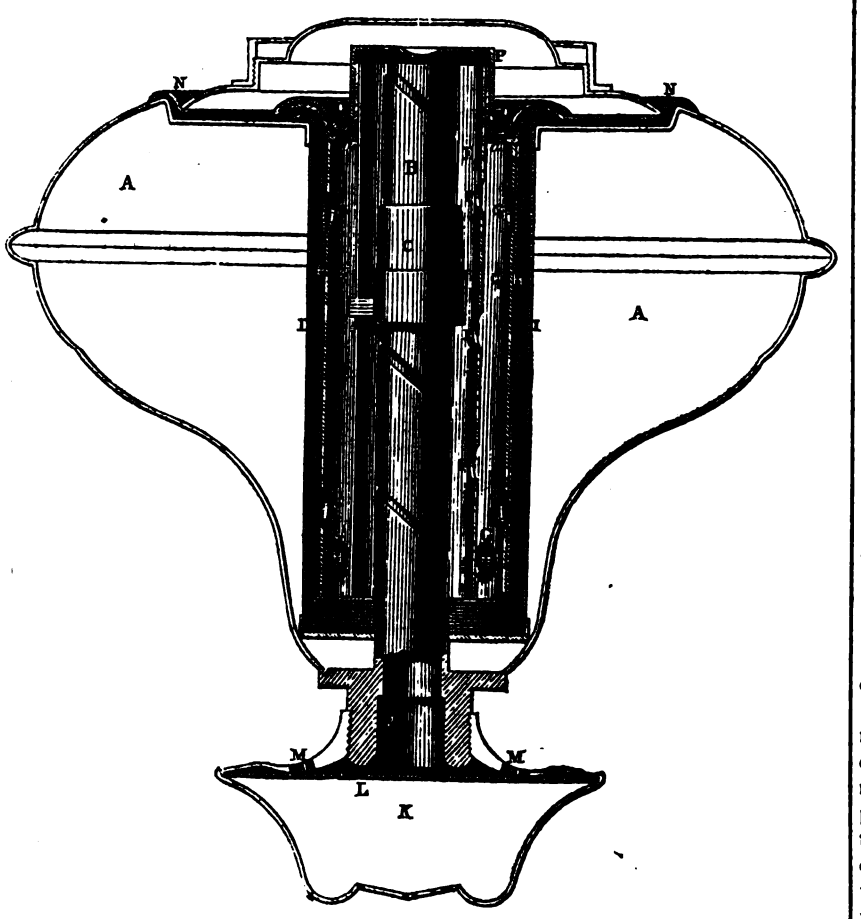
New Railroad Frog.

An improvement on the above has been invented by Benjamin H. Overhiser, of Binghamton, N. Y., who has taken measures to secure a patent. The point of the frog is secured in the bed-plate by having the lower portion of the point of a dovetailed form which fits in a correspondingly shaped groove in the bed plate. The point being secured in its place by means of a wedge or key, which is at the back end of the point, and forms a portion of it when in its proper position.

NEWELL'S WIRE GAUZE LAMP.

The annexed engraving is a vertical section of Newell's Wire Gauze Lamp for burning volatile hydro-carbon fluids. This lamp is similar to the common table globe lamps, and is designed to be set on a table, or into a socket and to be hung on a branch to the wall, with a reflector behind it.

A is the inside of the lamp for containing the fluid; B is the common screw tube, over which the circular wick thimble, C, is placed as in the common argand lamp. There is a cylinder of wire gauze around the tube, E, inside of tube, G, which fits like a sleeve over tube, E, as shown at H H. The fluid is poured in at the top, through a number of holes, a, in a circle. The fluid finds its way into the body of the lamp through the openings, G' G,' and it is fed to the wick through the small openings, F F, in the tube, E. There is a wire gauze cylinder, I I, fixed to the body of the lamp surrounding the tubes, and the tube gauze cylinder spoken of. The air to supply

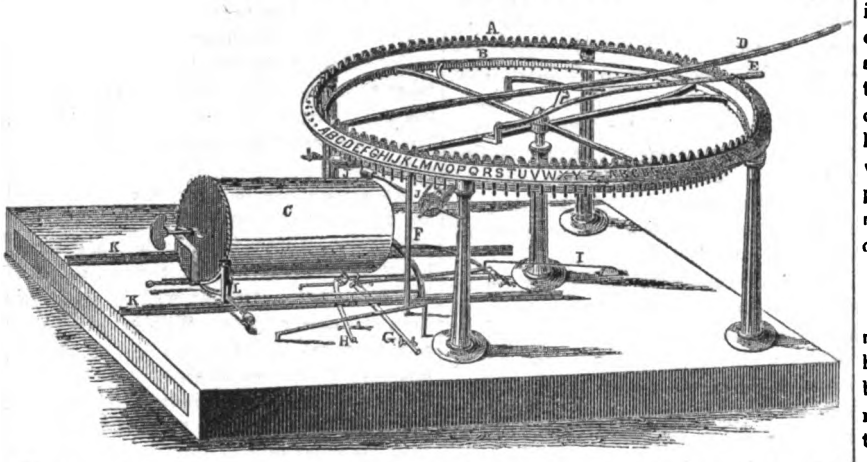


combustion passes through openings, M M, and up through tube, J. If any fluid is drawn up with the wick, it passes down the interior air tube into the small chamber, K, at the bottom, L, of the lamp. O is a cap to cover up the ring of holes through which the fluid is poured into the lamp. P is an extinguisher cap, which also prevents the evaporation of the fluid when the lamp is not used; it covers the wick perfectly tight; N, is the top piece common to all lamps which employ chimneys and a globe.

The wire gauze prevents explosions, even although the fluid inside may have passed into a gaseous state. This discovery was made by Humphrey Davy, who applied it to miners' lamps, but so far as we have been able to learn, it never has been before applied to lamps for burning volatile hydro-carbon fluids. The application is a beautiful and useful one, and is here presented to show what it is.

The lamps are manufactured by Newell & Co., Boston, and are sold in this city by G. W. McReady, 426 Broadway.

JONES' TYPOGRAPHER.



The annexed engraving is a perspective view of a press for printing letters, invented by John Jones, formerly of Clyde, N. Y., but now of Rochester, and for which a patent was granted on the 18th of June last.

A is a niched or toothed index wheel in a horizontal position, attached firmly to the bench by four posts; B is the type-wheel, arranged inside and below the index wheel, A, and has two motions, a revolving or rotary motion, and a motion in the direction of its axis, the type being arranged on its periphery, with the face of the type projecting a little below the rim of the wheel; C is a cylinder around which the paper is fastened, lying in a horizontal position, and resting on a carriage, L, which moves on the way, K K; D is a lever which the operator takes hold of in printing, having a small roller on its opposite end, which travels around on the under side of the index wheel, A, the middle of the lever resting in sockets in the lever, E. The lever, E, is forked at one end and attached by pivots to two prongs on the type wheel, the other end is kept high enough by a spring to pass around over the index; F is a rod working on pivots at each end, having two arms in the same direction; on the end of the upper arm is a roller which bears against the type when an impression is made on the paper; the lower arm is connected with the arrangement for moving the cylinder in such a manner as to cause the cylinder to move according to the thickness of the letter to be made; G is a lever used in making spaces between words; H is a lever used to let the cylinder run back when the line is run out; I is a cord passing over a pulley and attached to a spring inside to draw the carriage back; J J are the ink rollers that supply the ink for the type.

Strictly speaking, this is a machine for copying manuscript by printing it in letter form. It is a neat and ingenious little printing press for letters. The letter paper is put on the cylinder, C, which is pushed in towards the centre of the rings before printing is commenced, for every line. As the printing ring of type revolves or is moved round by the handle, D, every time the said handle is brought down the specific letter on the type ring leaves its impression on the paper, and cylinder, C is moved by the same action, a small distance forward, to leave a space for the next letter. The index ring, A, is for the purpose of showing what letter or figure the handle, D, hangs over, in order to press it down and imprint a like letter on the paper. When the cylinder, C, moves the paper to the end of a line, a small alarm is sounded, and the said cylinder is run back on its ways, and in doing so it is turned one notch around to leave a space for the next line. As the type ring passes over the ink rollers, each type receives its ink for printing. This ingenious machine is very compact, not over a foot square, and is not complicated considering the work it performs.

More information may be obtained by letter addressed to John Jones, care of A. M. Badger, Rochester, N. Y.

Improved Daguerreotypes.

An improvement in the process of taking daguerreotypes has been invented by James Brown, of New York City, who has taken measures to secure a patent. The apparatus employed is used in conjunction with the camera, and consists of an ornamental diaphragm placed in front with a suitable opening to take the picture of the intended object. The front of the diaphragm may be ornamented in any way by work in relief, or by drawing, painting, or otherwise, so as to form on the daguerreotype an ornamental back-ground. The diaphragm is made adjustable at different heights and inclinations by being fixed in a swinging frame hung on pivots in a standing frame, and having grooves to receive the sides of the diaphragm.

New Window Fastener.

Measures to secure a patent for the above have been taken by E. L. Brown, of Norwich, N. Y. The apparatus consists of a self-adjusting spring or weighted lever in combination with a notched hinge and a common slide bolt.—The slide bolt serves to retain the lever securely in the notches with which the hinge is provided, and thus render the opening and closing of the shutters from the outside impossible. The spring or lever is passed horizontally through a mortise formed in the vertical slide of the window frame, and secured loosely in the same by a fulcrum pin upon which it turns freely as its inner end is depressed and its weighted end raised, by which means the shutter is opened or closed as required

Improved Axle Box.

Measures to secure a patent for improvements in anti-friction axle and journal boxes have been taken by David A. Morris, of Pittsburg, Pa. Anti-friction axle boxes, as generally constructed, are practical failures, owing to the unequal wear of the anti-friction rollers, a defect caused by the irregularity of their revolutions. With a view to prevent this inequality and render the rotation of the rollers certain and uniform, the patentee furnishes each roller with a similarly toothed wheel at each or either end, and around these is an endless chain constructed to engage with the teeth of the wheels, and by this means uniformity of motion is ensured and all rubbing friction avoided.

We are indebted to Hon. S. Douglas, Hamilton Fish, and W. H. Seward, for repeated Congressional favors in the shape of speeches and public documents.

The tax on advertisements in British papers is to be abolished.

Scientific American

NEW-YORK, MAY 7, 1853

Citizen Knowledge.

There is a very general opinion abroad, an old and venerated one too, that learning and knowledge are two entirely different things. Thus, for example, a scholar—one who has a correct knowledge of the dead languages—is called "a learned man," while another person, better acquainted with art and science, but having only a knowledge of his native tongue, is called "an unlearned man." The distinction is not a correct one, for learning consists in the amount of useful *truths* (relating to any subject, art, or trade), which a man has stored up in his mind, and can apply, or direct others who to apply them, upon every proper occasion. The scholar is not to be lightly looked upon by the artist because he cannot model or paint a figure, neither is the artist to be treated lightly by the scholar, because he cannot converse about the works of Praxiteles in the language of the ancient artist. No one man can know all things or do all things, therefore a man should only be respected for what he does well in his profession, whatever that profession may be—a teacher of languages, or the sciences, or a maker of coats, or shoes. In speaking thus, we also assert that no excellence of hand, in executing works of art, or quantity of it,—in other words, however good a mechanic or artist a man may be, can make him respected, unless he is moral, honest, and wise. There are some qualifications, which every man must possess to make him respected, and others which every American should possess, apart from his occupation, whatever that may be, in order to perform his duties correctly as a good citizen. This we call "citizen knowledge." As we have said before, every man should do every thing he professes to do, well; if he is a machinist let him be a good one; if he is a carpenter let him not be a slovenly, coarse, and ignorant one, for his trade certainly can exercise the highest, and best qualities of mind; if he is a shoer of horses, let him shoe well, in short let all endeavor to excel in what their hands find to do. But along with this, every American citizen has great responsibilities resting upon him; liberty can only exist among a virtuous and intelligent people, and certainly it is our duty to warn our readers of a neglect of their duties, so far as it comes within the scope ofour journalism. The very great majority of our readers are mechanics and manufacturers, and to you, we say, it is our opinion, that you either lack some "citizen knowledge," or else you do not do your duty to your country in getting men appointed to offices, which their callings point them out as the very persons fitted to perform the duties of said offices, and also for suffering others to be appointed to such offices, whose profession, in a great degree, presents a total absence of the very qualities so necessary for the right performance of the leading duties belonging to the said offices. It is very evident to any one that there are many leading public offices in our country, which should be filled with mechanics and merchants, but all these offices are confined to a very small class, the lawyers; they fill every important office, from the President to the Collector of the Port of New York. Is it a fact that all the numerous trades in our country, our agriculturists, numbering two-thirds of the population, our professors and teachers, are all so ignorant, or thick-headed respecting the duties of the leading offices in this country, that they cannot be trusted? Is it creditable to our people thus, of their own free will and accord, to vote themselves incapable of self-government excepting through the hands of a very small class of our population. It is certainly a great honor to the lawyers, thus to distinguish themselves and stand up above all other classes. It is not their fault, but good fortune, thus to be distinguished, and we say unto our readers—our mechanics and manufacturers—"see well to it, where the fault lies in you, and remedy it as soon as possible." We have no doubt, however, but some offices, never filled by practical mechanics, suffer in consequence. "It is a most singular truth," says a late number of the "Shipbuilder's Manual;" that of the many improvements which have found place on shipboard in this country, those introduced by private enterprize, have very far transcended those of the naval service; so far has private enterprize outstripped the government in this particular, that the navy of the United States is no longer the right arm of her power or defence, our naval officers have been sent to learn from the navy of monarchies; those from other lands have been sent to learn from private enterprise, the secret of our success." So much as testimony against the evil of selecting all the leading officers of our country from one class. No man, however, learned in any profession can know everything, yet it is a fact, that one small class in our country is set up to know more than all the rest. To those whom these words are addressed, we say, "do you not think gentlemen that you would find some benefit in being more generally acquainted with the laws of our common country; do you not think there is something wrong in the management of the political affairs of our country; in short, do you not think there is a general want of "citizen knowledge."

Alloys of Iron for Railroads, &c.

At a recent meeting of the Institution of Mechanical Engineers in Birmingham, Eng., a very interesting paper was read by J. D. Stirling, on the composition and manufacture of alloys of iron. By introducing one-half per cent. of tin into the puddling furnace along with iron, a quality of iron crystalline, close in texture, and harder than common wrought iron was produced. This iron was very suitable for the wearing surfaces of rails and tires of wheels. It prevents lamination and wears smoothly and evenly. At points and crossings, and for rails upon sharp inclines of railroads, this kind of iron alloy was found to be far superior to any rails ever tried before, it had endured twice as long. It was believed that this superiority of the iron was not a result due to its greater hardness, but rather from the peculiar crystalline texture and fine grain of the iron enabling it to resist lamination, which high speeds and heavy engines so rapidly produce. This is certainly useful information for our manufacturers of railroad iron.

The addition of zinc and its oxides produces the opposite effect to tin, as the tin renders the iron more *crystalline*, while the zinc renders it more *fibrous*. Zinc renders cold short iron, tough and strong, and a great improvement is effected by the addition of zinc to red short iron. The addition of tin and zinc to iron is made at the time when the iron in the puddling furnace is beginning to boil. At the World's Fair, American iron of an excellent quality, made from cold and red short, to which some ore of zinc had been added, was exhibited. Mr. Ducloz, of Belgium, considers that the action of zinc in improving iron is not due to being mixed along with iron as an alloy, as zinc is volatile at the boiling point and he had analyzed some iron to which zinc had been added in the puddling furnace but found none in the iron; the zinc had all escaped in a state of gas, and yet a superior iron was made by a mixture of about one-fourth per cent. of zinc. There could be no doubt but this was due to a certain action, not well understood in the furnace, and not to an alloy formed with the two metals. These remarks respecting alloys of iron, we believe, are worthy of general attention. Cylinders and other machinery may perhaps be greatly improved by using alloys of iron.

American Steamship Aristocracy.

Many suppose that the European aristocracy, those descended from a long line of noble and ignoble and wealthy Barons are the only real wealthy and powerful persons or families in the world. This is all a mistake; petty German Princes and proud English nobles are but men of straw in comparison with some of our democratic noblemen—our aristocracy. It was a most astonishing event when the Marquis of Waterford arrived here in his own yacht on a pleasure trip; but all Europe will soon be taken by surprise, by a visit from one of our steamship nobility in his magnificent steamship—his pleasure steam yacht—in comparison with which the yachts of the English nobility are like fishing cobbles to a seventy four gun ship. The "North Star," for its owner, Cornelius Vanderbilt, is fast getting ready for her summer tour to Europe. Queen Victoria, Czar Nicholas of Russia, and Napoleon III, will get some of the conceit knocked out of them by a private citizen of New York.

Events of the Week.

New and old Bread—It is generally admitted that fresh bread differs from stale by containing a greater amount of water, the change after leaving the oven being attributed to a gradual drying. It is generally believed, that bread contains a greater amount of nutriment when stale, than new, and the only reason given for this is, that it contains less water. It is well known, however, that any person can eat more new than old baked bread at a meal, and the small portion of water lost by drying, cannot account for the difference, so far as the satisfaction of the stomach in eating is concerned. M. Boussingault, the imminent French chemist has recently shown that the difference between the fresh and stale condition of bread, is not due to a diminution of the water but to a peculiar molecular condition which takes place on cooling, and which continues as long as the temperature remains below a certain limit. M. Thenard explains this transformation, by considering the bread a hydrate which heat softens, and a low temperature hardens or renders less soft. The same effect actually takes place with many substances, such as grains, resins wax, gutta, percha, &c., which are softened by heat and hardened by cold.

Stale or old bread may be rendered tender after exposure in an oven heated to 158 degs. Fah. M. Boussingault has observed that bread will become stale even when kept in an atmosphere saturated with moisture. Bread may be transformed from soft to stale and vice versa. a number of times; its loss by moisture is very small.

Phosphorence at Sea—The waters of the sea, in some latitudes, and under certain circumstances, exhibit bright phosphorescent light. This has been observed by all voyagers, and has ever been a subject of great interest. On some nights, the ocean waves appear to be capped with molten brass, flaming, flickering, and hissing in terrific grandeur. Many have attributed the light of sea waves to electricity developed by the waves dashing against one another, or the resistance offered by the bows of vessels, or the dipping of oars in rowing. Some have attributed sea phosphorescence to minute marine animalculæ, while others have looked upon it as an effect produced from the very nature of the salt sea, like as diamonds give out their beams in darkness. Others again have supposed it to be a real phosphoretic effect produced by the decomposition of fishes and other marine animals. Great attention has been devoted to this subject within the past fifty years, by many eminent zoologists, and the most prevalent opinion is, that marine phosphorescence is caused by organized beings. It is well known that various kinds of fish are exceedingly phosphorescent, such as mackerel, &c. Viriani, a Professor of Natural History in Genoa has discovered that there are fourteen species of phosphorescent animals in the sea around that city.

Parker's Wheel Draft Boxes.—We have received a letter from O. H. P. Parker, of Phil. in reference to the statements furnished by J. Sloan, on page 253, respecting the area of the air tight cases or draft boxes, and the issues of the wheel. The letter says, "the best rule for ascertaining the proportions between the issues of the wheel and the air tight cases, is to be found by practice; thus after ascertaining the number of cubic feet of water the wheel will discharge per second, under a given head, the area of the air tight cases must be so proportioned that the water descending through them will not travel over one and a half foot per second. This rule should also govern the flume which conducts the water to the wheel. The velocity of air in ascending through water is 8 inches per second, consequently if the velocity of the water were reduced in the draft boxes to less than one foot, there would be much difficulty in getting the air driven out of the cases, and obtaining the full benefit o atmospheric pressure on said cases." As it only requires about half an inch of head to give water a velocity of one and a half feet per second when descending though draft boxes. Messrs. Parker—two brothers—have adopted that as a rule. It is necessary that the water should enter the shute as quietly as possible, reserving its power until it comes in contact with the wheel, on which it should expend its force, discharging with as little velocity as possible.

Next Eclipse of the Sun.

An eclipse of the sun will take place on the 30th of next November, and it will be total along a belt between the coast of Peru and the Sandwich Islands, &c. Prof. Schmidt, Royal Astronomical Observer at Bonn, on the Rhine, has written a letter to Lieut. Maury, of the Observatory at Washington on the subject, as we learn by the last edition of the "Sailing Directions," for which Lieut. Maury will be pleased to accept our thanks. Prof. Schmidt has sent some short instructions to be distributed among our scientific captains who may be navigating the Southern Pacific Ocean in the month of next November, and who may be favorably situated for taking observations. We hope that our sea captains sailing from New York to California between the 1st of August and 20th of next September will take schedules of instructions with them, and if they should be placed in favorable positions for making observations, to do so faithfully, and report to Lieut. Maury on the same. Some strange appearances have been observed on total eclipses of the sun, such as corona and red flames. It is very desirable that observations should be taken in different parts of the world in order to arrive at correct conclusions respecting the wonderful phenomena attending total eclipses.

Our Coasts on the Pacific.

The late heart-rending calamity of the wreck and burning of the steamer Independence, by which so many families have lost near and dear relatives, should direct the attention of our government to have a complete survey of the Pacific coasts on our continent. We know that our government has done something in this respect, but not enough; much has yet to be done, and when we consider what an amount of commerce there is carried on between New York and San Francisco, we hope that no efforts nor money will be spared to have correct charts at an early day, of the whole coast from Oregon to Panama.

Errata.

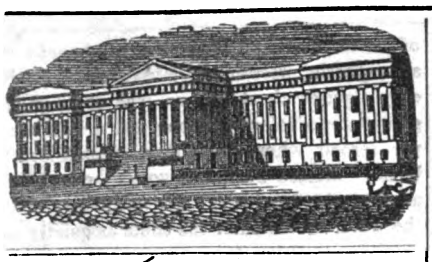
At page 252, this volume, Scientific American, under the head of "New Smoothing Iron," for Henry Benton, of Fairfield, Conn., read Henry Benton, of Guilford, Conn.

In the account given last week of the trial made with Berdan's Gold Crushing Machine, for 100 lbs. of tailings read 1,000 lbs., the latter being the quantity of ore from which the 58 dwts., 1 gr. of gold were obtained as stated.

We are glad to find that our anticipations respecting the process of obtaining wrought-iron direct from the ore, as invented by James Renton, of Newark, New Jersey, have been fully borne out by its practical results,—the furnace erected by the patentee and his associates in Newark, works well, and is approved by all who have seen it in operation so that all that has been said in its favor thus far proves true. We understand that the Company possess the entire patent of Alex Dickerson, which will doubtless render their position still stronger.

We would direct the attention of our readers to the advertisement of Wm. Trapp, of Elmira, N. Y., which appears in our columns this week and who has left specimens of the casks made by his Patent Barrel Machinery, at our office, which are there for public inspection. Any one, therefore, who feels interested upon the subject can examine for himself, and we have no doubt that he will agree in awarding them a high claim for superiority in workmanship and compactness of form.

The railroad fare between Albany and Buffalo has been reduced to $6. We have paid $12 for the same distance on the "*raging canal.*"



Reported Officially for the Scientific American

LIST OF PATENT CLAIMS

Issued from the United States Patent Office

FOR THE WEEK ENDING APRIL 26, 1853.

SUGAR DRAINERS—By Henry Bessemer, of Baxter House, England. Patented in England, February 24, 1852: I claim the combination of the revolving and hollow spreading table formed with a wire gauze, or perforated top (and connected with an air exhausting apparatus), the spreading mechanism, the water sprinkling pipe or its equivalent, the means of discharging the water and molasses, and that of removing the cured sugar, the whole substantially as specified.

SMUT MACHINES—By Samuel Cook, of Brockport, N. Y.: I claim the construction, combination, and operation of the fan, screening plate, and brush, in the cylinder, and the openings and tubes, or pipes, leading therefrom, when the fan is placed below, and the brush above said plate, so that the blast created by the fan shall be drawn through the plate, and also, when said cylinder is provided with discharge openings and tubes, for conveying off the full wheat, the lighter grain, and the dust, in separate directions, as described, and this claim, whether the same be effected in a single cylinder or in two or more, so long as they are the same, substantially, in construction and operation.

FOLDING ENVELOPES—By Ezra Coleman, of Philadelphia, Pa: I claim, first, the lifter, which acts in the double capacity of taking the paper from the package to the folders, and holding it while the ends are being folded.

Second, the folder, in combination with the pedals, in such a manner as to hold the paper by the end folders pressing it upon the bed, while the sides are being folded, the connection between the pedals being through the medium of racks, pinions, and pulleys, or other analogous devices.

Third, the arrangement of the roller in combination with the handle, by means of arms, rock shafts and levers, or equivalent, so arranged that the simple action of raising and lowering the handle distributes the paste.

Fourth, the roller for the purpose of removing the paper after it has been folded, substantially as described.

STRAW CUTTERS—By Reuben Daniels, of Woodstock, Vt.: I claim the combination of a series of straight rotating blades, whose cutting edges are equidistant from and parallel to a common axis of rotation, and hence describe a cylinder when they rotate with a fixed blade having a curved edge given to it, as described, and corresponding to a line drawn obliquely on the cylinder, generated by the rotating blades, and set in a position coinciding with that line, when, by a series of staight knives on a cylinder, are made to cut obliquely or with a shearing cut, by the oblique adjustment of the fixed blade only.

IRON CANDLESTICKS—By Wm. P. Merriam, N. C. Harris, Wm. Wheeler & E. N. Merriam, of Poultney, Vt: We claim the mode of constructing candlesticks of sheet metal, as described.

HOT AIR FURNACES—By James Bolton, M. D (assignee to Chas. D. Yale), of Richmond, Va: I claim packing the air chamber, connected with any contrivance for heating the air which it contains, with spiral metallic scraps, or scraps of metal, bent into other shapes, by which the same effect is produced, these scraps being designed for the conduction of heat and absorption of radiant heat, whether they be loose, or connected with the adjacent walls or heating contrivance.

CANAL BOATS—By S. F. Palmer, of New York City: I do not claim of itself the use of a wheel or drum, containing the spring upon which to wind a line, as I am aware that such drum, with spring, is in use, as applied to tape and clothes-lines; but I claim the arrangement of the wheel with the spring wound upon its axle, and fastened to the frame, as described, in connection with the brake and the tow line, as set forth.

SCREW BLANKS—By T. J Sloan, of New York City: I do not limit myself to the precise manner of mounting and giving the required motions to the cutter, for forming the point on the blank, or the chaser, for forming the thread on the shank and point, as these may be varied by the substitution of mechanical equivalents.

I do not wish to be understood as making claim, broadly, to the combination of a cutter, for pointing with the dies, for forming the thread on the cylindrical part of the shank.

But I claim combining, in an organized machine, a cutter and its appendages, operated as specified, for forming the point on screw blanks, as specified, with the chaser or cutter, which cuts the thread over the shank and pointed part thereof, down to the point, as specified.

POTATO DIGGERS—By T. B. Stout, of Key Port, N J: In the above improvement I claim nothing separately, the cylinder, with its teeth attached, has been previously employed for other, if not similar purposes.

But I claim the cylinder with the teeth attached to its periphery, in combination with the beater and forked cutter, the cylinder, beater, and cutter, being constructed and arranged in the manner as described.

RADIATORS FOR STOVES—By S. D. Tillman, of Seneca Falls, N. Y.: I claim the entrance and exit passages on the same horizontal line of the radiator, or nearly so, and at or about the position of the line of the middle horizontal section of the radiator, when such arrangement of these passages is combined with a series of flattened tubes or air passages and horizontally winding smoke passages, as set forth.

Also, in combination with the vertical air spaces and smoke passages, formed by the flattened tubes, the successive contraction of the air spaces, in the manner set forth, that is to say, the air spaces varying in thickness or the width of their cross section, as they recede from the source of heat, each tube being of uniform width or thickness, throughout, but narrower or thinner than that which precedes it

PREPARING GOLD—By A. J. Watts, of Utica, N. Y.: I claim the described processes of preparing or crystalizing gold, for the purpose of filling teeth, as set forth.

RICE HULLERS—By D. Marsh & B. Whitney, of Fairfield, Ct.: We claim the two dentated cylinders and the dentated beating arms running between them, to be used in connection with the above described machinery.

ORNAMENTAL COMPOUNDS—By Chas. Ludwig Gran, of Hamburg, Germany (assignor to Conrad Poppenhusen, of Brooklyn, N. Y.): Patented in Germany, Dec. 18, 1847: I claim the method of making artificial veneers, etc., by combining with saw dust or the equivalents thereof, as specified, the curd of milk and lime, or its equivalent, after these latter have been triturated and thoroughly mixed and reduced to a semi-fluid state, as specified.

CHAIN CABLE STOPPER—By J. E. Crane, of Lowell, Mass., I am aware that a pawl or nipper has been hinged above the hause hole, for the purpose of stopping the cable, by pressing it against the under side of the hause hole, and I am also aware that a chain stopper has been described, which consists of two concave plates of iron, between which the chain passes the lower one of the said plates being firmly secured to the deck, and the upper plate being turned upon a hinge, and the chain stopped, by pressing it tightly between the said plates, by means of leverage applied to the upper plate; and therefore I disclaim having invented the equivalent, in principle or action, of either of said chain stoppers

But I claim the ridge, rising from the deck of a vessel, between the hause hole and the windlass, combined with a heavy pawl placed above it; the said parts being arranged as described, whereby each moving link of the cable is turned flatwise, in passing over the ridge, and each link is acted upon by the pawl, as described.

RE-ISSUES.

REAPING MACHINES—By Wm. F. Ketchum, of Buffalo, N. Y. Patented originally July 10, 1847: I claim, first, placing the cutter bar and cutters lower than the frame of the machine and opposite the side of the plane of the wheel, in such a manner as to leave unobstructed space below the frame, and also between the wheel and the cutter, with their supports, to allow the machine to pass freely and without clogging, over the cut grass or grain, as set forth.

Second, placing the cutters lower than the frame and axle, and in or nearly in the same vertical plane with the axle, on which the frame hangs and vibrates, and parallel, or nearly so, to said axle, so that the vibrations of the frame, on uneven ground, shall not materially elevate or depress the cutters, as set forth.

Third, the endless chain of cutters in combination with the guard teeth, as described.

DESIGNS.

FOR GIRANDOLES, CANDELABRA, &c—By R. E. Deitz, of New York City.

LADIES HAIR COMBS—By Jeremiah Hills, of Newtown, Ct.

PORTABLE RANGE—By Garrettson Smith & Henry Brown (assignors to North, Chase & North), of Philadelphia, Pa.

COOKING STOVE—By S. H. Sailor (assignor to C. W. Warnick & Frederick Leibrandt), of Philadelphia, Pa.

PORTABLE RANGE—By J. C. Smith (assignor to C. W. Warnick & F. Leibrandt), of Philadelphia, Pa.

The Manufacture of Flax.

At a recent meeting of the London Society of Arts, an interesting paper "on recent improvements in the manufacture of flax," was read by Professor Wilson, late Principal of the Agricultural College at Cirencester. The professor stated the object of dressing the straw, which was to separate the inner fibre from the two outer ones. Two methods of dressing had been hitherto resorted to, the mechanical and the chemical; in the former the flax was dealt with in a dry, in the latter in a wet state. For a poor quality of flax, the mechanical process was preferable, on account of the expense of steeping. As this process did not touch the azotised substance found in flax, it left it with the liability to fermentation, and consequent deterioration of the fabric, under certain conditions. Patents for improvements have been taken out in 1812 and 1819; but none of the methods removed the liability to fermentation. This could only be done by the chemical processes. In one the fermentation was directly excited; in another, the azotised substances were steeped out. Two principles had been recently brought into operation which were likely to effect a complete revolution in the manufacture of flax. Having described the method of steeping as hitherto practised in Ireland and on the Continent, by immersing in water, still or running, or by "dew-rotting," the object of which was to excite and exhaust the fermentative action—the professor observed that the use of hot water materially accelerated the process. This was known to and practised by the Malays and Bengalese.

It was not, however, until 1847, that a patent had been taken out by a German named Schenck, for the scalding or hot water process. It was introduced into Ireland in 1848, and now upward of 40,000 tons of flax are prepared in this way every year in Ireland. That useful body, the Flax Improvement Society, had instituted a series of experiments, the result of which was, that Schenk's process gave an advantage of 20 per cent. in the yield, and a still greater advantage in the spinning quality of the flax. The result of a large rottery near Belfast was that 67 tons of straw yielded 39½ tons after steeping, which, when scutched, were reduced to 5·9 tons, and about 1½ tons of tow or plucking, a much larger result than was obtainable by any other means. Another chemical process, instead of exhausting the fermentative qualities of the flax, made use of alkalies to dissolve out the azotised substances. This had been first suggested so long as 1747, had been carried out to a great extent in Prussia, and was well known to the French chemists Bernouille, Gay Lussac, and others. While the cold water process occupied from seven to fourteen days, Schenk's process reduced the time to from 72 to 96 hours. Recently, however, Mr. Watts, of Glasgow, has patented a method of applying steam to the same purpose; and this was done with so much effect that the process might be expected soon to become general.

The advantages of this process were—a great saving of time, from eight to twelve hours being sufficient to bring the flax into a condition fit for scutching; the operation of scutching was facilitated; the fibre was improved; there was extremely little waste; and the production of noxious gases was avoided. Messrs. Leadbitter, of Belfast, had adopted this process, and had invited the attention of the council of the Flax Improvement Society, who, in November last, reported that 10½ cwt. of flax, after being steamed 11 hours, were reduced to 7 cwt. 11 lbs.; after scutching it yielded 187 lbs. of fine flax, 12 lbs. 6½ oz. of fine scutching tow, and 35 lbs. 3 oz. of coarse tow—being about 18 lbs of fine flax for every cwt. of tow. Only thirty-six hours were required for the whole process of converting the straw into fine flax fit for the spinner; and the cost was not more than £10 per ton. Samples were sent into the market and fetched from £56 to £70 per ton. No sooner had the committees pronounced in favor of this process, than another was patented by another ingenious Scotchman, Mr. Buchanan, who instead of employing steam, as in Mr. Watt's process, at once applied to the straw hot water raised to a high temperature by means of condensed steam. The principle was to keep up a series of immersions in hot water, whereby a much greater effect was produced than by allowing the flax to remain in the same hot water.

Ten such immersions were sufficient to produce all the effects of Watt's or Claussen's processes, occupying not more than a few minutes each. By this process the steeping water, instead of becoming the receptacle of noxious products, was nothing more than flax tea, and its feeding properties were quite equal to what was known as distillers' wash. In Ireland it was used for feeding pigs and cattle. The Professor said he had seen many experiments on the processes on Mr. Buchanan's patent, and he believed it would be highly successful, the quality of the flax being equal to that produced by any of the other processes, and a great saving of manual labor being effected. The process of scutching was then described, and the superiority of mill-scutching over the hand process pointed out. In England there were 250,000 to 300,000 spindles at work; in Scotland, upward of 300,000; in Ireland about 500,000; being a total of upward of a million. The fixed capital invested in the spinning and weaving process in England was estimated at five millions. On the continent the greater portion of the manufacture was still performed by hand labor. The requirements of the country considerably exceeded the production.—About 70,000 tons of flax fibre were imported every year, besides 65,000 tons of linseed, and 70,000 tons of oil cake for the feeding of cattle.

[The above condensed remarks of Prof. Wilson will show to our readers that Claussen's process is looked upon in a very indifferent light by those who are so deeply interested in the culture of flax and its preparation, but it shows us at the same time that they are not well acquainted with what has been done in this country in the preparation of flax and hemp. It is stated in the above that a Mr. Watt, of Glasgow, recently introduced the steaming of flax, instead of steeping it in hot water, now this is nothing new here, for in 1825 Achilles Chinn, of Harrison Co., Ky., took out a patent for the same thing. The difficulty with flax is in its preparation, the great expense lies in that quarter. In our opinion the improvement of Mr. Buchanan is a good one, and our flax manufacturers would do well to try it. A patent, however, has been applied for in our own country, for making flax cotton without employing an alkali for splitting the fibre. The substance employed for that purpose does not injure the fabric, and the flax cotton produced can be worked on the same kind of machinery as that now employed in the cotton manufacture.

Recent Foreign Inventions.

COLORED PHOTOGRAPHS.—J. Leon Tardieu, Paris, patentee.—This new process of coloring photographs is applicable to pictures taken on paper rendered transparent or on glass, and consists in applying oil or other colors at the back of the picture, so as to give the requisite tints to the several parts of the photograph without interfering with the extreme delicacy of effect, which characterizes this class of productions. Application has been made in this country for a patent also.

INDIA RUBBER COMBS.—Mr. Goodyear, of this city, has taken out a patent in England for manufacturing combs of india rubber combined with sulphur—vulcanized india rubber—resembling tortoise shell, and submitting the same to heat. Now in our Patent Office, the Examiners are in the habit of acting the part of our Judicial authorities; they refuse to grant patents like the above for a new application of well known products. This is not right, for whenever a new and useful manufacture is produced, it is held by our best Judicial authorities, patentable, and would be protected if tried at law. Let there be a reform in the decisions of our Patent Office respecting new articles of manufacture.

TANNING.—E. Moride, of Nantes, France, patentee. This improvement consists in the employment of an ooze cylinder, in which the oozes for tanning are prepared in a cold state out of contact with the atmosphere. The substance, oak, hemlock, or other bark to be used in tanning is placed in the cylinder on a perforated diaphragm, and water is admitted to cover it and fill the cylinder. Steam at the pressure of two or three atmospheres is then admitted above the water, by which it is forced through the bark and diaphragm, carrying with it the soluble matters of the bark and discharging it into proper vessels. Two or three waters are thus pressed through the bark or tanning matters in the ooze cylinder until its strength is exhausted. Different tanning qualities are thus obtained from the same bark to be used at different stages of tanning well known to those skilled in the art. A patent for this useful improvement has also been applied for in this country.

The French Crystal Palace.

A Crystal Palace is in course of erection in the Champs Elysees, Paris, for the French Industrial Exhibition of 1855, which, according to the accounts of our foreign exchanges, will be one of the largest modern buildings known. Its length will be 256 yards, breadth over 118 yards, height nearly 115 feet. The exterior wall will be of a circular form, flanked with six towers, and having 360 arched recesses. The access to the interior of the palace will be by four large entrances, and there will be additional ones by some of the towers. The principal front will be on the Champs Elysees, and the roof will consist of only iron and zinc, glazed similarly to the London Crystal Palace. The plans for ornamenting the building both inside and out are very costly. The area of the whole of the building will cover a surface of about seven acres and a quarter.

Accidents.

It is certainly a terrible thing in our country, that with the revival of travel every spring there comes a long train of heart-rending accidents. On the 25th ult., two opposing trains met on the Michigan Central Railroad, the collision was awful and the sacrifice of human life the greatest of any by a railroad accident since the first rail was laid down in our country.

The travel on the Ohio river, is said to be much larger than ever before. Every steamboat has its full complement of passengers, and all average fair freights.

TO CORRESPONDENTS.

J. W. P., of Mich.—The idea of taking the air from the front of the locomotive by using a funnel and conducting pipe for ventilating purposes, is not new. You have a new combination of devices for accomplishing this result, however, which might be patentable.

J. S. B., of Ohio—Scott's Engineers' and Machinists' Assistant is as good a work as you can order: price $24.

M. B., of Ind.—The use of potash lye for softening wood, for bending, will no doubt answer the purpose, but it will destroy the fibre and render it unendurable; no patent could be obtained by you.

S. & A. P., of Phil.—We are not engaged in the manufacture of machinery of any description. You had better address James Terry & Co.; they probably will not object to answering your questions.

J. H., of Ill.—The very reason you allege for employing a shaft in the flues of boilers, is an objection to their introduction; braces are now employed, and fire bridges are better than the spur shaft.

S. S., of N. Y.—Your stump machine sketch has been received

A. B. B., of N. Y.—We cannot properly decide upon the merits of your invention without a model: please send one down.

T. H. M., of Ga.—Your statement is no doubt correct; we have entered your name upon our subscription books and sent such back numbers as we have.

T. Y. C., of ——.—We would advise you to get "Smee's Electric Metallurgy;" it is for sale by J. Wiley, this city; if you cannot obtain the information there we cannot give you any more.

L. C., of Pa.—Horizontal saws have been used for cutting down trees, but no patent could be obtained for it; changing the position of the saw is not a patentable subject.

W. C. A., of Ohio—It is not new to make a saw that is capable of cutting both ways; we have seen them made substantially in the same manner.

——, Yasoo City—Your letter not being signed we are unable to write to you in regard to the boiler; it contains no patentable feature that we can discover.

A B, of Mich.—No changes have been made in the charges to British subjects for patents here, we know not when any reforms will ever be made in the Patent Laws; political manœuvring is the order of the day.

E. M., of Ind.—We do not know of any publication which will afford such information as you want. $1 credited on account of advance subscription.

A. J. W., of N. C.—We do not know of a 12 horse second-hand engine and boiler for sale. We do not know anything of the Caloric Engines which, it is said, are being built.

M. C. M., of O.—It would no doubt pay well if you could get a patent, but of the success of the application we are doubtful.

D. M. B., of Conn.—We never attend to an inventor's business under any such circumstances, and you will not find any respectable agency—one to whom you could with safety confide your business to—who would.

M. C. F., of Me—You cannot have been a very attentive reader of the Scientific American, or the article referred to would not have escaped your observation.

C. & Bro., of Conn., A. H. B., of Pa., and J. W. H. of R. I.—We will endeavor to have your inventions illustrated in our next number.

D. B. S., of Pa.—It is not unusual to have cases lie in the Patent Office unexamined for six months. We agree with you in pronouncing it a great wrong to inventors to be obliged to wait so long before their applications are examined, but we can offer no relief. It is to be hoped that the new Commissioner, when he assumes the office, will provide for the increase of business by the appointment of additional examiners.

N. B. C., of Geo.—Send on your drawings and we will execute and publish engravings of your invention for six dollars.

D. B. N., of Ill.—No model is required to be deposited in any of the foreign patent offices.

M. R., of Me.—We have carefully examined the sketch and description of your lathe, and it appears to us to be a good and patentable improvement. Perhaps you had better try it and ascertain its operating value before going on with it.

Money received on account of Patent Office business for the week ending Saturday, April 30:—

R. P. W., of N. Y., $30; G. S., of Ct., $27; H. S. W., of O., $8; J. S Van G., of Tenn., $25; W. L., of N. Y., $80; W. B., of N. Y., $100; M. & T., of N. H., $55; J. N., of N. J., $30; B. H. O., of N. Y., $75; J. B. G., of Mass., $30; M. B. F., of N. Y., $55; C. D., of Ill., $50; B. H. B., of Ct., $30; T. D., of Miss., $20; D. W. S., of N. Y., $55; E. H., of Mass., $50; G. N., of N. Y., $20; S. F. A., of N. Y., $25; P. W., of Me., $10.

Specifications and drawings belonging to parties with the following initials have been forwarded to the Patent Office during the week ending Saturday April 30:—

S. F. A., of N. Y.; H. S. W., of Ohio; G. S., of Ct.; E. L. B., of N. Y.; G. N., of N. Y.; E. H. O., of N. Y. (2 cases); G. E., of N. Y.; J. G., Jr., of Mass.; P. W., of Me; E. H., of Mass.

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

SCIENTIFIC MUSEUM.

New Way to make Protoxyd of Nitrogen or Laughing Gas.

The following method of making laughing gas was discovered by Prof. Lawrence Smith, while prosecuting some experiments to determine the alkalies in minerals. The following, taken from "Silliman's Journal," is Dr. Smith's own account of the experiment:

"The experiments made with the nitric acid heated with sal-ammoniac, to test the character of the decomposition, have resulted in the discovery of a new method for procuring protoxyd of nitrogen with the aid of a very low temperature. Among the experiments, the following were quantitative. Two grammes of sal-ammoniac were placed in a glass flask, and half an ounce of nitric acid poured upon it, the flask was connected with a small wash bottle containing a little water, and from this latter a tube passed into a pneumatic trough filled with hot water, heat was applied to the flask, and before the temperature reached 140° Fah., a gas began to be given off, and at 160° it came off rapidly, and continued to do so after the lamp was withdrawn. A small amount of red fumes appeared in the flask, that were condensed in the wash bottle, the gas that passed over was collected in a receiver, and measured 1008 cubic centimeters; the gas smelt of chlorine, the flame of a candle burnt with an increased brilliancy when introduced in it, the candle was re-ignited when extinguished, if a burning coal remained on the end of the wick—no red fumes were formed when it came in contact with the air, and the gas was absorbable by cold water. The properties were those of protoxyd of nitrogen. In another experiment the gases were collected at different stages of the process, in vials over hot distilled water, and a solution of caustic potash introduced and shaken up for some time; this latter was subsequently analyzed for the chlorine it absorbed, and in three different portions, collected at the beginning, middle, and end of the process, the proportions of the chlorine to the whole bulk of the gas were 1-57, 1-29, and 1-16. The amount of protoxyd of nitrogen due to the ammonia in two grammes of sal-ammoniac and its equivalent of nitric acid, is 887 cubic centimeters. The gas freed from chlorine, on being shaken up with cold water for some time, was found to be almost entirely absorbed by the water. What remained was a mixture of nitrogen and a little air: some nitrous or hyponitrous acid forms during the whole process, if concentrated nitric be used; if, however, it be diluted, little or none is formed, and the gas is readily given off at about 212°.

In all my experiments, the protoxyd of nitrogen constituted from seven-eighths to twenty-four-twenty-fifths of the gaseous products, and when washed from its chlorine by a little lime-water or soda, possessed all the properties of pure protoxyd of nitrogen, and I would recommend it as a convenient way of forming this gas, especially when not required for respiration.

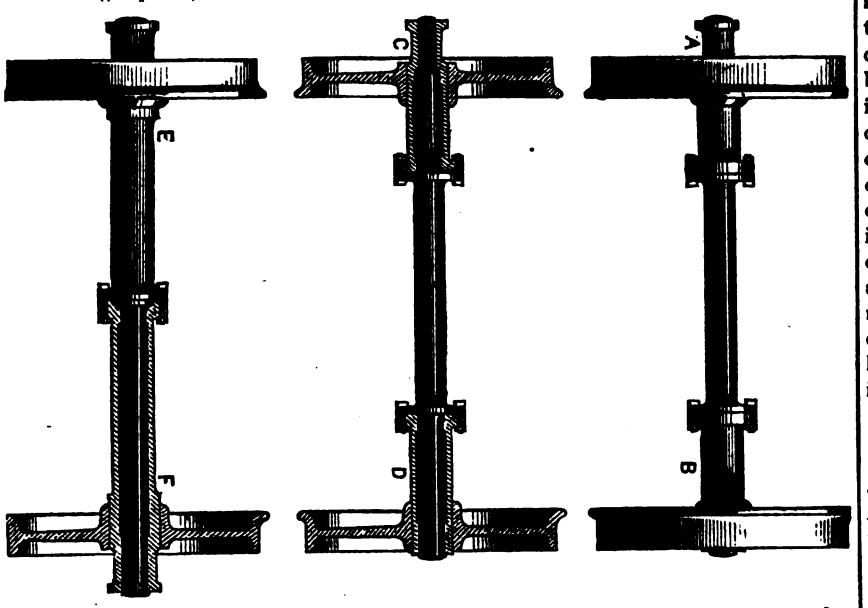
The character of the decomposition which takes place, is somewhat curious and unexpected. At first, I supposed that the decomposition resulted in the formation of equal volumes of N.O., Cl., and N., but it appears that such is not the case, and that all but a very small portion of the ammonia, with its equivalent of nitric acid is converted into N.O.; the liberated hydrochloric acid mixing with the excess of nitric acid does undergo the decomposition first supposed, and in this way only can the small amounts of chlorine and nitrogen be accounted for. At the time this method was first tried, I also tried the decomposing effects of nitrate of ammonia on sal-ammoniac, that has been shown by Maumone to result in the formation of chlorine and nitrogen; but the difficulty of controlling the decomposition once commenced, the puffing up of the mixture, and the necessity of having the salts dry to begin with, render this method (which was proposed by the author for forming chlorine) useless in processes for removing the sal-ammoniac in analysis. This gas is of no use in the arts, but as a chemical compound it is one of the most interesting in the whole range of the science.

Gardiner's Compound Car Axle.

The annexed engraving represents three different views of the patent Compound Car Axle of P. G. Gardiner, No. 10 Wall street, this city, which is now attracting much attention on account of its merits, which, after many repeated trials, have gained for it a high character, for safety and economy.

Every wheel is shrunk upon a sleeve which has a loose inside flange upon it and a small rim on the inside of the flange. The axle has a fixed flange upon it, inside of the wheel, and it extends through the sleeves. The sleeves of the wheel, therefore, run upon the axle, and are like long boxes which are secured by the screw bolts as represented in the figures.

A represents a finished view of an outside bearing of an axle, and B represents a finished view of an inside bearing; C represents a central section of an outside bearing; D represents a centre section of an inside bearing; E shows a finished view of a continuous sleeve joining in the centre of the axle, as different from the other two above; F is a centre section of the same. By this arrangement of the axle, an independent motion is given to opposite wheels without affecting their relative lateral action. The excessive strain upon the common axle in turning narrow curves is obviated and the danger of breakage removed.



In turning curves of average radius, and with ordinary trains, a large portion of the motive power may be saved. With the common axle, owing to the greater distance to be traversed over in the same time by the wheel on the outer rail, all the wheels on one rail must slide to compensate for the natural tendency to a difference in velocity. With this axle, each wheel moves with a velocity due to the length of rail to be traversed.

In the application of the brakes the torsion of the axle is also obviated—each wheel turning with the velocity due to the pressure of the brake on itself, and not affecting or being affected by the other.

This axle for railway cars should certainly attract the attention of our railway companies; it has been faithfully tested on some of our railways, and as we have been informed, it has succeeded admirably. A number of our railroads are now adopting them, this they are doing after repeated and fair trials to test their efficacy and superiority over the common axle. Every improvement which has for its object the prevention of railroad accidents, by obviating the breaking of axles, merits our approbation, and every improvement which prevents accidents, we are confident, lessens the expenses of railroad companies, and increases the travel upon them.

More information may be obtained by letter (or otherwise) addressed to P. G. Gardiner, No. 10 Wall street, this city, room 15.

Sulphate of Zinc—To Farmers.

A correspondent of the "New England Farmer," who was formerly a practitioner of medicine, makes some very interesting and useful remarks about the application of the sulphate of zinc in solution as a wash for horses, cattle, sheep, &c. He asserts that it is excellent for sore teats in milch cows, and mentions a few cases where its application was at once effectual and permanent. For washing all kinds of wounds and sores, we believe that the sulphate of zinc will be found to possess virtue by those who use it, superior to any solution with which we are acquainted. We have been acquainted for a number of years with its useful properties for inflammation of the eyes, for which a very weak solution should be used, and also for washing all kinds of sores.

The sulphate of zinc is often used as an emetic. One twelfth of a tea-spoonful dissolved in warm water and given at milk heat, is an emetic for a child, and one-fourth of a common tea-spoonful is an emetic for an adult. The operation of this emetic, is hastened by giving drink of warm water in order to slightly distend the stomach. If it does not operate in five minutes, the dose should be repeated until the stomach is evacuated. It might be well to give from two to six drops of laudanum afterwards, to allay any irritation of stomach caused by the zinc or the indigestible food, especially if there is tenderness upon slight pressure on the pit of the stomach.

If any poisonous substance is taken by mistake, and when a doctor cannot easily be obtained, the stomach should be emptied as soon as possible. The sulphate of zinc is a good emetic for this purpose; but as mustard is kept in almost every house, a tea-spoonful of it mixed with a cup full of milk-warm water, answers as well. For children the common syrup of ipecac (ipecacuanha) is better than zinc or mustard, and should never be absent from any house. Children frequently eat substances which their stomachs are unable to digest, and which, if not soon relieved, throw them either into convulsions or fever, the ipecac is perhaps the best and most simple medicine to use in all such cases.

An Infected Ship.

We learn from the "London Times" that the steamer Agamemnon, a double-deck screw propeller, carrying 91 guns, and manned by a company of about one thousand chosen men, is lying at the docks at Portsmouth, in a terribly infected condition. It appears that toward the close of the last year, under some extraordinary impulse, the dock yards of England became very busy, and that a full complement of artificers were for some time kept at work day and night. One of the most important results of their labor was to get afloat, rig, and put in condition for sea, this fine large vessel. This was effected about the first of January, when she sailed from Sheerness to her present position at Portsmouth, where she has lain ever since, the destroyer of her living burden, and the dread of the adjacent ships, and of the town itself. From the latest accounts, it appears that one-third of her company were ill, and the other two-thirds either convalescing or awaiting in mute-terror the attack of the disease, which appears to be of a low typhoid character. The patients are well attended on board, or at the hospital at Haslar, whither many of them are removed; but the "Times" asserts that the infection is known to be, mysterious as it may seem, in the timbers of the ship; and it denounces the Admiralty for exposing the lives of so many men, as well as of the whole contiguous community, to such dangers, while pursuing a temporizing policy, in delaying to clear the ship, and trusting to fumigations and other feeble expedients to eradicate the contamination. Had the vessel departed for the Mediterranean before the disease developed itself, how appalling would have been the scenes presented.

Ochre.

This substance is a native mixture of silica and alumina, colored by oxide of iron, and sometimes containing a little calcareous matter and magnesia. The oxide of iron may occur in so large a proportion that the ochre becomes an ore of that metal. Ochre is found in beds some feet thick, generally above the oolite, and covered by sandstone and quartzose sands more or less ferruginous, and accompanied by grey plastic clay of a yellowish or reddish color. All these substances enter into the composition of the ochres. The ochry earths are ground under edge millstones and elutriated for use; the yellow ochres may be changed into red or reddish brown by calcination, whereby the iron is raised to a higher degree of oxidation. Native red ochre is also called red chalk and reddle.

Glazing Paper.

The high glazing of paper, as stated in the Jury Report of the Great Exhibition was first introduced about thirty-five years ago. On the introduction of steel pens, there was an increased demand for smooth papers, and a desire to obtain the highest possible finish. The paper of our American books seems to be very inferior to that of the English for writing upon. Our very best book paper, is rough to write upon and blots.

A tunnel now in course of construction on the line of the Dayton and Cincinnati railway, will, it is said, be, with its approaches, 10,000 feet in length, and the largest work of the kind in the United States.

LITERARY NOTICES.

PRINCETON REVIEW—The April number of this able religious Quarterly informs us that it is to be conducted hereafter under the editorial responsibility of Prof. Hodge; it contains a very fine article on Fenelon, which breathes a noble and generous spirit; there are six able and original articles in it, any one of which is well worth the price of the work. It is published at the office of the Biblical Repertory, 265 Chestnut street, Philadelphia.

GRAHAM, for May, is a sterling number; the illustrations are numerous and very finely done, and the original and selected articles are characterized by sound discrimination and much ability; we have always cherished a high regard for this serial. The agents for New York are Stringer & Townsend, 222 Broadway