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USEFUL RECEIPTS.

Tests for Guano.

Drying and Subsequently Washing with Water.—If the guano, as is generally the case with those varieties that are brought from Peru and Chili, is a smooth and uniform powder, weigh out two ounces, spread it upon paper, and let it lie for two days in a moderately warm place, in summer a dry and airy situation, in winter in a warm room or chamber, in order that the air may dry it. What it may then have lost in weight must be esteemed mere surplus moisture. Many sorts of guano are so moist as to lose by this gentle drying from three to four drachms (20 to 24 per cent.) in their weight.

Combustion.—Pour half an ounce of the guano to be examined into an iron spoon, and place it upon red-hot coal until a white or grayish ash is left, which must be weighed after cooling. The less ash is left behind, the better is the guano.

Lime Test.—Pour a teaspoonful of each guano to be examined into a wine glass, and upon this a teaspoonful of slacked lime; then add a few teaspoonfuls of water and agitate the mixture briskly. Lime liberates the ammonia from the ammoniacal salts contained in the guano. The more excellent, therefore, a guano is, the stronger will be the pungent ammoniacal odor which escapes from this guano paste.

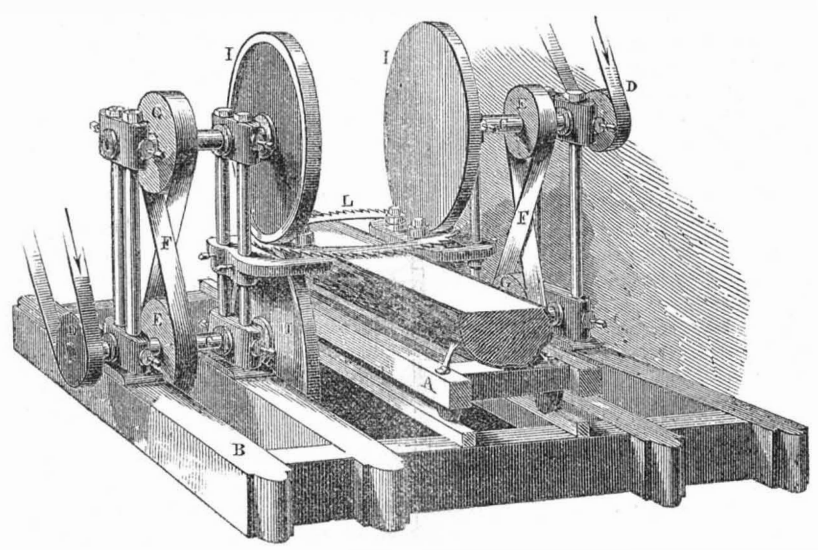
Treatment with Hot Water.—Half an ounce of the air-dried guano is placed in a filter made of blotting-paper, folded together in the shape of a cone, and this put into a funnel or wire filter, and scalding water poured over it until the water runs without color. If the paper with the moist guano is laid, when no more liquid drops from it, in a warm place, and the residue weighed when it has become completely dry, the deficiency from its original weight will show the weight of those elements which have been dissolved by the water. As a general rule it may be held, the larger the quantity of guano that is dissolved in water, the more ammoniacal salts does it contain, and the better it is. Hence that guano must be preferred, as in the test by combustion, which, upon being so treated with water, leaves behind the smallest residue.

Vinegar Test.—Pour strong vinegar over the guano to be examined, or, better still, some muriatic acid; if a strong effervescence ensues, an intentional adulteration of the guano with lime may be inferred. This substance may also be recognized by the combustion test, since lime remains behind in combustion, and augments the quantity of ashes.

A Brother Mechanic to his Brethren.

We have received a letter from a correspondent and subscriber, who states, in respect to what we have said about intelligent mechanics, that speaking for himself, he believes that every subscriber might induce a friend to subscribe also. This was the way he became a subscriber, and his friend has his sincere thanks for soliciting him to become one.

PATENT CIRCULAR SAW WITHOUT A SHAFT.



The annexed engraving is a perspective view of the invention of Ammi M. George, of Nashua, N. H., for running a circular saw without an arbor, and respecting which so many paragraphs have appeared in different papers in our country. A patent was granted for the invention on the 11th of last month (Jan. 1853.) We believe we shall be able to explain the invention in a very few words.

A is the log carriage; B is the frame, and there is a log on the carriage; L is a saw without a shaft or spindle; it is of the form of a ring, and its inner edge is guided in the grooves of two friction metal rollers inside. This saw is driven by friction pulleys, I I I I, two on each side, one above and the other below, they run on the face of the ring saw, and drive it round. The saw is of such a diameter as to allow the log to pass through inside of the pulleys. The driving friction pulleys are driven from the main shaft of a water wheel, by belts, D D, which rotate the shafts, C C, on opposite sides, one above and the other below. Belts, F F, from the secondary driving pulleys, E E, drive the pulleys, G G, and the shafts of their respective friction pulleys, I I. The whole parts of this machine will, by this description, be rendered plain to any person in the least acquainted with machinery.

The object of the invention is to saw boards of a diameter nearly equal to that of a circular saw; the driving friction pulleys are therefore very narrow, so as to allow of as much space as possible between them. The inventor intends also to save something in the price of saws by having merely ring plates made, with steel teeth inserted in the edges.

More information about the sale of rights, &c., may be obtained of the inventor at Nashua, N. H., or John Mullay, of Bangor, Me., who is an assignee of one-half of the patent.

IMPROVEMENT IN BOOT TREES.

Figure 1.

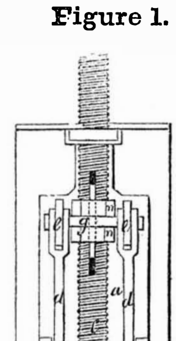
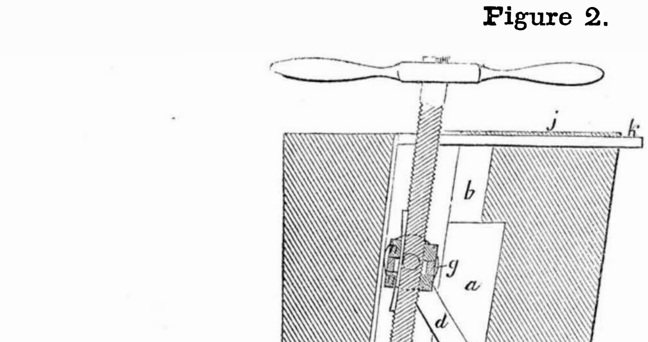


Figure 2.



The annexed engravings are views of an improvement in Boot Trees, invented by David Sadlier, of McWilliamstown, Pa., and for which a patent was granted on the 23rd of last November, (1852.)

Figure 1 is an inner face view of the hind part of the boot-tree; and figure 2 is a vertical section showing the levers partly depressed, and the tree extended. The same letters refer to like parts.

The nature of the invention consists in forming cavities in the hind part of the boot tree, and inserting therein a series of levers and friction rollers, which being operated by a screw are made to expand the tree whilst in the boot, by bearing against the shin piece.

A is the boot; B is the shin, and C the back part forming the tree, all of which are of the ordinary external form. In the inner side of the back part is the cavity, *a*; the vertical groove, *b*, crosses the cavities and admits the screw, *c*, levers, *d*, and friction rollers, *e*, all folding within the hind part, C. These levers have their fulcra in the lower end of he two cavities at *f*, two levers in each, one on either side of the screw, *c*. The upper ends of the levers are attached to said screw by swivel collars, *g*, with a gudgeon on either side which serve as connections for the levers and axes for the friction rollers, *e*. Said swivels are secured at any desired point on the screw by set nut, *n*, above and below each, which, when set, are keyed on the screw to prevent them from turning across the upper end of the back part, C. The groove in the back part is covered with a plate, *j*, and there is a slide, *k*, fitted in a groove on the top of the tree. This slide has a graduated edge, and a left-handed nut on its inner end, through which the screw, *c*, works. The shin part, B, has a metal plate fitted on its inner side, for the friction rollers, *e*, to work against, also a metal shield, *m*, from the top to bottom on each side, to give a bearing to the leather between the shin and back when extended by the levers. The foot, A, is connected with the shin, B, in the usual manner.

The several parts of this boot-tree being placed in their respective positions, the tree is held in the left hand on the top of the parts, B and C, the thumb tightly bearing against the outer end of the slide, *k*. The screw, *c*, is then turned down by the lever, *i*, on its upper end, which extends the levers, *d*, their friction wheels bearing against the shin part, force it and the hinder part asunder and thus stretch the leg of the boot to any desired size. If it is desired to stretch the lower part of the leg more than the upper part, it can be done by moving the upper nut, *n*, higher on screw, *c*, and keying it in that position, which makes the levers, *d'*, act against the shin part sooner than the upper levers are run up on the screw; this makes the upper levers, *d*, press against the shin part first. By this arrangement the centre wedge in the common boot trees is dispensed with, and the leg can be stretched at the upper and lower parts as desired, which cannot be done with the wedge without danger of bursting. The leather of the leg is also prevented from wrinkling down, as is commonly the case with pressing the wedge; it is also a tree to suit the largest and smallest sized boots, by the greater or less extension of the levers, *d d*.

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

Plastic Materials for Forming Various Objects.

Five parts of sifted whiting are mixed with a solution of one part of glue. When the whiting is worked up into a paste with the glue, a proportionate quantity of Venetian turpentine is added to it, by which the brittleness of the paste is destroyed. In order to prevent its clinging to the hands while the Venetian turpentine is being worked into the paste, a small quantity of Linseed oil is added from time to time. The mass may also be colored by kneading in any color that may be desired. It may be pressed into shapes, and used for the productions of bas-reliefs and other figures such as animals, &c. It may also be worked by hand into models, during which operation the hands must be rubbed with linseed oil; the mass must also be kept warm during the process. When it cools and dries, which takes place in a few hours, it becomes hard, and may then be employed for the multiplication of these forms.

MISCELLANEOUS.

(For the Scientific American.)

Heliochromy.

Having seen nothing on the subject of Heliochromy, in your columns, since my former communication, I now present you another on the same subject, which will I hope stimulate artists, and those fond of scientific experiment, to further discovery; I propose briefly to discuss the action of light on the chloridated plate, and to give you the results of a few experiments on it. It is well known to chemists that light produces little or no change on perfectly pure chloride of silver, but that it is rapidly blackened if organic matter be present, and that this organic matter is generally found in the water with which it has been washed, or in the solution from which it has been precipitated. When the chloridated plate is exposed to light, this organic matter is decomposed, oxygen being eliminated, and the free nascent hydrogen reduces the chloride to a metallic condition, and an opposite state of electrical excitement is induced.

Now M. Becquerel and Niepce de St. Victor have proved that if chloride of silver containing a slight trace of copper be exposed to the prismatic spectrum, or to rays of different colors, while undergoing this reduction. it is susceptible of coloration after a protracted exposure. From this it would seem that this process might be much accelerated, if we were careful to aid nature in her operations, instead of trying mere hap hazard experiments, not based on rational theory. I will show by a few experiments that this may be done, and to avoid being too prolix, will, at present, speak of the chloridated silver plate, unaccelerated by iodine, bromine, fluorine, chrome, or their compounds.

If the plate, covered with the enamelled chloride of silver prepared by Niepce's process, be exposed to a current of hydrogen while receiving the image, the process will be much accelerated, and the image will be impressed in from half an hour to an hour; according to the amount of gas passed into the camera, the light, temperature, electric state of the atmosphere, &c., instead of requiring from three to five hours, as in the original process, and the colors of the picture will be impressed on the plate in all their original beauty. This experiment may be very easily performed, it only requiring a few grains of zinc in a small vial, containing dilute sulphuric acid. The vial and its contents may be placed in the camera, and the hydrogen being nascent is in its most active state, and as it is perfectly transparent, it permits the light to act on the plate, while it is itself engaged in reducing the chloride, which it is only capable of doing in sunlight.

The hydrogen, probably from its affinity for oxygen, hastens the decomposition of the organic matter, and assists in reducing the chloride, thus acting as a deoxydating and dechloridating agent. There is, however, sufficient hydrogen contained in the combined organic matter, to effect the reduction of the chloride, hence it is probable that the excess merely hastens the decomposition.

Following this train of investigation, I have tried many other reducing agents both liquid and gaseous. The most important liquid agents tried have been, the proto sulphate and nitrate of iron, ferocyanide of potassium, protochloride of tin, and the fluorides of potassium and sodium. The principal gaseous agents tried are hydrogen alone and in combination with carbon and sulphur, ammonia, sulphuric ether in vapor, chloroform vapor, sulphuret of carbon, chloride of sulphur, hydro-sulphuret of ammonia, and sulphurous acid. As very remarkable results followed from the application of the gases, I will speak of them more particularly. Sulphurous acid has a strong tendency to abstract oxygen from organic bodies, it also unites with chlorine in sunlight, and so do light and heavy carburetted hydrogen, the latter, indeed, without the influence of light. Sulphurous acid abstracts oxygen from organic bodies, with which it combines, forming sulphuric acid, and sulphuric acid renders chloride of silver unchangeable to light by destroying the organic matter with which it is combined. I hence inferred that it might be used for the double purpose of reducing and fixing the picture. That it is a powerful accelerator is certain, the fixing requires further experiment. Pictures may be obtained with this gas in half an hour, by passing it nascent and in sufficient quantity in the camera and the colors are preserved. There is, however, sometimes a little sulphur deposited under the enamel, which gives the light parts of the picture a yellowish cast. This color may sometimes be removed by heating the plate. Carburetted hydrogen acts still quicker, probably from the free carbon which results from its decomposition being a powerful reducing agent, and as the carbon is not left under the enamel it probably passes off under the form of the volatile chloride of carbon. I obtained one picture in five minutes, by passing into the camera the gases generated from the distilling alcohol and sulphuric acid in a retort. The gases formed were olefiant gas and sulphurous acid, mixed with a little light carburetted hydrogen and sulphuric ether. The colors were very fairly represented, but not as good as I had previously obtained; I considered this experiment as very encouraging, but having only lately tried it, have not repeated it by itself without the agency of electricity.

As electricity is a powerful agent in decomposing chemical compounds, it might be naturally inferred that it would aid in this process. I have often tried it but without, until lately, any very important results. Dry chloride of silver is not decomposed by electricity, yet its decomposition by light, and other agents, may by it be much accelerated, and I did not at first use a sufficiently powerful current. I now render the plate a part of the conducting medium which terminates at the positive pole, and terminate the poles in water, to which some saline constitutent has been added, and by the decomposition of the water am enabled to judge of the power of the current. By using the gases at the same time that the plate is thus excited, I have been enabled to take pictures in from four to five minutes, which would otherwise require from three to five hours for their production. These pictures are developed under a hard, tough enamel of chloride of silver, cannot be rubbed out by the fingers, and will even bear considerable buffing, and, if the enamel is thick, are improved by the operation. I have not been able to permanently fix the picture, but it will keep a long time, if not exposed too often and too long, to the light. From the above experiments it seems that a prolonged exposure is not necessary to produce coloration, hence agents of great energy may be employed in reducing the chloride.

That coloration may be produced, it is important, I think, that the picture by whatever process it is taken, be positive, and complete on its removal from the camera. For fixing, it is important that all the organic matter be destroyed, and then, I believe, it will be fixed. I am at present engaged in experimenting with iodine, bromine, fluorine, sulphur, chrome, and copper, and their compounds, deposited on the silver plate by electric action, or otherwise, but have not, as yet, any results sufficiently matured to publish, though I have produced coloration. Great care is requisite in preparing the enamelled plate of chloride, and some experience is required to judge at what state of its preparation it is most sensitive to light, yet any artist can after a few experiments prepare it.

I have had but little time for experiment, owing to the pressure of other duties, and the weather here has been for the last few weeks unfavorable. I am not a daguerrean artist, and am under many obligations to Messrs. Bisbee and Robinson, of this city, for the loan of a camera and other apparatus for my experiments. Having been obliged also to make the greater part of the chemicals used, I have as yet, been able to make, but a very meagre investigation of this interesting subject.

JAS. CAMPBELL.

Dayton, Ohio, Jan. 20, 1853.

[The above communication from the pen of Mr. Campbell is the most important that has ever been published on the subject of "Heliochromy" in this or any other country We advise all our readers who feel an interest in "sun-coloring," to read the article with attention—ED.

Hot Air and Steam.

MESSRS. EDITORS—I have read with great pleasure your criticism on the Hot Air Engine, and greatly admire your frank and honest course about this invention—your course with every thing. You look the naked facts in the face, and speak out what you think, without fear or favor. By this course your paper has become the real guardian of inventions and inventors. I have looked back over all your articles on the Caloric Engine, and in no case can I see that you opposed this invention, but that in every case (it appears to me) you have been actuated solely by a desire of seeing and exhibiting what the thing really is Yet I cannot agree with you in your conclusions, for I think you have left the relative specific heats of air and water out of your calculation.

So far as your dissertation relates to the vapors of fluids, you are right: you handle Prof. Apjohn correctly, excepting that he is right in saying "that equal volumes of the vapors of different liquids will have the same elastic force at their respective boiling points," for the boiling point is that temperature at which the elastic force of the vapor becomes equal to the atmospheric pressure. But equal bulks of liquids converted into vapor exert a force inversely as the densities of these vapors, hence the vapor of alcohol, ether, &c., cannot do the work of steam. But no comparison can be made between the elastic force produced by that expansion of vapor due to increased temperature, and that due to the making of vapor; unless we take the specific heats in consideration along with the boiling points and latent heats, when the result will be largely in favor of the permanent gas or vapor, or in favor of expansion and against vaporization.

By the doctrine of specific heats, different substances have a capacity or appetite for heat, which is inversely as their atomic weights; a pound of hydrogen will hold as much heat at the same temperature as 100 pounds of gold or quicksilver, 14 pounds of air, or 3 pounds of water: hence a pound of water will require 33 times as much heat to raise its temperature one degree, as a pound of mercury; or the same quantity of heat which will raise the temperature of one pound of water one degree will raise a pound of mercury 33 degrees. The specific heat of water is nearly four times that of air, consequently the heat or caloric which will elevate a pound of water one degree will heat a pound of air four degrees, or four pounds one degree. Now the latent and boiling heat (not the latent and specific, as Mr. Apjohn has it) of water, as steam, combined, are 1150°, or if a cubic foot of water, at 32°, were confined and heated 1150° or to 1182°, then, when released, it would all become 1728 cubic feet of steam at atmospheric pressure, with a sensible heat or temperature of 212°; and the available force would be 1728 feet. But this same heat which raised the water 1150°, and produced a force of 1728, will raise an equal weight of air 864 cubic feet, 4 times 1150° or 4600°, which will expand it 9½ times its bulk, equal to 8200 cubic feet, which is the measure of its available force—equal to 4¾ times the force gotten from water.

The heat which produces a given volume by expansion is always less than that required to make the same volume by vaporization, and this is the case even with steam and water, which have nearly the same specific heat, for if 62½ pounds or 1728 cubic feet of steam at 212 deg. are heated apart from water to 1182 deg., or raised 980 deg, then it will expand to three times 1728; if water at 212 deg. is then let in, the 980 deg. will become latent in producing one volume of steam from the water, and we shall have two times 1728 at 212 deg. instead of 3 times 1728 at 1180 deg. If we have this odds in favor of hot dry steam, what will it make with air which has four times the advantage in specific heat.

Let us take one more view of the question. One cubic foot of water at 32 deg. will give 1728 feet of steam of atmospheric pressure and 212 deg. temperature, by the application of 1182 deg. more of heat. If the cubic foot of water were resolved into its component gases they would occupy 2000 feet. Now if the water and the gases had the same capacity for heat, then the 1182 deg. which produced 1728 feet by vaporizing the water, would make the 2000 feet of the gases increase 4800 feet more for each degree, would expand it 1-491 of its bulk at 32 deg., which will give 2¾ times advantage in favor of the gases over steam; but the difference of the specific heats will make the advantage about double this; for the specific heat of the steam is so much greater than the gases that, taken with the specific gravity, it is double the gases; for steam, being composed of one volume of oxygen, with two volumes of hydrogen condensed into one volume, makes its specific gravity at 212 deg., and atmospheric pressure, compared with its gases at the same heat and pressure as 24 is to 16, and its specific heat double an equal bulk of the gas: (I use round numbers only for these points about the gravity, and specific heats of the gases cannot be nicely determined).

Hence we see that steam and water will actually hold one-third more heat than the very gases which compose them. Water is a fire-eater, and for this was it made by Infinite Wisdom. How wondrous, then, may be its mechanism; probably it does not consist of two little balls, one of hydrogen and the other of oxygen sticking side by side?

This superior power of expansion over vaporization was first noticed, I believe, by Mr. Frost, who so clearly showed through your paper, that it was the cause of the boiler explosions; and that dry steam (his stame) might greatly economise fuel or increase the power of the engine; and you gave, in the last volume, a letter from a person who says that he saved 25 per cent. by heating the steam (expanding it dry) after it left the boiler. I thought that this was a settled matter-of-fact, by Mr. Frost's experiments and the other things you published in favor of it. I never shall forget the sorrow I felt when I read in your paper that that truly scientific man had breathed his last moments in comparative poverty. How often is this the reward of that friend of man—the Inventor.

I trust that you will receive this in the spirit in which it is given.

I doubt if the "Ericsson" would have a greater speed with larger engines; for the rate of working will be the rate of heating the air, and a larger fire surface will heat no faster—it must be made hotter; or else the motor cylinder must condense into a receiver, and this supply the cylinder which propels the boat.

GEORGE MATHIOT.

Washington, D. C., 1853.

MESSRS. EDITORS—In the "Scientific American" of Jan. 8th, in giving the reasons why hot air must continue to fail in competing with steam as a force to move machinery, I think you have fallen into an error in not taking into account the difference in the specific and relative heat of water and air. The specific heat of air, or the actual quantity of heat required to raise the same weight of air and water, each the same number of degrees, is in the proportion of water 1, air 0·2669, and as air is less dense in the proportion of 830 to 1, the quantity of heat for an equal volume, or, as it is called, the relative heat is as 1 to 0·0003215, or as 1 to 1·3110, that is, the same amount of heat that will raise 1 cubic foot of water 1 deg. is sufficient to raise the same volume of air 3110 deg.; or, what raise 1 cubic foot of water 1184 degrees, converting it into steam, increasing its volume 1728 times, will raise 1 cubic foot of air 3110×1184=3682210 degrees, which, divided by 479 (the number of degrees by the books necessary to double the volume of air) gives 7687 as the number of times its volume is increased by the same amount of heat which changes the same volume of water into steam. Divide 7687 by 1728, it gives 4·45 as the ratio of increase in volume by the same amount of heat in favor of air over water. 7687×2160 gives 16603920 lbs., raised one foot high by the air, against 3,732,480 lbs., by the water, or otherwise the heat that will raise one volume of water into steam will raise 7687 volumes of air 479 degrees, doubling its bulk and coming to the same result. You say that it requires 864 in. of air (it should be 1728 in.) raised 491 deg. to equal 1 cubic inch of water raised into steam. Let us see what proportion of heat it will take. What will raise 1 cubic inch of water one degree, will raise one cubic inch of air

3110 deg., or 1728 cubic inches 1·8 deg.; 273 times that amount will double the volume of the air, while it will take 1184 times the same absolute amount of heat to change the water into steam, giving the proportion of 4·34 in favor of air. The difference from the proportion 4·45 is made by using 91 deg. in place of 479, which I think is more correct. It also requires more than 50 per cent. of heat to raise one cubic foot of steam at 212 deg., a given number of degrees, more than it does to raise one cubic foot of air the same number of degrees; that is, the relative heat is, by the books as 1 53 to 1, being as 3 to 2 in favor of applying heat to air rather than steam, and about as 3 to 1 in favor of applying heat to steam rather than to water, to change it into steam. Why, then, has air not been used? I suppose one reason is, that it takes half or more of the power to do the necessary pumping. Mr. Ericsson uses two-thirds nearly, the remaining difference is balanced by the power gained by condensation of steam and the application of the expansion principle applied to high pressure steam, leaving them, perhaps, not far from equal. But when Mr. Ericsson saves five-sixths of the heat, and consequently the same proportion of fuel, that is a different matter, and it becomes evident that if necessary, human ingenuity and power will be taxed to their utmost capacity to insure the success of his experiment. I think you will have to give it up at last.

Akron, Ohio, 1853. S. H. Bass.

[For editorial remarks on the above two letters, see page 189.]

Machinery and Tools as they are.--Saws and Saw Mills.

(Continued from page 179.)

No tool is used in a greater variety of industrial occupations than the saw, and when made in a circular form it is even more useful than when rectilineal, finding alike a place among the minute tools of the optician and among the rough but rapid working instruments of the backwoods. In employing the circular saw to cut lumber, the primary subject of inquiry is concerning its diameter,—as a rule it is generally advisable to employ a saw of as small a diameter as circumstances will permit, for the resistance, the surface friction, and likewise the waste from the thickness of the plate, rapidly increase according to the size. But if the saw is so small as to be nearly buried in the work, the metal becomes heated, the escape of the dust is prevented, and the rapidity of the sawing is consequently diminished. As a general rule it appears best to use that part of the saw which is nearest to the centre, and to allow its diameter to be about four times the average depth of the log. Circular saws are usually fixed on mandrels, which revolve in bearings securely united to the stationary frame-work of the saw bench, the end play of the spindle being prevented by collars, as it is highly important to check any lateral motion. The saw is placed between two plates or flanges, which are firmly pressed against the former by a nut, so that they compel it to accompany their revolutions as the mandrel revolves, and to further ensure the saw's rotation, steady pins are passed both through the saw and the fixed flange. When the diameter of the saw is considerable, compared with that of the flanges, the blade is very flexible and liable to be diverted from the true plane. In order to prevent this, there are many different contrivances; when a wooden bench is employed, the saw works in a narrow groove, which it cuts for itself in the bench, or a metal plate with a suitable slot is sometimes used, but a preferable method is to inlay a piece of hard wood and allow the saw to form the groove. Other methods, namely, to guide the periphery of the saw by rollers, or to employ two small saws in lieu of a larger one, are devices familiar to our readers. Sawing apparatus of both these and of nearly every other description, will be found illustrated and explained in the back and current volumes of the "Scientific American." When it is designed to use this tool for cutting wood at any angle, it is customary to make the platform adjustable, and that to an extent commensurate with the exigency of the case; a more simple way is to use supplementary wooden beds placed to the angles required. A plan for cutting weather-boards out of a sound log, has been proposed, when the timber is placed between centres over the revolving saw, which makes a vertical and radial incision, the tool is then released and the wood shifted on its axis for a new cut, so that the entire tree is sawn into feather-edged boards. In this instance the saw is novel in design, on account of its being buried so deeply in the wood, a circular plate is fitted with four pieces of steel, each having two teeth, while a great velocity atones for the paucity of these latter.

The cutting of veneers is undoubtedly the most remarkable instance of the precision that can be attained in the operation of sawing; for this description of work the saw is generally large, and here advantage is taken of the pliancy of the veneer, which allows the saw to be thick towards the centre, whilst it is thinned away towards the edges. In the large application of the principle, the saw is composed of many segments, and is often 18 feet in diameter. For sawing ivory in thin leaves, the saw is a single plate from 6 to 36 inches diameter, when frequently a block only one inch thick yields thirty leaves. But when a large log of timber is to be cut into veneers, and the saw exceeds four feet in diameter, it is formed of segments firmly secured to an iron plate, whilst the timber has two motions, the one longitudinal and the other lateral, to advance it sideways between each cut. This latter object is effected by adjusting screws and worm wheels moved by a handle, which makes 50 or 60 turns to advance the log one inch, the veneer, as it is cut, being guided off from the saw. There is a mode of superseding the saw in veneer cutting, which has several times been proposed, and probably originated in Russia, where a machine is employed capable of cutting an entire tree into one spiral veneer with a knife, as if the veneer were uncoiled like a piece of silk from a roller. In France, the plan has been applied to iron and sheets obtained measuring 150 by 30 inches. This plan, however, is not adapted for brittle woods, and does not expose the most ornamental section to view, which is the desideratum in veneers, on account of the purposes for which they are always employed, namely, fine cabinet work, and to give a superior appearance to the exterior of furniture. Circular saws have likewise been applied to cut off the ends of railway bars whilst red-hot, the saw making 1000 revolutions per minute, and having the lower ends immersed in water.

Marble has, for several years, been extensively sawn by machinery driven by steam power, although the processes are closely analogous to those pursued by hand. The ordinary arrangement is to form a frame by fixing vertically four strong posts well connected together, within this the block of marble is placed, and over the marble is suspended the saw-frame, which reciprocates horizontally, and rolls on pulleys which slide in vertical guides, and are suspended by chains connected to a counterpoise weight, so adjusted as to allow the saw frame to descend when left to itself, and which supplies sufficient pressure for causing the penetration of the saws. The distances between the saws and their parallelism are adjusted by iron blocks, and every blade is separately strained by its wedge until sufficiently tense. The blades, it must be observed, are merely slips of soft iron without teeth, so that the blade itself does not cut but simply serves as the vehicle for the application of the sand, which acts as the teeth of the saw, and performs the cutting process, the action of the saw being assisted by a small stream of water supplied from above. The introduction of the sand and water at the proper time is the chief difficulty in stone-sawing, to allow the cutting material ready access beneath the edges of the saw blades, the frame is slightly lifted during each stroke, and by the usual system the end of the stroke is the period chosen, but a recent patent points at the central position as most eligible. The traverse of the frame is, perhaps, preferably given by a jointed connecting rod attached by an adjustable loop to a long vibrating pendulum put in motion by steam power. The circular saw is also employed for cutting slabs of marble into narrow pieces, but although termed a saw, in work of this kind it is, in reality only a disc of iron without teeth, several of these being fixed on a revolving mandrel, whilst the marble is placed on a reciprocating bed which travels with a slow traversing movement.

(To be Continued.)

[For the Scientific American.]

Burning Fluid and the Newell Lamp.

As I am willing to avow myself the writer of the article in the "Haverhill (Mass) Gazette," respecting burning fluid, and the Newell Lamp, an extract from which, with some comments thereon, you publish on page 160 of your useful journal, I trust you will suffer me to say a word in vindication of its justness and entire correctness. since it has been called in question by the statements of Dr. C. T. Jackson, Newell, and others.

I wish to be brief, and therefore I will say at once that every statement contained in that article is strictly and entirely correct, and I challenge the parties denying them to prove them otherwise. I am ready to show by proof, which will not be questioned a single moment, that hundreds of gallons of "turmeric colored" burning fluid is sold every week in Boston. I will produce a highly respectable manufacturer of burning fluid, who will testify that he has been provided with a glass measure, and been directed to add it full of tincture of tumeric to each barrel of burning fluid, by a dealer in "Safe Patent Oil." Who will connive at and deny the existence of such outrages? Is this gentleman, who is a "distinguished chemist," willing to meet me on this subject? This gentleman uses a "hydro-carbon fluid, with diluted alcohol, containing 20 per cent. of water, which makes it less dangerous," &c. No chemist would ever make a statement like this. I profess to be somewhat intimately acquainted with the exact chemical nature of all volatile hydro-carbon mixtures used for purposes of household illumination, and do not believe in such a mixture as that, containing 20 per cent. of water. Will he give me the formula for the mixture he uses, I wish to examine it?

I stated in the article in the "Gazette," "that if Newell was to be believed these holes in the cap of his lamp were ordered by Jackson." Gentlemen of the highest respectability in Boston have signified their willingness to testify, under oath, that Newell has stated to them, repeatedly, that Jackson would not give his certificate until the holes were made. It is generally understood that Dr. Jackson proposed them. The holes still continue to be made in the cap, and it is a mild term you use, Messrs. Editors, when you call them a "scientific blunder." You state that you have been unable to find a record of Jennings' old patent for wire-gauze tubes, like Newell's, taken out in 1836. You will not find it in the books; it was, I think, destroyed at the time the Patent Office was burned. A record of the patent is on file at the Department. Any one who has any doubt respecting the granting of this patent can receive positive information by writing to the Commissioner. I have, in my hand, at this time, one of Jennings' gauze tubes probably a dozen years old. There are many of them in existence in Boston at the present time. In respect to burning fluid, I wish to say that I have not, and never have had, any interest whatever in the manufacture or sale of the article.

Jas. R. Nichols.

Haverhill, Mass.

[See some remarks on this letter on page 189.—Ed.]

The Tunnelling Machine.

Messrs. Editors—I perceive in your paper of the 5th inst. a paragraph, that, from a similarity of phraseology, seems to have been copied from a paper in this city. It announces with much plausibility that "the Hoosic Tunnelling Machine has proved a failure." To enable you to see how much truth there is in that assertion, I wish to quote the very language used by one of the most distinguished engineers of Western New York, in a conversation between himself and one of our city lawyers of high distinction; in answering the question, "what is your opinion of the machine?" he said, "I have seen the machine operate and have examined it well: it is my deliberate opinion it will cut out more rock in a day than can be removed by any means known to me." If that can be called a failure, what must it be capable of doing to entitle it to the appellation of a successful machine? As I am a constant reader of the "Scientific American," such an expression of opinion on its page must, of course be somewhat annoying to me, as I claim to be the inventor of said machine, and have ever entertained the highest respect for the candor as well as the scientific character of your paper. I take the liberty of sending you an article on the doings of the machine by an eye-witness, who has honestly given the dark as well as the bright side of the matter. If you have not seen this before, it may afford some additional light on the subject, and I cannot yet believe you are one of those who prefer darkness to light.

Chas. Wilson.

Boston, Feb. 9, 1853.

[The article referred to by Mr. Wilson appeared in the "Boston Transcript" of the 7th inst., which confirms the opinion expressed by the engineer mentioned above. We entertain something of a dread to notice anything that appears in some papers, as news, about inventors, for the very reason that nine times out of ten it is incorrect—either wilfully or by mistake.

Basket Willows.

I have lately seen in several papers, articles on the basket willow, and in your last paper you give the amount paid for the foreign article. There is perhaps not a place in the country where the willow could be cultivated to as good advantage as on our alluvial meadows along the Connecticut river. It grows here spontaneous of all sizes and sorts from the fine seedling to the coarse, which is just fit for hampers. There is no attention paid to it here, except to clear it out of the land, which is a work of much labor. I have seen the finest work made from it, of all kinds, from the most beautiful fancy baskets, to the largest and best willow cradles. There is a celebrated basket maker here, who makes all his work from those willows; he has been all over Europe, and he has repeatedly told me that there is no place where he has ever been, where willows grow so fine and good as here. His prepared willows have often been exhibited at our fairs, and as far as I could judge, were of very superior quality. Any quantity can be gathered in our meadows.

Yours, W. Bigelow.

Hartford, Conn., Feb. 14th 1853.

Labor Law in Rhode Island.

The Senate of Rhode Island have passed a bill regulating the employment of minors in factories. The act provides that children under twelve years shall not be employed in any manufacturing establishment in that State, and children between twelve and fifteen shall not be employed more than eleven hours in any one day, nor more than nine months in any one year, and these children must attend school at least three months in the year. The bill provides that ten hours shall constitute a day's work.

Sperm Oil.

The New Bedford, Mass., "Standard" has the following:—"We understand that $1,30 per gallon has been refused for sperm oil during the past week. The last sales that have come to our knowledge were made at $1,28. The quantity in the market is extremely small. The vessels which are to arrive here within the next few weeks will make profitable voyages for the owners."

United States Survey.

The United States Survey in California is rapidly progressing, the base line being already completed seventy miles. It will probably touch the sea coast some four miles north of Los Angeles. Mr. Gray is following Col. Washington, and is surveying a range of townships.

The French Navy.

No less than twenty ships of the line are now building in the French dock-yards, and for the greater number of them screws have been ordered. In addition to these there are eighteen frigates and fifteen other vessels of different classes building, which are to be all propelled with screws.

NEW INVENTIONS.

Improved Spike Machine.

Measures to secure a patent for an improved Spike Machine, have been taken by John R. Richardson, James Westerman, and Ebenezer Wilder, of North Castle, Pennsylvania. In this machine the inventors employ an original mode of forming the point of the spike, which they accomplish by means of rollers attached to slides, and working on adjustable beds, so that by placing the beds in a more or less oblique relation to the spike, a shorter or longer point is given to the latter by the pressure of the roller. To relieve the ends of the jaws from the pressure of the spike head, so that they can separate freely, it is proposed to give the header a return motion before the jaws are parted. There is also an efficient plan for holding the rod which forms the spike material whilst the requisite length is being cut off. The working parts of the machine are all moved by a shaft carrying five cams, so placed as to properly time the several operations of cutting, heading, and pointing. The initial process is to pass a rod of iron through a loop, and upon an under die, whilst a gauge regulates the length, when a knife cuts off the piece, the holder and under die securely holding it in the meanwhile. The piece of iron is then pressed between the two jaws and the upper die, which is intended to press upon the spike, and directly over the rollers which are now advanced until they come nearly or quite in contact. The header is moved instantaneously with the roller carriages until, having executed its duty, it recedes a little, and the spike being now completed is allowed to escape.

Corn Grinding Mill.

A mill of an improved description, for both grinding and shelling corn by one operation, has been invented by Wm. Zimmerman, of Quincy, Ill. In this improved arrangement the mill is made to consist of a revolving and stationary grinder, over which latter is placed a hopper connected with the revolving grinder, by two uprights, and made to revolve in a similar manner. The hopper is furnished with several openings, through which, as it rotates, the ears of corn are made to fall on the stationary grinder, where the shelling operation is performed. For this purpose the stationary grinder is provided with slots, into which a series of teeth, belonging to the revolving grinder, are made to fit so that the edges of the slots act against the corn as the revolving grinder turns round. After being released from the cob the grain falls through shelling holes at the lower part of the stationary grinder, and is ground into meal between the two grinders, which are for this purpose corrugated on their appropriate sides. The cobs, by adjusting the hopper sufficiently close to the stationary grinder, may also be ground between the two, if desired, but in this case the under side of the hopper must be likewise corrugated. The spindle that forms the shaft for the lower grinder is made hollow for facility of lubricating the step.

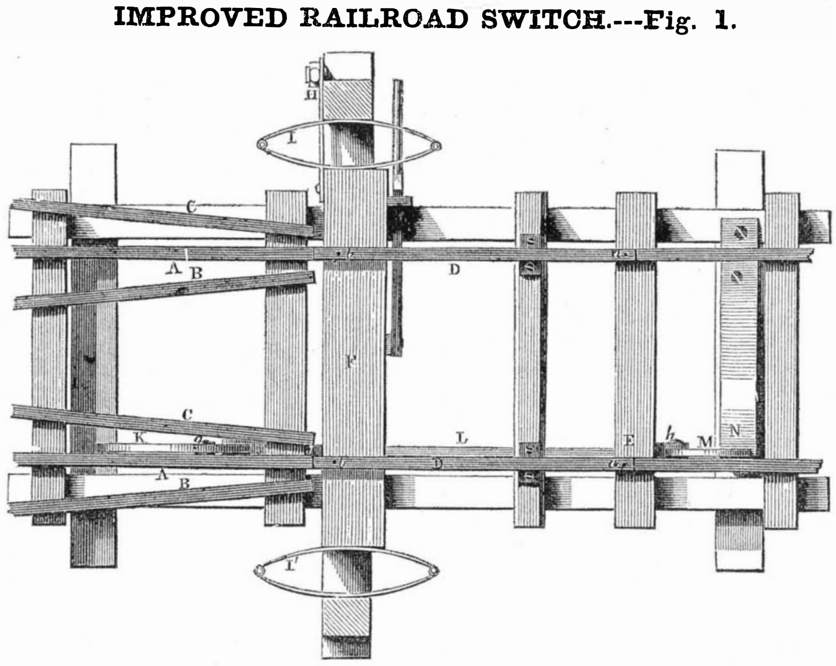
Improved Cider Mill.

A Cider Mill of an improved construction has been invented by John M. Hanford, of Howell's Depot, N. Y., who has taken measures to secure a patent. In this machine the cider mill is made with two screws and followers, one on each end, and having a crushing or grinding apparatus in the centre, under which is placed the pomace receiver. This latter is slatted for allowing the juice to run through during the process of extracting it by the screw, and is divided into two compartments, which are separate although connected together, so that, in fact, there are two receivers. It is in this latter circumstance that the principal merit of the invention consists, for, by this arrangement, there is always kept up a continuous supply for the crushing apparatus, as either receiver is always in the centre underneath, and according as the operation is performed, is drawn off to the right or left under its proper screw, where the juice is squeezed out and the refuse discharged, after which the receiver is drawn back again to the crusher, and the other receiver forced under its proper screw, and thus the operation is carried on alternately with each. The machine is fixed between two upright posts upon a platform, to which wheels are attached, so that it can be moved about, and is furnished with stops for regulating the distance, that the receivers are to be moved back and forth.

Another Improved Car Seat.

Measures to secure a patent for the above have been taken by William M. Warren, of Watertown, Conn. This improvement for rendering railway travelling more pleasant gives the passenger an option as to the inclination of the seat, places the foot-board entirely under his control, and, in addition to a revolving back, which can be turned over so as to face either way, allows him likewise an adjustable one, so that a high or low backed seat can be had at pleasure. The seat is suspended upon pivots and shifted as desired, by means of a lever catching into recesses in a sector, so that it cannot move unless at the will of the occupant. The adjustable back is so connected to the other by jointed levers that it can be made available whichever way the passenger may face. The foot-boards are placed upon beds, so that they can be moved and retained beneath the seat when not wanted, catches holding them in their place, and when in use they can be regulated to any height or for any required position.

IMPROVED RAILROAD SWITCH.---Fig. 1.



The annexed engravings are views of an improved railroad switch, invented by James M. Dick, of Buffalo, N. Y., who has taken measures to secure a patent for the same.

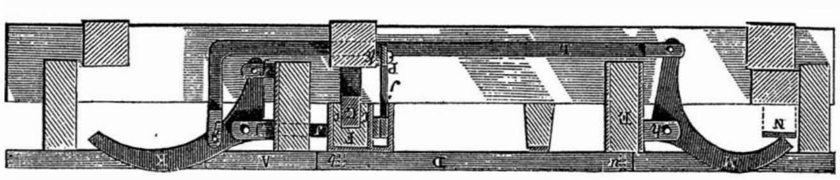
Figure 1 is a plan or top view of the improved switch; figure 2 is a longitudinal vertical section of the same; figure 3 is a transverse vertical section; figure 4 is also a transverse vertical section. Similar letters refer to like parts.

The nature of the invention consists in the employment of springs and levers so arranged and adjusted to the switch, that the car wheels, as they pass, will operate upon the levers above mentioned, release the switch, and allow the springs to throw it in a line with the direct track. The switch is set in line with a branch track by an attendant, and the cars after passing from the branch track upon the direct track operate upon the levers, and produce the result mentioned.

A represents the rails of a direct track; B and C represent the rails of branch tracks, and D are the short movable rails which connect with either of the above tracks.

The movable rails are connected at one end by pivots, *a* to the sleeper, E, and in line with the direct track, A, the opposite ends of the movable rails are connected by pivots, *b*, to the slide or movable sleeper, F. The slide or movable sleeper, F, rests upon a cross piece, G, and flanches or projections, *c*, attach-

Figure 2.



ed to the slide, pass down on each side the cross piece, as seen in figure 2; these flanches keep the slide properly on the cross piece: H, figures 1 and 4, is a lever by which the slide, F, is moved, and the movable rails, D, put in line with either of the branch tracks, B C; I I' are elliptic springs, one placed at each end of the slide, and J is a stop attached to the lever, K, which lever, K, has its fulcrum at *f*, and is attached by a pivot, g, to the connecting bar, L, and the connecting bar, L, is attached to a lever, M, having its fulcrum at *h*, and similar to the lever, K. Both levers, K M, project up a short distance above the rails. There are two recesses, *d e*, (see figure 4) in the slide, F, in which the stop, J, fits. When the stop, J, is in the recess, *d*, the short movable rails, D, are in line with the branch rails, B, and when the stop is in the recess, *e*, the short movable rails are in line with the branch rails, C, figure 1. The stop, J, is forced into the recesses by the spring, N, which acts upon the lever, M, figures 1 and 2.

O O' are guards attached by a pivot, *i*, to one side of the slide, F, and P, is a lever having two vertical pins or projections, *j j'*, upon it.

Figure 3

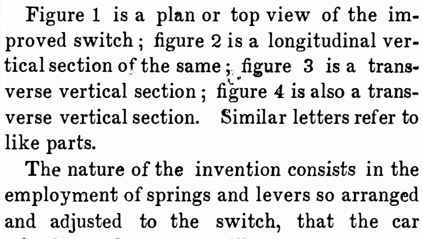
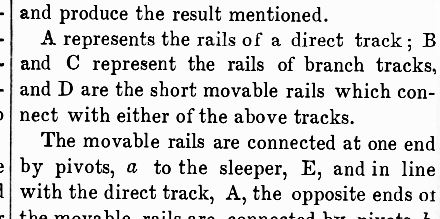


Figure 4.



The lever, P, has its fulcrum at *k*, by raising or depressing the end of the lever, P, the pins, *j j'*, will act upon the guards and elevate them, so that the slide, F, may be moved.— The guards prevent the slide from being moved accidentally.

OPERATION.—Suppose that the short movable rails, D, are in line with the direct track, A, and it is desired to move them in line with the branch track, B. The end of the lever, P, is depressed by an attendant, and the pin, *j'*, throws up the guard, O', and by drawing outward the top of the lever, H, the slide, F, is moved along until the stop, J, is thrown into the recess, *d*, by the spring, N, while in this position the movable rails, D, are in line with the direct rails, A, and branch rails, B, and secured in that position by the stop, J. Now, when a train of cars passes from the branch track, B, upon the direct track, A, the car wheels will depress the lever, M, and the stop, J, will consequently be withdrawn from the recess, *d*, and the elliptic spring, I, which was compressed when the slide, F, was moved, will, by expanding, throw the slide, F, back to its original position, and the movable rails, D, will be again in line with the direct track, A. The same operation is performed when the movable rails are in line with the branch rails, C, only the slide, F, is moved in an opposite direction, and the stop, J, fits in the recess, *e*. In case the movable rails, D, are set in line with either of the branch tracks, and the train is passing along on the direct track in either direction, the movable rails will be brought in line with the direct track as soon as the wheels depress either of the levers, K M.

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

Hot-Air Furnace.

An improved apparatus of the above description has been invented by M. B. Dyott, of Philadelphia, Pa., who has taken measures to secure a patent. The object aimed at in the improvements, is to obtain as much caloric as possible from the furnace, or, in other words, to heat the greatest quantity of cold air, and to obtain the largest amount of heat from it. This purpose is effected by placing a cylindrical flue inside the fire chamber, so that a large radiating surface is exposed, up which the cold air passes, and by fixing outside the same air chambers or drums, through which the hot air from the fire chamber circulates by means of tubes, and which communicate with one another by a similar method. These air chambers or drums are so arranged as to allow a current of cold air to act upon the outer surface of the fire chamber, both for the purpose of heating the air and also of preventing the fire chamber from being injured by the action of the fire. The arrangements for the admission of the cold air, and for the circulation of the hot air are very simple and complete.

Stone Dressing Machine.

Measures to secure a patent for improvements in the above have been taken by E. G. Hastings of New York City. The improvements consist in the employment of a cutter slider, which carries the necessary chipping tools, and works in an inclined slide, which is adjustable at different inclinations by means of screws, that serve to raise or lower either cross piece of which it is composed. The slider is raised up to a suitable height by a cam on a rotary shaft, and is made to descend with a quick jerk by a spring or weight, the depth of the cut being regulated by the above-mentioned screws. The stone is placed on a table which slides on a stationary bed below the cutter slider, and the table has a regular feed motion communicated to it between every two blows of the cutters. These latter must be of suitable width or in sufficient number to cut across the entire surface of the stone at every blow, which is given by the descent of the slider; if requisite, the spring for aiding its descent may be dispensed with, and the slider may be caused to fall and strike by its own weight.

Another Specimen Letter.

DEAR SIR.—Whi cant I fly if I make the wings like a birds and work them like a bird. I dont want you to refur me to Mr. Wise, as I dont go by gass, I want your opinon.

S. H.

Feb. 14th, 1853.

[There is no reason, dear sir, why you can't fly, if you make your wings large enough, and get on the top of a house, you can fly down to the ground much easier than you ascended to the roof of the building. We do not advise you to try the experiment, however.

A company is being formed in Fall River, with a capital of $100,000 for the purpose of manufacturing locomotives.

A new custom-house at Bangor, Me., is to be built of granite at a cost of $41,000.

Scientific American

NEW-YORK, FEBRUARY 26, 1853.

The Commissioner of Patents.

With a change of administration there will no doubt be a change in the Patent Office.—This has been the rule, and we suppose ever will be. A new Commissioner of Patents has always been appointed with the elevation of an opposite political party to power. The present Commissioner, S. H. Hodges, Esq., has been but a short time in office, but during that period he has earned for himself in his new capacity, a high character for urbanity, ability, and courtesy. He has qualities of mind which eminently fit him for such an office, and had his political party been successful, we would have anticipated much good from his future administration. This, however, we cannot expect, and we have no views to present opposed to political rules when good men are selected to fill the places of good men.

The office of Commissioner of Patents is a very responsible one, and politically speaking is one of great influence. The number of inventors in these United States is not small, and their influence we know is very powerful. A man of courteous manners, of a clear mind, well acquainted with law, mechanics, and scientific matters, and of an honest open character, is required to fill such an office. He should also be intimately acquainted with inventions and the affairs of the Patent Office. Now where is the man to be found in the political ranks of the successful party who has these personal qualifications, without which we would not desire to see him appointed Commissioner of Patents. The Hon. D. K. Cartter, of Ohio, the present Chairman of the Committee of Patents in the House of Representatives, appears to us to be well qualified to fill it. We have no interest in the matter excepting the desire to see a good and proper Commissioner appointed. We certainly have some knowledge of the qualifications necessary for any man to fill that office, and we merely point to a gentleman who appears to us to possess them. We do not say who should get the office, we merely point out the qualifications a person must have to perform its duties for the benefit of inventors, the progress of art and science, the honor of our country, and the credit and influence of the party in power.

Hot Air and Steam---The Ericsson Engine.

On page 186 are two letters discussing the merits of water and hot air, as applicable to propel machines with the greatest economy by expanding them through the agency of heat produced by combustion. The question discussed—strictly speaking—is not one we have raised, and we might truly say, "there is no controversy between us" in respect to what we have hitherto said. The arguments presented, however, are the only scientific ones that we have seen in favor of hot air as a superior substitute for steam. Mr. Mathiot expresses himself in favor of steam, while Mr. Bass seems to be halting between two opinions. We are well aware that the capacity of water for heat is 3·74 times greater than air weight for weight; but at the same time air is 815 times lighter than water; it takes 815 cubic feet of air to weigh as much as 1 cubic foot of water. Knowing as we do, that we would have a poor set of flying artillery if every pound shot required a cubic foot of powder to discharge it, we have in all our articles on this subject spoken of the comparative values of air and water, bulk for bulk, as motive agents, especially as air cannot be used at a high heat. Instead of adopting a positive theory, that "substances have a capacity for heat inversely as their atomic weights;" we would rather say, "substances have a capacity for heat, according to their nature and conditions," for ice, water, and steam (the same substances under different conditions) have different capacities for heat; water has a capacity of 1·0000, ice, ·5130, steam, ·8470.

The manner in which Mr. Bass has treated the question, shows him to be exceedingly dexterous in exterminating non-existing improbabilities. He compares water and air bulk for bulk, and raises the temperature of a volume of the latter to 3,682,210°, a heat respecting which no one can form any possible conception who has not visited the warmest corner of Hades. Let us treat the question as it stands plain and open.

As the capacity of water for heat is to air as 1·0000÷·2669=3·74, so will the same amount of heat which will raise a certain weight of water to 1180°, raise 3·74 times the weight of air to the same temperature. In comparing the two bodies we must take the real temperature of them both as it is. Air is 815 times lighter than water; it doubles its volume by the application of 491° of heat, and with the doubling of its volume, its capacity for heat is increased 50°—this we must also take into consideration. One pound of water multiplied by 1180° expands to 1728 times its volume. But air is 815 times lighter than water, and it takes 791 volumes of it to one of water multiplied by 1180° to equal the expansion of the water into steam. It is true, there is much less fuel used, but look at the volume of air to be operated on, and any person can see that when we take the element of time into consideration, the balance is in favor of steam, yes in favor of the steam engine without a condenser. But as in the Ericsson engine, the air is heated only to 384°, therefore we have (with the saving of fuel to be sure, for how can it be otherwise) 1180÷384=3·07; 791×3·07=2428·37 that is if the Ericsson engine could use its air at a temperature of 1180°, it would only have to use 791 cubic feet to produce the same effect by the same fuel, which it now requires to heat 2428·37 cubic feet of air. Mr. Mathiot views the question aright respecting the value of highly heated air. The man who consumes five times more food than another, and yet does the same amount of work five times faster, is the more profitable laborer; so it is with the steam and hot air engines; the former consumes more fuel, but yet does more work in less time. And what is meant by *capacity for heat*, just this, that if a body requires more heat to raise it to the temperature of another body, it takes a longer time in proportion to part with it. In the steam boiler we have a magazine of heat of 1180°, yet it raises the iron to only 212°, the strength of which is but insensibly diminished at such a temperature. The heat of a common fire is only 1141°; heat up the crown plates of the Ericsson's furnaces to this heat, and put on a pressure of 30 lbs. to the square inch, and what would become of them? they would be flattened out like pan cakes. They are limited to both a low heat and pressure, and to produce as rapid and as good effects in the same time as water to which heat is applied, they would have to carry hot air reservoirs as large as the temple of Babylon. The cold water fed into the boiler to supply that taken off in steam from it, is diffused among the hot water in the boiler, which may be compared to a mass of liquid fire as great in quantity as the hot water in the boiler is to the feed water. On the other hand, the cold air fed into the hot air chamber of the caloric engine, fills up the whole boiler, as it were, every stroke, and the heat of the furnace acts upon such a quantity of so bad a conductor as air, and the fire-surface is so small in comparison with the quantity of matter to be heated every stroke, that steam, when the element of time is taken into consideration, is far above air as a cheap agent in moving machinery. The pressure of steam (force increased for the engine) can be highly augmented in any steam boiler, without absorbing extra power of the engine, but this cannot be accomplished in the hot air engine, its pressure is limited and circumscribed by a low figure.

In calculating the economy of any motive agent, we must never leave out the element of time. Water being 815 times less bulky than air, weight for weight, has thereby the advantage of being more quickly acted upon because of its density. The feed pump of a steam engine is required to restore one volume of water for every 1728 volumes of steam used; the feed pumps of the Ericsson engine have to feed in 491 volumes of cold air for every 875 volumes of hot air used; and thus the difference of capacity in the two elements—air and water—for heat is beautifully compensated in the steam engine, by using the less bulky agent, to supply the magazine of force.

We would like, had we room, to say something to corroborate Mr. Mathiot's views of Mr. Frost's experiments. The time has already arrived when the honor which is justly due to his memory, is sought to be purloined by others. We will speak of this at some future time.

We perceive that some ignoramus in the "Akron (Ohio) Standard," has been endeavoring to astonish mankind by his knowledge, asserting that if, as we stated, the Ericsson required 8 times its power (250 horse-power) to double its speed, it would have engines twice the power of the Arctic's. Why, the engines of the Arctic work up to 2,290 horse-power.

The saving of heat to use it over and over again, is an idea imbibed by the false teachings of Prof. Harvefelt, of Sweden, who, perhaps, after reading the boast of Archimedes about his lever, stated in a public lecture, "that there is nothing in the theory of heat which proves that a common spirit lamp may not be sufficient to drive an engine of 100 horse power." Ericsson embraced this view, and "he has been in the habit of regarding heat as an agent, which, while it exerts mechanical force, undergoes no change;" so said John O. Sargent. This is a converse theory to that of Mr. Paine, with respect to the decomposition of water by mechanical action.

Burning Fluid Lamp Controversy.

On page 187 will be found a letter from Dr. Nichols, of Haverhill, Mass., respecting "burning fluids and the wire gauze lamp." We have but a few words in explanation to say respecting it and the matters upon which it treats. On page 173, in making a few remarks about burning fluids, we said, "there is no fluid so clear and beautiful for domestic artificial illumination as a mixture of turpentine and alcohol distilled together." It should have read, "double-distilled alcohol and turpentine *mixed* together." As we have furnished many persons with receipt for mixing these fluids, the error is a singular one.

We have repeatedly stated that the common burning fluids should not be used in houses where there are servants or children. We know of two cases of explosions, not of lamps nor cans containing the fluid, but by the fluid. One was by a servant girl, who thought that as paper saturated with oil was excellent for kindling a fire, she would try some of the burning fluid, which must, as she thought, be much better; she therefore saturated some paper with the fluid, put it in the stove, piled on some chips and charcoal, and then ignited the paper with a match, when lo, to her astonishment, off went the kindling pile like powder, the covers were thrown off the stove, and chips and charcoal scattered over the floor. The other case differed only from this in using some shavings for kindling a fire which had been saturated with spilt fluid, and were used in ignorance of this fact. No one was hurt, but these cases are positive proof of the danger of having such a fluid about.

We have the word of Mr. Newell, and also that of Dr. Jackson, to the effect that the latter had nothing to do either by consultation or otherwise, with the holes in the cap of Newell's lamp. We therefore rely on this personal testimony as positive. We do not know what kind of fluids they sell in Boston, but we know that a burning fluid (alcohol and turpentine mixture) has been sold here under the deceptive character of *rosin oil*—a safety fluid.

Prof. B. Silliman, of Yale College, in a letter to the "Boston Traveller," which has been extensively copied in other papers, asserts that the danger of explosions in lamps burning alcohol and turpentine mixtures, "may be entirely avoided by the use of wire gauze protectors, which have been recently introduced." These quoted words are from the letter. He also adds, "I have no interest whatever in the invention."

The subject of burning fluids and "safety fluid lamps," has excited a most interesting and explosive state of feeling among some of our New England professors of chemistry. The letter of Prof. Silliman is used as a tremendous truncheon of high authorative endorsement of Newell's wire gauze lamp, so are the certificates of Drs. Jackson and Hayes, of Boston, also that of Prof. Cleveland, of Bowdoin College, Maine. The lamp as made by Newell & Co., with the wire gauze protector, is the best we have seen; this is all we can say of the matter; we can only speak of that with which we are acquainted, and it it is a re-invention, the fact of Jennings' previous claim was, we believe, unknown to the re-inventor, whose name, we humbly think, has unjustly, for his honor, been kept from the public.—This subject has received all the attention we can devote to it, at least for some time.

Novel Engineering Project---A Marine Railway One and a Quarter Miles in Length.

The introduction of railways has produced many astonishing changes in the course and channels of our internal trade, and not least among these changes is that which is just being shadowed forth by the completion of the several lines of railroad in the States of Virginia, Pennsylvania, New York, and Ohio, through the various points on the Ohio river. What this change is to be is already indicated by the delivery, on the sea board, of cotton, pork, and other Western produce, by way of the Baltimore and Ohio Railroad, now completed to Wheeling. The advantages which must accrue by thus delivering produce in the sea board markets in from ten to twenty days, instead of as formerly, by way of New Orleans in about three months, are too evident to be overlooked. Some enterprizing gentlemen engaged in the Western trade have investigated this subject thoroughly, and have become satisfied that the present means for passing steamboats around the falls of the Ohio (by the Portland canal) will soon become entirely inadequate to the increased commerce of the Ohio, which must result from these new outlets. With these views they have projected the following novel plan for increasing the facilities so as to pass steamboats of the largest class around these falls.

It may be premised that the only present mode of passing boats in times of low water, is by the Portland canal, on the Kentucky side of the river; this canal can only pass boats the dimensions of which do not exceed 180 feet in length and 48 feet beam over the guards, consequently the business must then be carried on by boats within these dimensions. Referring again to the project above mentioned:—It is simply to construct upon the Indiana bank of the river a railway, the length of which will be about one and a quarter miles, and the width about 72 feet, with proper locks at each terminus; the whole to be of such magnitude as to be able without discharging cargo, to pass steamboats of the largest class, or say about 350 feet in length and 80 feet beam over the guards. The difference in level between the head and foot of the falls may be assumed at about 24 feet, and it is proposed to lift the boat a part of this height in the lock, and the balance by the grade of the railway. The power to be used will be one or more stationary steam engines, applied to the moving of the carriage upon which the boats will be transported, by means of a tow rope or chain.

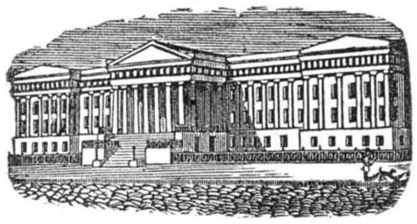
This project, although when first presented to the mind it appears chimerical and difficult of execution, will be found, upon thorough examination, to be perfectly practicable, and to present less engineering difficulties than many other important works already successfully executed.

The plans have been submitted to several eminent engineers, to obtain their views as to the feasibility of the project, and without exception, they have all concurred in the opinion that the work can be executed without difficulty, and at moderate expense.

The estimated cost of the work is $600,000, and it is estimated from reliable data that very soon after it is in successful operation, the receipts from tolls alone will not be less than $150,000 per year.

To Correspondents.

We have to ask some of our correspondents who are expecting replies through the Scientific American to exercise patience, as we are unusually pressed with enquiries; all will receive attention as soon as we have time at command.



Reported Officially for the Scientific American

LIST OF PATENT CLAIMS

Issued from the United States Patent Office

FOR THE WEEK ENDING FEBRUARY 15, 1853

CUT OFF FOR PUPPET VALVE ENGINES—By Horatio Allen & D. G Wells, of New York City: We claim, first, the combination of pawls, with the two arms, whereby the valves are iifted and tripped, as described.

Second, the combination of the arms provided with rollers which, in their action, assist in transferring the pawls from one arm to the other, with the pawls and loose toes, as described.

Third, the making the rollers adjustable with reference to each other, by means of supporting them on independent arms and connecting them to each other and the arms by means of a right and left screw, whereby the point of cut-off may be altered.

Fourth, the mode of operating the loose toes by means of pawls and rollers substantially, as described.

Fifth, the mode of working the valves, by hand, by means of toes supported on the rock shaft, substantially, as described.

CAR SEATS—By John Briggs, of Boston, Mass.: I claim a seat sliding in an arc formed in the framework of the chair, and fastened in any desired position as set forth, whereby the back is made to follow the motion of the seat in such a manner as to preserve a constant or nearly a constant connection and angle therewith.

HARNESS FOR LOOMS—By D. C. Brown, of Lowell, Mass.: I claim, first, the fliers constructed with a spring nose, or its equivalent, so as to yield the twine, when the needles draw the stitches into the rest, and to take up the binding twine, or draw it tight, when the stitches slip off the needles.

Second, the apparatus or its equivalent for shoving the eyes off of the rod F, consisting of the cam J, slide D, lever, rod C, and slide E.

Third, the revolving spring nose flier or its equivalent in combination with the needle, or its equivalent, for the purposes set forth.

SPIKE MACHINES—By J. C. Cary of Richmond, Va.: I claim sustaining the heading lever upon a movable fulcrum, so as to be capable of adjustment to the requisite distance inside or outside of a vertical line drawn, touching the plane of the face of the griping dies, for effecting the heading of the spike, either up or down, or otherwise in one single motion upon its fulcrum, as set forth.

PAGING BOOKS—By R. M. Leslie, of Philadelphia, Pa: I claim, first, the spring slat type wheels, made after the manner, and operating for the purposes, described.

Second, the combination and arrangement of the spring slat type wheels, the adjustable posts, sliding arms, spring frame, inking rollers, with their tables and the rod K, with its ratchet and pawls, whereby I am enabled to number one side of four pages, by a single movement of the treadles, as described,

ARTIFICIAL TEETH—By L. F. Sheppard, of Alhambra, Ill.: I claim extending a suitable metallic plate over the masticating portion of artificial teeth, to protect them more effectually against injury from use, substantially as set forth.

SAW-SETTING MACHINE—By R. B. White, of Meridon, N. Y.: I claim the combination of the spring hammer. with the tooth gauge, both operating in the manner and for the purpose described.

SEED PLANTERS—By David and Herman Wolf, of Lebanon, Pa.: We claim the movable clearer arranged and operating in the manner and for the purpose set forth.

RE-ISSUE

EXCLUDING DUST FROM RAILROAD CARS—By Ed Hamilton, of Bridgeport, Conn., (assignor to H. B. Goodyear, administrator of Nelson Goodyear, deceased), patented May 27, 1851: I claim inducing outward currents of air through the windows of railroad cars, to prevent the entrance of dust, &c., by the action of the surrounding air on deflectors, combined with the sides of the car, substantially as set forth.

DESIGN.

SEWING BIRD—By Chas. Waterman, of Meriden, Conn.

Motive Power Without Fuel.

Among the many wonderful discoveries of the age, the Genoa correspondent of the "Newark Advertiser" notes that a complete revolution in the means of steam navigation and locomotion, is anticipated from a recent invention by Carosio, of that city. He has, it is said, succeeded in constructing an apparatus for the decomposition of water by electro-magnetism, which will introduce the gases thus generated into the engine, in a way to save all the expense of fuel! His invention has been approved by savans and practical engineers and a company has subscribed the means of giving it a full experiment. Means have also been adopted to secure patents in all other countries. Mr. J. B. Musso, a respectable merchant of Genoa, has started for the United States, with letters from our Minister at Turin, to the heads of the Patent Office at Washington.—[Exchange.

[This power is to beat the Ericsson all hollow; but why not apply the magnetism to drive the engine instead of the gases which it produces. Magnetism is a motive power.—How sharp some people are; the above invention is like using a steam engine to pump up water to drive a water wheel.

Riddle's Report of the Great Exhibition.

[Continued from page 182.]

MANURES.—The subject of manures is treated somewhat extensively, and as it is one of great importance to our farmers, and as we have a great many subscribers amongst our agriculturists, we will continue this subject from week to week, until it is completed, in order to have the subject finished about the period when spring cultivation opens.

Every substance which has been used to improve the natural soil, or to restore to it the fertility which is diminished by the crops annually carried away, has been included in the name of manure. It is well known to all practical agriculturists that the texture of the soil, and the proportions of the earths of which it is composed, are the first and most important conditions of its productive powers. Where there is a good natural loam, which retains moisture without being overcharged with wet, and permits the influence of the atmosphere to pervade it, the crops cannot fail to be more certain and remunerating than in loose sand, or tenacious clays; but at the same time it is equally true, that the best texture of soil will not produce good crops for any length of time without the help of manure, to recruit the loss produced by vegetation.

The methods employed in the cultivation of land are different in every country; and when we inquire the cause of these differences, we receive the answer that they depend upon circumstances. No answer could show ignorance more plainly, since few have ever yet devoted themselves to ascertain what these circumstances are. Thus, also, when we inquire in what manner manure acts, we are answered that the excrements of men and animals are supposed to contain an incomprehensible something which assists in the nutrition of plants, and increases their size.—This opinion is often embraced without even an attempt being made to discover the component parts of manure, or to become acquainted with its nature.

In addition to the general conditions, such as heat, light, moisture, and the component parts of the atmosphere, which are necessary for the growth of all plants, certain substances are found to exercise a peculiar influence on the development of particular plants. These substances either are already contained in the soil, or are supplied to it in the form of substances known under the general name of manure. But what does the soil contain, and what are the components of the substances used as a manure? Until these points are determined, a rational system of agriculture cannot exist. The power and knowledge of the physiologist, agriculturist, and chemist must be united for the complete solution of these questions.

The general object of agriculture is to produce, in the most advantageous manner, certain qualities, or a maximum size, in certain parts or organs of particular plants. Now this object can be attained only by the application of those parts or organs, or by supplying the conditions necessary to the production of the qualities desired.

The rules of a rational system of agriculture should enable us, therefore, to give to each plant that which it requires for the attainment of the object in view.

As the composition of soils forms an important feature in the profession of agriculture, it will be our duty to explain, as briefly as possible, some of those which have the most distinct characters from their connections with different geological formations.

There are various modes of distinguishing soils without entering into a minute analysis of their component parts. The simplest and most natural is, to compare their texture, the size and form of the visible particles of which they are composed, and to trace the probable source of their original formation from the minerals which are found around or below them. The science of geology is of great utility in aiding us to compare different soils and ascertain their composition.

The soils which are immediately derived from those rocks, in which no traces of organic remains are to be found, consist either of visible fragments of hard minerals, which are not affected by exposure to air or water, or of minuter particles of the same, of which the shape is not readily distinguished by the naked eye. When they are altogether composed of visible particles and stones, the water readily passes through them; and unless they are kept continually moist by a regular irrigation, without any stagnation of the water, they are absolutely incapable of sustaining vegetation.

It is seldom, however, that any gravel or sand does not contain any portion of earth or other matter, of which the particles become invisible when diffused through water, and to which we will here give the name of impalpable substance. A certain portion of this finer part of the soil, and its due admixture with the coarser, especially where there is some regular gradation of size, and no stones of too large dimensions to obstruct the instruments of tillage, may be considered as essential to fertility.

The soils which have been formed from the disintegration and decomposition of the primitive rocks, such as granite, basalt, or limestone, and those which contain all these minerals minutely divided and intimately mixed, are always naturally fertile and soon enriched by cultivation. The hard particles of quartz maintain a certain porosity in the soil, which allows air and moisture to circulate, while the alumina prevents its too rapid evaporation. The silicate of potash is highly favorable to the vegetation of those plants which contain silica in their stems; in fact silica is present in the ashes of nearly all plants, having entered the plants by means of alkalies.

The primitive limestone, which is very hard, is yet gradually decomposed by the action of air and water, being in a very small degree soluble in the latter. The water which flows through these rocks is soon saturated; but when it springs out and comes to the light, the carbonate of lime is deposited by the evaporation of the water, and if this meets with the clay which results from the decomposition of the slate, it forms a marl, which, naturally or artificially added to silicious sand, forms the basis of a very good soil, particularly well adapted to pasture.

The soils, which have evidently been formed from the rocks, which are supposed to be of secondary formation, are fertile according to the proportion of the earths of these rocks, which they contain. It is of these chiefly that those loose, sandy soils are formed, of which the particles appear as distinct crystals, easily distinguishable with the aid of a lens, or even by a naked eye. Air and water have been the chief agents in the decompositions of those secondary rocks called sandstones, and agitation in water has washed from them the finer portions which have remained suspended. The immense sandy plains which are for the most part barren, have probably once been the shores of the sea, from which the waves have washed all that portion which was impalpable and easily suspended in water, depositing this in the depths, which, by some convulsion in nature, may some time or other be raised above the level of the waters, and form hills or plains of clay.

Argillaceous earth exists, in some proportion, in almost every rock. Some of the hardest gems are chiefly composed of alumina. It has the property, when mixed with other substances, as silica or lime, of fusing into a stone of great hardness and insolubility. In this state, its effect on the soil is not to be distinguished from that of silica; and by burning common clay, or clay mixed with carbonate of lime, a sandy substance is produced, resembling burnt brick, which tends greatly to improve the texture of those clays which contain little or no sand in their composition. It must be remembered that the stiffest clays contain little or no sand in their composition. It must be remembered that the stiffest clays contain a large portion of silica in an impalpable state; but this, instead of correcting their impermeable and plastic nature, rather adds to it. It is only palpable sand, which, with clay, forms what is commonly called loam, and which, when the sand is in due proportion with a mixture of organic matter, forms the richest and most easily cultivated soils. Some of the rocks of secondary formation contain a considerable portion of alumina and lime; and when these earths meet with crystallized sand, a compound, or rather a mixture, is formed, which has all the requisite qualities, as to texture, to produce the most fertile loams. The only deficiency is organic matter; but this is so readily accumulated wherever vegetation is established, or can be so easily added artificially, that these loams may be always looked upon as the most favorable soils for agricultural operations, and if a considerable depth of loam is found, which neither retains water too long nor allows it to percolate too rapidly, it may be looked upon as a soil eminently capable of the highest degree of cultivation. It is known that the aluminous minerals are the most widely diffused on the surface of the earth; and all fertile soils, or soils capable of culture, contain alumina as an invaluable constituent. There must, therefore be something in aluminous earth which enables it to exercise an influence on the life of plants, and to assist in their development. The property on which this depends is that of its invariably containing potash and soda.

Destruction of Moose and Deer.

The destruction of deer in the eastern counties of Maine for two or three years past has been immense. Not less than six thousand deer have been killed in the counties of Penobscot, Hancock, and Washington, within the last year. Five thousand skins were purchased in Bangor alone. Hunters from other States come in at all seasons, and in many cases apparently for mere sport, and often reserving only the skin as a reward or a trophy. During the present winter loads after loads of carcasses or of saddles of deer have been brought into the Bangor market.

Those interested in the matter, the settlers in these counties, feel that at the present rate of destruction, the moose and deer will soon be annihilated in Maine. They are bestirring themselves in the matter of their protection by getting up petitions to the Legislature, asking for a law imposing a fine upon every person who shall kill a moose or deer between the first day of January and the first day of September. The Legislature, says the "Bangor (Maine) Whig and Courier," will doubtless attend at once to this application, and provide a stringent law for the protection of these animals, and secure to the State a greater benefit than is now derived from their indiscriminate and wanton destruction.

Ingenious Invention---Ship's Indicator.

Z. A. Wagner has invented an apparatus for ascertaining the speed of vessels at sea, which appears to possess much merit, and is certainly an excellent substitute for the old fashioned log and line. A brass blade about six inches long, is placed at the side of the keel, which, when not in use, is folded close against the keel, and presents no resistance to the water. By means of a rod passing through a tube to the cabin or captain's state room, it connects with a dial plate. The apparatus is thrown into gear whenever the captain is desirous of knowing the rate at which the vessel is going, which turns out the blade, so that the whole resistance of the water is thrown against it, and the exact speed is shown by a hand traversing the dial. The apparatus already made, to be affixed to the sailing yacht White Lily, goes as high as twelve knots, but it can be increased to any number necessary. The importance of knowing to a fraction the rate at which a vessel is going, in order to guide the captain in his calculations, cannot be too highly appreciated.—[Exchange.

The above invention is not new. For an illustrated description of the same thing see page 57, Vol. 6, Scientific American.

The Great Silk Workshop.

Lyons is the great silk workshop of Europe. The large amount of silk fabrics is manufactured mostly by families and individuals in their own dwellings, for, and by contract with, the large dealers or commissioners.—Many of these last are exporting houses, and many of them associated with houses in the United States.

The stocking makers of Paris have presented the Emperor an address of thanks for making the men wear long stockings.

TO CORRESPONDENTS.

W. E. L., of Ohio—You must have been in an extraordinary hurry when you penned your letter. If you made it a business to study such things, you would be more careful in expressing such ideas; and your views, as expressed, are certainly not very clear, although you wrote them "to clear up the subject."

J. V. D., of Ohio.—We receive many letters like yours; there are many men who read considerable, and presume that they can write better than those who study and make it a business. You say that if we had used the word "ground" instead of "principle" in reference to Judge Kane's decision, we would have been saved from a loose style of language. See Webster's dictionary.

J. E. C., of N. Y.—There is nothing new or patentable in your pump, that we can discover. The principle is old and well known.

J. B. F., of Ohio.—We have entered your name upon our subscription books and credited you with the dollar received. Where the evidence is palpable that a person subscribes for the paper, a dollar's worth, for the purpose of getting five dollars' worth of information by letters, he need not feel disappointed if he gets no reply.

E O , of Ill.—E, Howe, Jr,, Chas. Nettleton, J. M. Singer & Co , are manufacturers of sewing machines in this city—all good machines. Wheeler, Wilson & Co , Watertown, Ct, and J A Ross, of St. Louis, are also makers, and will give all needful information about prices, etc.

R. B , of Geo —Letters not signed by the proper name of the writer are not answered or preserved.

E. T., of Va —Essentially the same plan as yours for operating brakes is described in the caveat of Joseph Marks, filed some months since.

J. C., of Ohio.—We have seen no picture taken by the process of Niepce. none has been exhibited in this city. We would like to see some of your specimens. Your article is in this week; your honor is secure as a discoverer. We could not publish it before.

E. B. R., of Ky.—Your pump is different from any with which we are acquainted, and we have no doubt a patent can be obtained. Still, you should remember that much has been done in this branch, and it is therefore the more difficult to determine accurately.

W. B , of Tenn.—We do not find that Mr. S. has a patent for his mill. We furnish only copies of claims, and have credited you with one dollar on account of further subscriptions. We should think the invention possessed some novelty, but cannot determine without a sketch or a model.

L. B. G., of Pa.—We do not remember to have seen a plough beam like yours. This, however, is not conclusive as to its novelty, because there are many improvements in ploughs with which we are not familiar; in fact, there are so many patents for this purpose, that no one will venture an unqualified opinion.

E W. H., of Mass.—We will send you a copy of the patent laws as soon as we have them to furnish.

W. H. F , of Mo.—For the very fine list of subscribers sent by you, accept our thanks.

J. T. A., of Va.—We made a similar enquiry some months since for another party, and found that the yellow oak bark under the name of "quercitron bark" is largely shipped from Philadelphia. We cannot learn of its being an article of commerce from this city.

F. B. H , of Ind.—You will not have to make any alteration in patent if issued, so long as you retain in the machine the principle upon which the claims are based. We hope the case will meet attention soon.

G. V. A., of N. Y. Your improvement in journal boxes appears to be new, and we think a patent can be obtained.

G. M., of Md.—We regret to be obliged to inform you that we have not a copy of either No. 19 or 20 of the present volume on hand.

M. G., of N. Y.—If you insist upon it, we will make an application for a patent for you, but your invention does not possess a feature that is not in common use, and it will be useless for you to maintain a hope of success, if you apply.

N. S., of Mass.—The plan you suggest for obviating railroad accidents, has been tried, but it was found not practicable.

W. A. S., of N. Y.—Your letters of the 27th ult. and 11th inst , were both duly received. The for mer contained $10 ; which we credited to Mr. Sloan; the latter $1, which was credited to complete your yearly subscription.

J. R , of Mass.—We cannot furnish such a receipt as you want.

Money received on account of Patent Office business for the week ending Saturday, Feb. 19 :

B. L, of N. Y , $25 ; J. P. W , of Mass , $20 ; W. J. McA., of Ga , $24 ; J A. R , of Mo., $25 ; J. O C., of N. J., $10 ; C. T. of R. I., $600 ; J. P. A., of Ct., $30 ; G. W B., of N. Y., $100 ; T. J. A , of Ohio, $55 ; J. N. A., of Ct., $30 ; C. H. P , of N. Y., $30 ; J. B. T of N. Y , $30 ; L. B. W. of N. Y , $10 ; J. T , of N. Y. $300 ; S. W. D & Co. Mass , $60 . M. B. D., of Pa , $16 ; S. B. B., of N. Y., $30 ; J. P., of L. I., $30 ; J. M. R , of N. Y., $57 ; J. L., of L. I., $27 ; J. E. N. of N. Y., $35.

Specifications and drawings belonging to parties with the following initials have been forwarded to the Patent Office during the week ending Saturday Feb. 19 :

J. L , of L I.; J. P. W. of Mass ; J. E. N., of N. Y.; T. R., of N. Y.; M. B. D. of Pa.; S. C. R., of N. Y.

A Chapter of Suggestions, &c.

Back Numbers and Volumes—In reply to many interrogatories as to what back numbers and volumes of the Scientific American can be furnished, we make the following statement:—Of Volumes 1, 2 and 3—none. Of Volume 4, about 20 Nos., price 50 cts. Of Volume 5, all but four numbers, price, in sheets, $1. Of Volume 6, all; price in sheets, $2; bound, $2,75 Of Vol. 7, all; price in sheets. $2; bound, $2,75. Of Vol. 8, none.

ADVERTISEMENTS.

SCIENTIFIC MUSEUM.

A Want Supplied.

A domestic hand loom of a simple construction that could be easily managed, and worked by the most inexperienced, was a great desideratum in country districts. The old fashioned hand loom is cumbersome and difficult to work by those not accustomed to it, and some improvement was much to be desired. This improvement, we are able to congratulate our country readers, has been effected, and we have had the pleasure of viewing a new hand loom, which is illustrated on page 148, this volume. It differs from the hand loom which is at present used, in the direct action of the lay, thus working the treddle and throwing the shuttle, whereas, by the other, the treddle is operated by the feet, and the shuttle thrown by the hand. This alone would be sufficient to obtain for it a preference among the farming classes, who required some such simple contrivance by which weaving might be done at home without the trouble of a long practice, which is required by the old method to obtain any sort of proficiency. The above improvement has, however, many other advantages, it will do a greater quantity of work, takes up much less room, and is so simple and inexpensive in its structure, that it can be made wherever there is a carpenter and an ordinary blacksmith. A hand loom of this description will be of incalculable benefit, for it must infallibly make weaving as common an art as that of handling the needle, and indeed requires less skill. Those who have been accustomed to the old fashioned country loom will find no difficulty in operating this, for the manner of putting in the web is precisely the same, and very little instruction will be required by the uninitiated. All sorts of cotton and woolen articles of a common description can be manufactured by this loom, and it is well adapted for the South, where it might be advantageously employed for weaving the common fabrics of domestic use.

The patentee, S. C. Mendenhall, is now on his way to Washington, for the purpose of exhibiting his invention at the Metropolitan Fair in that city. We have not the least hesitation in venturing to affirm that this machine will eventually supersede the ordinary hand loom in country districts, and that it is as useful an article for domestic purposes as we have ever had an occasion of noticing. As an in-door resource of employment among farmers and others, it will be of the greatest value, and every housewife will be rejoiced at the introduction of a money-saving machine that can be worked so easily and so effectually almost by a child.

Natural Gas.

The "Holmes County (Ohio) Farmer" states that a wonderful natural curiosity has been discovered in that county, in the shape of natural gas. The discovery was made on the farm of a Mr. Purdy, some eight or ten rods south of the house, in a curious kind of earth resembling dark sawdust. The owner, for some years, has been aware of the existence of some wonderful phenomena. The place on which the discovery has been made has been cultivated for a number of years, and it has been observed that, in a number of places, every thing planted or sown, and all kinds of vegetation, would dwindle and die, and seemingly turn up. After the late rains the water was discovered to be agitated, and to bubble up in a number of places, which led Mr. Purdy and others to experiment, by collecting a bottle of this gas, and setting it on fire, when, the instant a lighted match was touched to it, the vapor ignited, and sent the bottle whizzing through the house.

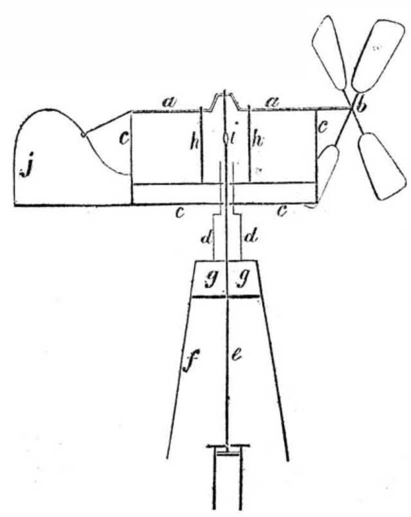
How have the Chinese managed to keep their lands in a productive condition for so many centuries, with so few cattle, and without the usual facilities for producing manures, which are so common to all other highly cultivated regions?

A sort of prepared linen is now used in Germany to print youngsters' books on; it is dearer than paper, but the youngsters cannot tear it.

Wells, Pumps, &c.

[Continued from page 176.]

Wind-Mill Pump.—The annexed engraving is an elevated section of a plan for working a pump by the direct action of the main shaft of a wind mill.



a a represents the shaft; *b* the fans; *c c* the frame on which the shaft rests; *d* is a cylinder on which the frame turns, so as to keep the sails to the wind; *e* is the piston rod passing from the top of the pump to the crank; *f* is the frame attached to the platform of the well; *g* is the top of the frame in which the hollow axle is placed; *h* are braces to prevent the shaft from springing; *i* is a joint and swivel to prevent the crank motion from interfering with the top of the axle, and also to prevent the lower part of the rod from turning with the frame; *j* is the oar to keep the wheel or sails to the wind.

On level lands such a method of pumping for irrigation may be very useful, especially where fuel is expensive. In places where fuel is cheap, we recommend a steam engine, but this wind-mill pump is no doubt adapted for the purpose specified, to many places of our extended country. In broad and open prairies near low sluggish streams, it might be employed with success. It can be made of any size and by any clever mechanic.

Novel Manufactory.

The skins used by the London furriers for making muffs, boas, and tippets, are submitted previously to a singular process, called "tubbing" The workmen are ranged in tubs along the sides of an apartment, or shed, or outhouse, in a yard, or some secluded spot in London. Every tubber, with the exception of those who may be unwell, who may then wear a loose sort of jacket, which, however, tells against the efficiency and rapidity of his work—is altogether naked! The tub in which the man works reaches up to the waist, and a thick yellowish cloth is thrown over its top, which the workman keeps every now and then gathering about him, and which he can draw around him like a bag, so that while at his labor the upper part of his person alone is visible. There is no water or any other fluid used in tubbing, but the fleshy part of the skins are all buttered, and with the cheapest butter or scrapings, and in some places rancid butter, when such things are purchaseable in sufficient quantity. Sawdust is used, which gives the butter a firmer tread, and tends to aid, by its friction, in scouring skins; so prepared, the men tread, and the perspiration which sometimes pours from them is considered better and readier for the cure of the skins than any butter or other fatty compound, which are looked upon as merely auxiliary to what oozes from the workman's body. And in this way men's sweat is forced for hours together into the skinny parts of the furs which are to be ladies' muffs, boas, and tippets.

Testimonial to Lient. Maury.

The merchants of the city of New York have taken measures to bestow upon Lieut. Maury, of the National Observatory, some mark of their high appreciation of what he has done for nautical science, and the benefit he has conferred upon the maritime interests of our country. We are happy to see this movement; it is honorable to our merchants, and nobly has Lieut Maury earned the thanks and admiration of his countrymen.

Francis' Life-Boat Manufactory.

Owing to the constantly increasing demand for Francis' invaluable life-boats, this gentleman has found it impossible to supply the demand without increased facilities. He has therefore erected at Green Point, a mammoth building for the construction of his metallic life-boats and life cars. The main part of the building is 190 feet deep by 113 feet wide, and 40 feet high at the peak, and contains 700,000 cubic feet of space, 21,470 cubic feet to each floor. The wall is 20 inches thick, and is built of brick, laid in hydraulic cement and grouted from top to bottom. There are eight 16 feet doors, and 247 lights, including the skylights. Each floor and separate apartment is thoroughly ventilated by flues, which are carried through the numerous piers for the health of the workmen. The roof of the building is of corrugated galvanized sheet-iron, and is said to be the best roof of the kind in the United States. The building was erected under the superintendance of Mr. Archibald White, of New York. The boiler-house is a separate building built of brick and iron. Some 70 or 80 men were to commence work in this factory on Friday; one press has now been put at work, which will prepare the material for about 40 boats per day, and eventually Mr. Francis intends to put in five more presses and engines, which will give employment in the various departments to about 500 men. The following is a description of the life car:—They are in shape somewhat similar to a boat, formed of copper or iron, and closed over by a convex deck, with a hatch-way, through which the passengers are admitted. The car will hold from four to five persons. When the passengers are inside the cover is shut down and bolted, and the car is then drawn to the shore, suspended by rings from a hawser which has previously been stretched from the ship to to the shore. There is no light in the car, or openings for the admission of air; the car containing sufficient air for the use of its passengers for a quarter of an hour, and but three or four minutes are seldom occupied in reaching the shore. The company intend to send one of these cars, containing several live animals over Nirgara Falls this season, in order to ascertain the quantity of pressure they will sustain without injury.

The Ericsson Hot Air Ship.

This ship left her place at Williamsburgh, on Tuesday the 15th inst., with a S. E. light breeze. From the time she passed pier No. 1, East River, until she passed the Narrows, it was 1 hour 38 minutes; she had the tide in her favor, and ran only at the rate of 6 knots per hour. A correspondent informs us that, with the tide in her favor, she only run at the rate of 4 miles per hour, and an eye witness says that she took 22 minutes to make the first mile. She left to go to Norfolk, Va.; we have not heard any word from her since she went to sea. We are patiently waiting for the "New York Tribune" and "Times" to tell us the exact day—seeing the days of steam are numbered, when all our steamboats will stop running.

Manufacture of Boiler Iron.

The Secretary of the Treasury publishes a notice to the manufacturers of boiler iron, calling their attention to the provisions of the new Steamboat Law, which requires,—

"That all plates of boiler iron shall be distinctly and permanently stamped in such manner as the Secretary of the Treasury shall prescribe, and, if practicable, in such place or places that the mark shall be left visible after the plates are worked into boilers, with the name of the manufacturer, the quality of the iron, and whether or not hammered, and the place where the same is manufactured."

The Secretary says, in pursuance of the authority vested in him by this act, that, in future, all iron to be used in boilers of steam vessels must be clearly and distinctly stamped in not less than three places on each sheet or plate, as follows, viz., at two diagonal corners, at a distance of about four inches from the edges, and also about the middle of such plate or sheet, with the name of the manufacturer, and the name of the place where manufactured, designating the latter by the name of the city, town, or county, and also State.

Railroad and Engine---A Memorial.

A memorial has been presented to the U. S. Senate, by Col. James French, of Virginia, praying Congress to aid in putting his invention of a new locomotive and railroad in operation at Washington, to test his plan thoroughly. The memorial was referred to a select committee of five Senators, Messrs. Foote, Rush, Dawson, James, and Norris.

LITERARY NOTICES.

Chemical Field Lectures.—Cambridge, John Bartlett; 12 mo, pp. 242. The above is a chemical work for agriculturists, by Dr. Stockhardt, Professor in the Royal Agricultural Academy, at Tharand Saxony, and is now presented in a translation to the American farmers, with additional notes, under the editorship of James E. Teschemacker. The subject of agricultural chemistry is one of such vital importance, that we cannot allow the opportunity to pass by of making a few remarks upon the subject. This new area of enquiry, which was first opened by Sir H. Davy, and so vastly extended by Liebig, is sufficiently ample to admit of still further votaries; and, considering his opportunities, no farmer should be content, in the present advanced state of knowledge, to be in ignorance of the constituents of the soil that he tills. That much culpable neglect has been exhibited by agriculturists of every country, in the tillage of the soil, no one can deny; and, therefore, the dissemination of agricultural chemistry will tend much to correct those errors into which so many have fallen. The proper application of manures is a subject of the greatest importance; and the author has treated lucidly upon the principal—namely, guano, bone dust, &c. But, as the work was originally written for the farmers of Germany, it is not so useful for the agriculturists of our own country as we would have wished. A careful reader will, however, gather much practical information from its pages; and on account of the vital importance of every thing pertaining to agricultural chemistry, we hail it as a valuable addition to the works already written on the subject.

Illustrated Journals.—On the first day of January, Messrs. Barnum & Beach commenced the publication, in this city, of a weekly journal, devoted to art, literature, news, &c., under the title of the "Illustrated News." It is a large 8 vo. imperial sheet, profusely illustrated, and contains solid, interesting matter for all classes. It is truly a high-toned, admirable journal, and is conducted with great energy, enterprize and tact. No. 8, now before us, contains 19 beautiful engravings, done in the best style of the art Among the subjects represented are the following: Burning of Steamers at St. Louis, The Castle, the Ghost of Wallenstein, Wadda Rapa, Mirage in the Desert, John Banvard, California Miner's Hut, Veterans of 1812 at the Capitol, Sponge Fisheries in Cuba, Fairmount Water Works, Philadelphia; Interior view of the Water Works, Mission House on site of the Old Brewery, House of Refuge, Randall's Island; Bridal Cake at Renseliaer Manor; St. Peter s, at Rome; Adams' Express Building, San Francisco; Madame Sontag, from a daguerreotype; Madame Sontag in La Sonambula, The terms of the Illustrated News, are $3 per annum Office, 128 Fulton street.

Book of the World, No. 6; Weik & Wieck, Philadelphia. This number, among other interesting matter, contains a short memoir of Henry Clay. It is properly called the "Book of the World," for it has something to say on every thing, and it would be strange if in so great a variety there should be any one who could not find some article that would be amusing or instructive.

"A Guide to Roman History," from the earliest period to the close of the Western Empire, by the Rev. Dr. Brewer; C. S. Francis & Co, publishers, 252 Broadway. This is a most excellent and instructive publication designed especially for schools and families. We recommend it as a work of uncommon value to those desiring to acquire, in an easy manner, a general knowledge of this ancient and venerable region.