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Improved Water Elevator.

The paintings in the tombs and temples of Egypt, which have preserved in so wonderful a manner the minute records of the life of that singular people, show that the efforts of mankind were directed in very early times to contriving plans for raising water. These efforts have been continued in all ages. The old treadmill has been superseded by the windmill, the waterwheel, the steam engine and the air motor. In this, as in every other department, the activity of the present century asserts its superiority over all those which have preceded it. We have no doubt that more devices for raising water have been invented in this country in the last 40 years than had been produced before in all the world since the beginning of time. We have had rotary pumps, centrifugal pumps, cylinder pumps, single and double acting, with movable valves, with stationary valves, with solid pistons, with hollow pistons; water wheels, buckets, and elevators in almost endless variety of combination. After so thorough an investigation of the subject by so many active and fertile minds, it is surprising to find an invention in this department entirely original and novel; perhaps no more striking proof could be furnished of the absolutely boundless extent of the field which is open for inventors.

By this contrivance water is drawn from an open well by turning a shaft or crank constantly in one direction; two buckets alternately rising and falling, being filled and emptied, and the direction of their motions being changed, all by automatic devices. The mode of accomplishing this is very simple, as will be seen by examining the engraving.

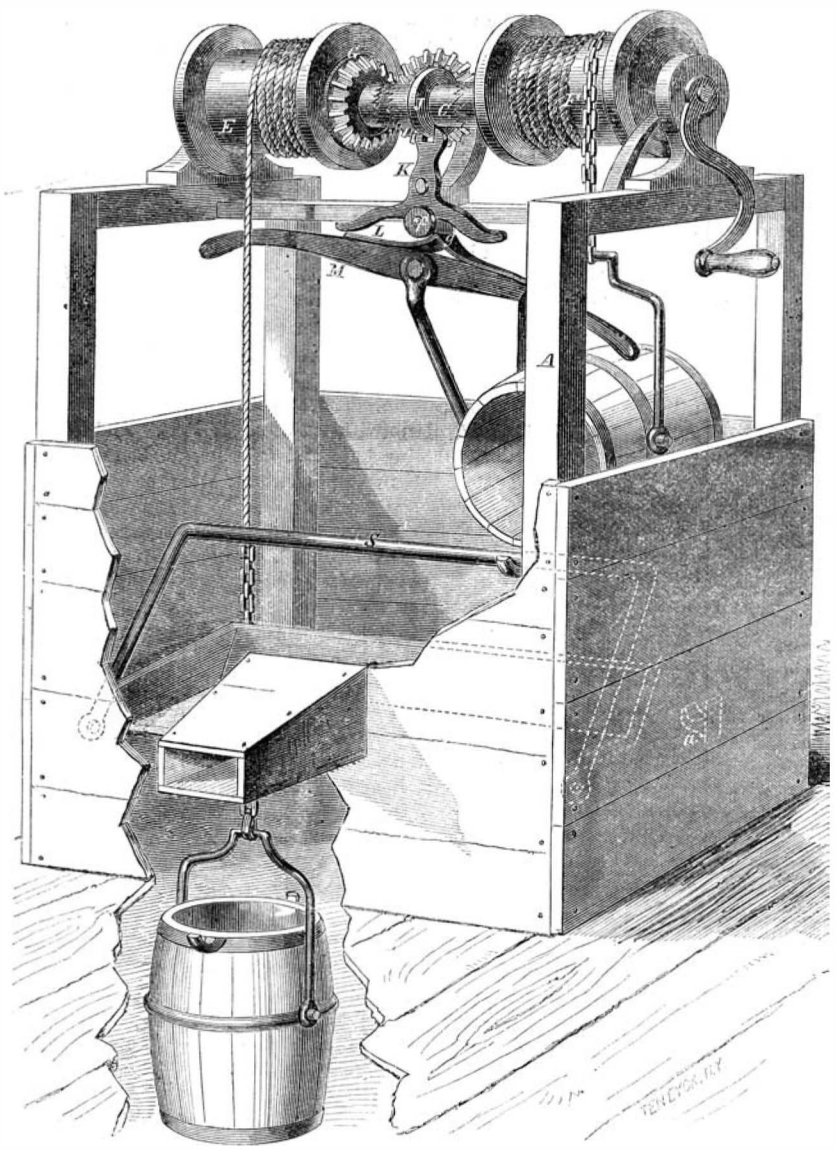
A curb, A, is placed over the well, with shaft, C, across it. Upon this shaft are loosely placed the two drums, E and F, around which the ropes for raising the buckets are wound. Around the middle of the shaft, C, is the sleeve, J, sliding freely horizontally, but caused to rotate with the shaft by a feather and groove. To the inner ends of the drums, E and F, are secured the beveled gears, G, which mesh into the gear wheel, H, so that when one drum is rotated, it will carry the other drum in the opposite direction, and *vice versa*. The sleeve, J, has ratchet teeth which lock into similar teeth upon the end of either of the hollow axles of the drums, E and F. Thus it will be seen that, when the sleeve, J, is locked to the drum, E, so as to cause it to rotat with the shaft, C, the drum, F, is turned in the opposite direction. As one of the buckets is drawn to the upper part of the curb by the drum, E, it strikes one arm of the lever, M, which carries up the arm of the lever, K, and thus slides the sleeve, J, into connection with the drum, F, thus of of course reversing the motion of the buckets, carrying the upper one down and bringing the lower one up. A friction roller, *f*, upon the lower part of lever, K, and a spring, L, with an inverted V-shaped projection, *g*, upon lever, M, render this movement quick and positive, and prevent it from occurring casually without the action of the buckets.

The buckets are caused to be tilted and emptied by a simple device, which acts with great certainty. A hook, *l*, upon the upper edge of the bucket, catches into a bail-shaped bar of iron, S, which is connected to the curb by hinges, and rests in a support, *s*. As the bucket is liable to turn by the twisting of the rope, a flat chain is introduced at the end of the rope, and this chain, by winding upon the drum, always turns one of two sides of the bucket to the spout side of the curb, hooks being placed upon both of these sides of the bucket.

The buckets may be made with valves in the bottom opening upward, so that they will be filled without being inverted.

The advantages secured by this apparatus are: 1st, The weight of the descending bucket aids in bringing up the one that is ascending; 2d, As one bucket is being filled while the other is being emptied, there is no delay in waiting for the former operation; 3d, The rotating of the crankshaft continually in the same direction saves all time and trouble in reversing its motion, and adapts the apparatus to be worked by steam or other power; 4th, The ease with which it can be adjusted, so that the buckets will descend precisely to the depth required and no further, thus allowing the water to be drawn from very near the bottom of the well without rendering it turbid.

The patent for this ingenious and novel invention was granted, through the Scientific American Patent Agency, February 12, 1861, and further information in relation to it may be obtained by addressing the inventor, Philander Anderson, at Norwich, N. Y.



ANDERSON'S IMPROVED WATER ELEVATOR.

The Color of Water.

Dr. Tyndall has shown, by a series of beautiful and conclusive experiments, that water has a decided color—that even in small thicknesses it is not the colorless substance it is usually imagined to be. When seen through a glass full of the liquid, of course it appears without color, but if looked at through a stratum of fifteen feet its color is very evident. The following is Dr. Tyndall's arrangement of the experiment for showing this to a large audience. A tin tube, fifteen feet long and about three inches in diameter, is placed horizontally on a stand, and half filled with water. The tube is closed by plate glass at each end, and a beam of electric light is thrown through it from the further end. By this means an image of the contents of the tube is projected on a white screen. The tube being about half filled with water, and the image upon the screen being inverted by the lens, the upper air space in the tube is seen in the lower part of the image, which is quite colorless; whilst the upper portion, illuminated by the rays which pass through the stratum of water, is of a greenish blue color. The color varies from a pure green up to a blue, according to the purity or otherwise of the water. Thus it is evident that the color of water is very appreciable; for, in a stratum of fifteen feet, a very considerable amount is exhibited, and thus there is no difficulty in comprehending the fact that, in looking through a deeper stratum, such as is seen in the Swiss lakes and in the waters which we have around our own shores, this color of water makes itself very perceptible.

KEHL is the name of a small town on the German side of the Rhine, nearly opposite to the ancient city of Strasburg, France. We remember crossing the river at this point a few years ago upon a pontoon bridge, a structure quite common on the Rhine. Near to this bridge is a red sandstone monument, erected upon a small island in the river, to the memory of the gallant Desaix, one of Napoleon's trusty and brave generals. A great railway bridge over the Rhine, at Kehl, is now completed. It is provided with draws to admit the passage of boats which are easily turned. They were recently subjected to an enormous pressure of two heavy trains, and the flexion was found to be very trifling.

THE CHEMICAL HISTORY OF A CANDLE.

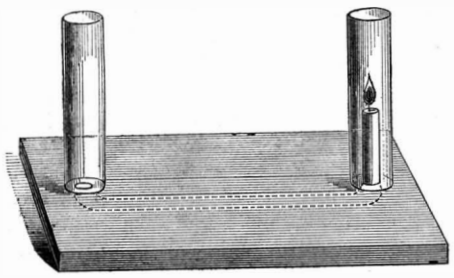
By Professor Faraday.

A Course of Six Lectures (adapted to a Juvenile Audience) Delivered before the Royal Institution of Great Britain.

LECTURE VI.— (Concluded).

Carbon or Charcoal—Coal Gas—Respiration and its Analogy to the Burning of a Candle—Conclusion.

Now, I must take you to a most interesting part of our subject—to the relation between the combustion of a candle and that living kind of combustion which goes on within us. In every one of us there is a living kind of combustion going on exactly like that of a candle, and I must try to make that plain to you. For that is not merely true in a poetical sense—the relation of the life of man to a taper, and if you will follow, I think I can make this clear. In order to make the relation very plain, I have devised a little apparatus which we can soon build up before you. Here is a board and a groove cut in it, and I can close the groove at the top part by a little cover;



I can then continue the groove as a channel by a glass tube at each end, there being a free passage through the whole. Suppose I take a taper or candle (we can now be liberal in our use of the word "candle" since we understand what it means) and place it in one of the tubes; it will go on, you see, burning very well. You observe that the air which feeds the flame passes down the tube at one end, then goes along the horizontal tube, and ascends the tube at the other end, in which the taper is placed. If I stop the aperture through which the air enters, I stop combustion, as you perceive. I stop the supply of air, and consequently the candle goes out. But now what will you think of this fact? In a former experiment I showed you the air going from one burning candle to a second candle. If I took the air proceeding from another candle, and sent it down by a complicated arrangement into this tube, I should put this burning candle out. But what will you say when I tell you that my breath will put out that candle? I do not mean by blowing at all, but simply that the nature of my breath is such that a candle cannot burn in it. I will now hold my mouth over the aperture, and without blowing the flame in any way, let no air enter the tube but what comes from my mouth. You see the result. I did not blow the candle out. I merely let the air which I expired pass into the aperture, and the result was that the light went out for want of oxygen, and for no other reason. Something or other—namely, my lungs—had taken away the oxygen from the air, and there was no more to supply the combustion of the candle. It is, I think, very pretty to see the time it takes before the bad air which I throw into this part of the apparatus has reached the candle. The candle at first goes on burning, but so soon as the air has had time to reach it it goes out. And now I will show you another experiment, because this is an important part of our philosophy. Here is a jar which contains fresh air, as you can see by the

circumstance of a candle or gas light burning in it. I make it close for a little time, and, by means of a pipe, I get my mouth over it so that I can inhale the air. By putting it over water, in the way that you see, I am able to draw up this air (supposing the cork to be quite tight) take it into my lungs and throw it back into the jar; we can then examine it and see the result. You observe I first take up the air, and then throw it back, as is evident from the ascent and descent of the water, and now, by putting a taper into the air you will see the state in which it is by the light being extinguished. Even one inspiration, you see, has completely spoiled this air, so that it is no use my trying to breathe it a second time. Now you understand the ground of the impropriety of the arrangements among the houses of the poorer classes, by which the air is breathed over and over again, for the want of a supply, by means of proper ventilation, sufficient to produce a good result. You see how bad the air becomes by a single breathing, so that you can easily understand how essential fresh air is to us.

To pursue this a little further, let us see what will happen with lime water. Here is a globe which contains a little lime water, and it is so arranged as regards the pipes, as to give access to the air within, so that we can ascertain the effect of the respired or unrespired air upon it. Of course, I can either draw in air (through A) and so make the air that feeds my lungs go through the lime water, or I can force the air out of my lungs through the tube B, which goes to the bottom, and so show its effect upon the lime water. You will observe that however long I draw the external air into the lime water, and then through it to my lungs, I shall produce no effect upon the water—it will not make the lime water turbid; but if I throw the air *from* my lungs through the lime water several times in succession, you see how white and milky the water is getting, showing the effect which expired air has had upon it; and now you begin to know that the atmosphere which we have spoiled by respiration is spoiled by carbonic acid, for you see it here in contact with the lime water.

I have here two bottles, one containing lime water and the other common water, and tubes which pass into the bottles and connect them. The apparatus is very rough, but it is useful notwithstanding. If I take these two bottles, inhaling here and exhaling there, the arrangement of tubes will prevent the air

going backward. The air coming in will go to my mouth and lungs, and in going out will pass through the lime water, so that I can go on breathing and making an experiment, very refined in its nature and very good in its results. You will observe that the good air has done nothing to the lime water; in the other case nothing has come to the lime water but my respiration, and you see the difference in the two cases.

Let us now go a little further. What is all this process going on within us which we cannot do without, either day or night, which is so provided for by the Author of all things, that He has arranged that it shall be independent of all will? If we restrain our respiration, as we can do to a certain extent, we should destroy ourselves. When we are asleep, the organs of respiration and the parts that are associated with them still go on with their action, so necessary is this process of respiration to us, this contact of the air with the lungs. I must tell you, in the briefest possible manner, what this process is. We consume food: the food goes through that strange set of vessels and organs within us, and is brought into various parts of the system, into the digestive parts especially; and alternately the portion which is so changed is carried through our lungs by one set of vessels, while the air that we inhale and exhale is drawn into and thrown out of the lungs by another set of vessels, so that the air and the food come close together, separated only by an exceedingly thin surface; the air can thus act upon the blood by this process, producing precisely the same results in kind as we have seen in the case of the candle. The candle combines with parts of the air, forming carbonic acid, and evolves heat; so in the lungs there is this curious, wonderful change taking place. The air entering combines with the carbon (not carbon in a free state, but, as in this case, placed ready for action at the moment), and makes carbonic acid, and is so thrown out into the atmosphere, and thus this singular result takes place; we may thus look upon the food as fuel. Let me take that piece of sugar, which will serve my purpose. It is a compound of carbon, hydrogen and oxygen, similar to a candle, as containing the same elements, though not in the same proportion; the proportions being as shown in this table:—

SUGAR.

Carbon	72	
Hydrogen	11	99
Oxygen	88	

This is, indeed, a most curious thing, which you can well remember, for the oxygen and hydrogen are in exactly the proportions which form water, so that sugar is compounded of 72 parts of carbon and 99 parts of water; and it is the carbon in the sugar that combines with the oxygen carried in by the air in the process of respiration, so making us like candles; producing these actions, warmth, and far more wonderful results besides, for the sustenance of the system, by a most beautiful and simple process. To make this still more striking, I will take a little sugar, or to make the experiment shorter, I will use some sirup, which contains about three-fourths of sugar and a little water. If I put a little oil of vitriol on it, it takes away the water, and leaves the carbon in a black mass. [The lecturer mixed the two together.] You see how the carbon is coming out, and before long we shall have a solid mass of charcoal, all of which has come out of sugar. Sugar, as you know, is food, and here we have absolutely a solid lump of carbon where you would not have expected it. And if I make arrangements so as to oxydize the carbon of sugar, we shall have a much more striking result. Here is sugar, and I have here an oxydizer—a quicker one than the atmosphere; and so we shall oxydize this fuel by a process different from respiration in its form, though not different in its kind. It is the combustion of the carbon by the contact of oxygen which the body has supplied to it. If I set this into action at once, you will see combustion produced. Just what takes place in my lungs—taking in oxygen from another source, namely, the atmosphere, takes place here by a more rapid process.

You will be astonished when I tell you what this curious play of carbon amounts to. A candle will burn some four or five, or six, or seven hours. What, then, must be the daily amount of carbon going up into the air in the way of carbonic acid! What a quantity of carbon must go from each of us in respiration! What a wonderful change of carbon must take place under these circumstances of combustion or respiration! A man, in twenty-four hours, converts as much as seven ounces of carbon into carbonic acid; a milch cow will convert seventy ounces, and a horse seventy-nine ounces, solely by the act of respiration. That is, the horse in twenty-four hours burns seventy-nine ounces of charcoal or carbon, in his organs of respiration, to supply his natural warmth in that time. All the warm-blooded animals get their warmth in this way, by the conversion of carbon, not in a free state, but in a state of combination. And what an extraordinary notion this gives us of the alterations going on in our atmosphere. As much as 5,000,000 pounds, or 548 tuns of carbonic acid is formed by respiration in London alone, in twenty-four hours. And where does all this go? Up into the air. If the carbon had been like the lead which I showed you, or the iron, which, in burning, produces a solid substance, what would happen? Combustion could not go on. As charcoal burns it becomes a vapor, and passes off into the atmosphere, which is the great vehicle, the great carrier for conveying it away to other places. Then what becomes of it? Wonderful is it to find that the change produced by respiration, which seems so injurious to us (for we cannot breathe air twice over) is the very life and

support of plants and vegetables that grow upon the surface of the earth. It is the same, also, under the surface, in the great bodies of water, for fish and other animals respire upon the same principle, though not exactly by contact with the open air. Such fish as I have here [pointing to a globe of goldfish] respire by the oxygen in the air, which is dissolved by the water and forms carbonic acid, and they all move about to produce the one great work of making the animal and vegetable kingdoms subservient to each other. And all the plants growing upon the surface of the earth, like that which I have brought here to serve as an illustration, absorb carbon: these leaves are taking up their carbon from the atmosphere to which we have given it in the form of carbonic acid, and they are growing and prospering. Give them a pure air like ours, and they could not live in it; give them carbon with other matters, and they live and rejoice. This piece of wood gets all its carbon, as the trees and plants get theirs, from the atmosphere, which, as we have seen, carries away what is bad for us and, at the same time, good for them—what is disease to the one being health to the other. So are we made dependent not merely upon our fellow creatures but upon our fellow existers, all Nature being tied together by the laws which make one part conduce to the good of another.

There is another little point which I must mention before we draw to a close—a point which concerns the whole of these operations, and most curious and beautiful it is to see it clustering upon and associated with the bodies that concern us—oxygen, hydrogen and carbon, in different states of their existence. I showed you just now some powdered lead, which I set burning; and you saw that the moment the fuel was brought to the air it acted, even before it got out of the bottle—the moment the air crept in, it acted. Now, there is a case of chemical affinity by which all our operations proceed. When we breathe the same operation is going on within us. When we burn a candle the attraction of the different parts one to the other is going on. Here it is going on in this case of the lead, and it is a beautiful instance of chemical affinity. If the products of combustion rose off from the surface, the lead would take fire, and go on burning to the end; but you remember that we have this difference between charcoal and lead—that while the lead can start into action at once if there be access of air to it, the carbon will remain days, weeks, months, or years. The manuscripts of Herculaneum were written with carbonaceous ink, and there they have been for 1,800 years, or more, not having been at all changed by the atmosphere, though coming under various circumstances in contact with it. Now, what is the circumstance which makes the lead and carbon different in this respect? It is a striking thing to see that the matter which is appointed to serve the purpose of fuel *waits* in its action: it does not start off burning, like the lead, and many other things I could show you, but which I have not encumbered the table with; but it waits for action. This waiting is a curious and wonderful thing. Candles — those Japanese candles, for instance — do not start into action at once like the lead or iron (for iron, finely divided, does the same thing as lead), but there they wait for years, perhaps for ages, without undergoing any alteration. I have here a supply of coal gas. The jet is giving forth the gas, but you see it does not take fire—it comes out into the air, but it waits till it is hot enough before it burns. If I make it hot enough it takes fire. If I blow it out, the gas that is issuing forth waits till the light is applied to it again. It is curious to see how different substances wait—how some will wait till the temperature is raised a little, and others till it is raised a good deal. I have here a little gunpowder and some gun cotton; even these things differ in the conditions under which they will burn. The gunpowder is composed of carbon and other substances, making it highly combustible; and the gun cotton is another combustible preparation. They are both waiting, but they will start into activity at different degrees of heat, or under different conditions. By applying a heated wire to them, we shall see which will start first [touching the gun cotton with the hot iron]. You see the gun cotton has gone off, but not even the hottest part of the wire is now hot enough to fire the gunpowder. How beautifully that shows you the difference in the degree in which bodies act in this way. In the one case the substance will wait any time until the associated bodies are made active by heat; but in the other, as in the process of respiration, it waits no time. In the lungs, as soon as the air enters, it unites with the carbon, even in the lowest temperature which the body can bear short of being frozen, the action begins at once, producing the carbonic acid of respiration; and so all things go on fitly and properly. Thus you see the analogy between respiration and combustion is rendered still more beautiful and striking. Indeed, all I can say to you at the end of these lectures (for we must come to an end at one time or other) is to express the wish that you may, in your generation, be fit to compare to a candle, and that you may, like it, shine as lights to those about you; that, in all your actions, you may justify the beauty of the taper by making your deeds honorable and effectual in the discharge of your duty to your fellow men.

Guano.

Peruvian Guano is the most concentrated manure with which we are acquainted; and, under certain circumstances, it exceeds all other substances in its fertilizing influences. A manure is valuable in proportion to the amount which it contains of three substances—*ammonia*, *phosphate of lime*, and *alkaline salts* (compounds of potash and soda with acids). The proportions of these ingredients present in farmyard manure are shown in the following figures, and are the average results of several analysis made by ourselves :—

100 PARTS OF FARMYARD MANURE CONTAIN :—

Ammonia	0.450
Phosphate of lime	1.750
Alkaline salts	1.300

The great superiority of guano over farmyard manure will be seen from the following statement, which gives the average results of several hundred analysis of this substance, made by us during the last six years :—

100 PARTS OF PERUVIAN GUANO CONTAIN :—

Ammonia	16
Phosphate of lime	22
Alkaline salts	9

The use of guano, as a manure, was long known to the Peruvians, and so highly was the article valued, that the *Incas*, the ancient rulers of Peru, at one time attached the penalty of death to the offence of killing the "manufacturers" of the article—the sea fowl that haunted the coast.

Sir Humphrey Davy was the first who suggested the employment of guano in British husbandry. This was in the year 1810; but the distinguished chemist's advice was not acted upon till thirty years afterwards. In 1840, a small quantity of the article was imported by Mr. Myers, of Liverpool, which, on being applied as a fertilizer, produced such wonderful results that in the following year the large quantity which was imported was readily bought up, and ever since, the annual demand for guano in Britain has only been satisfied by the enormous supply of from 200,000 to 300,000 tuns. The great demand for this curious substance inducing enterprising merchants to explore other regions than Peru in search of a similar commodity, and with considerable success, as guano is now imported in large quantities from various countries. With scarcely an exception, the guano found in every locality, except on the Chinchas islands, the other places along the coast of Peru, contains but a small proportion of ammonia in relation to the amount of lime; and, as it is an established fact that certain crops require more than others do, an abundant supply of phosphate of lime, it is very desirable that the farmer should know the composition of the various kinds of guano, in order that he may apply the most suitable kind to his crops, as the time for purchasing artificial manures is rapidly approaching.—*Irish Country Gentleman.*

[Guano should never be brought into contact with seeds. It should always be mixed with about six times its weight of finely sifted soil—loam, we think, is best. Guano requires considerable moisture to give out its fertilizing properties; in dry seasons its effects are inconsiderable. Peruvian guano is a monopoly; the government of Peru fix the price of it, and farm it out to a great company, who charge $40 per tun for it.—Eds.

Artificial Guano.

A desire to obtain an artificial guano, equal to that of Peru, and at a moderate cost, has long been manifested. The following has been furnished us by Dr. Abraham Gesner, F.G.S., on this subject :—

Guano, so valuable a fertilizer, is chiefly composed of the excrements of sea fowls. Frequently it contains feathers, bones of fishes, humus, &c. It is very variable in composition, a circumstance that has been ascribed to the different kinds of food upon which the birds subsisted. Some guanos contain upwards of 25 per cent of uric acid, in others that acid is almost entirely absent, and it is the same in regard to other acids, salts and alkalies. Ammonia usually enters largely into the best qualities of this fertilizer, and the presence of its carbonate is known by its odor. The oxalate, urare and phosphate of ammonia and magnesia are almost always present with the phosphates of soda and lime, the phosphates having been derived from the bones of the fish upon which the birds fed. In the supply of ammonia and of earthly and alkaline salts, guano is of the greatest value for plants cultivated for food. The food of the birds, from which the guano had been deposited has been certain fish that fed upon other fish, the food of which was marine plants, or animalcula. The origin of this fertilizer is therefore found in marine plants and animals.

The writer has obtained a product analogous to the true guano, and one nearly, if not quite, equal in its value for fertilizing purposes. Chemical and mechanical means have been applied to the marine *fuci* and fishes and fish offal until an artificial guano has been obtained. The sources of the alkaline carbonate, chloride of sodium and organic matter have been found in marine plants, the phosphates and carbonates of lime and ammonia in the bones and flesh of fishes, and after many experiments carefully performed, they have been combined so as to form a cheap and portable manure. At Long Island, in the State of New York, *menhaden* are manufactured into manure : the oil, which is very offensive, being extracted from the fish and employed for common purposes.

Having visited a great number of the fishing establishments of the Provinces of New Brunswick, Nova Scotia, New Foundland and the islands and coasts of the Gulf of St. Lawrence and Labrador, the writer obtained a knowledge of the vast quantity of fish and flesh offal annually thrown into the sea, or otherwise lost to every useful purpose. The garbage thrown overboard yearly from vessels fishing on the Banks of Newfoundland, if properly preserved and manufactured, with the annual growth of sea weeds upon the shore, would fertilize the entire cultivated surface of the Eastern States and British Provinces; still the amount of animal matter thus referred to is far less than that produced by the inshore fisheries.

To the foregoing may be added the enormous quantities of mytili and other shellfish growing upon the shore, and which are not less applicable for the manufacture of artificial guano, than the offal of the finny tribes. At many places on the shores, fish are met with in such abundance that they are employed by the fishermen to manure the small patches of ground some of them cultivate. At the principal fishing stations, the refuse garbage and bones alone would supply a manufactory, and with good management and the use of kelp, the offal may be transported from place to place without inconvenience. Like the bones of terrestrial animals, the inorganic matter or ash of the bones of fishes consists in the greater part of the phosphates of lime, or bone phosphate, with carbonate of lime, the fertilizing properties of which are well understood. Few soils preserve their fertility for any length of time. Every crop removes from the earth certain elements, which it is the business of the farmer to restore, and for that purpose no manure is better adapted than guano, either natural or artificial.

MODELS UNDER THE NEW LAW.—A number of newspapers, in attempting to enlighten their readers in the new patent law, have erroneously stated that hereafter models would not be required to accompany applications for patents. So far as applying for patents in ornamental designs, trade marks, paintings, busts, &c., their information is correct, but applications for patents in all mechanical inventions are required to be accompanied with models as formerly.

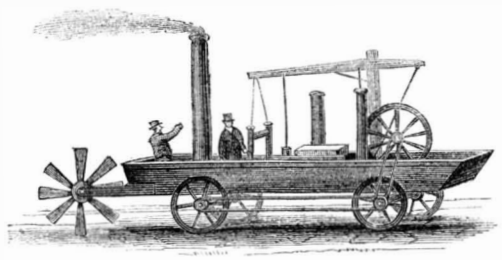
ROMANCE OF THE STEAM ENGINE.

ARTICLE XX.

OLIVER EVANS.

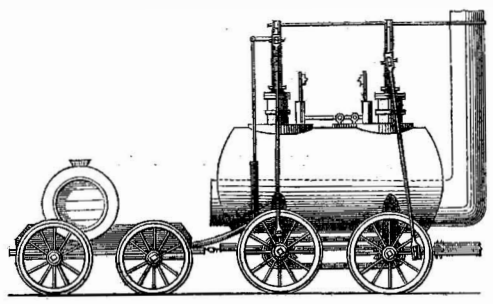
From the investigations of the subject, which we have made, we are perfectly convinced that Oliver Evans was the inventor who designed and constructed the first appropriate boiler for generating high pressure steam, and also that he was the first person who really appreciated the value and advantage of using steam at a high pressure. When we consider what has been accomplished by the employment of light, powerful engines—such as locomotives, carrying very high pressure steam—the name of Evans deserves a very high place on the scroll of fame. In an able and elaborate article, by Oliver Evans Woods, published in the Philadelphia *Evening Journal*, on the 1st of June, 1859, it is stated that in the year 1794 Oliver Evans sent Joseph Stacy Sampson, of Boston, to England, with drawings and specifications of his high pressure cylindrical boiler and engine, for the purpose of securing a patent in that country, but, for some cause not explained, it was not obtained for some time afterward, but the drawings had been exhibited to several English engineers. It was not until the winter of 1804, we believe, that he carried his ideas fully into practice. His boiler was cylindrical, with a flue through the interior, and in the front end of which was placed the furnace. The engine which Evans used was nearly similar to Watt's; it had four puppet valves for the cylinder, operated by cams, an arrangement which has been adopted for the most approved engines now in use in some steamboats and factories. Evans applied his engine to a mill for grinding plaster-of-paris, but the first real value of high pressure steam seems to have been obtained in applying his engine to drive a gang of saws. It is stated, in R. Stewart's work on the steam engine, that Evans found that in working ten saws, when the steam employed was at a high pressure, the engine drove the whole gang as easily as one saw was driven by the same engine worked by low pressure steam; in the former case there was a slight excess in the consumption of fuel. It is also said that his boilers were built for steam of from 50 to 150 pounds pressure to the inch. Evans also passed his exhaust steam through a small vessel containing water, to heat it previous to its being fed into the boiler—an arrangement now quite common on high pressure engines. The strong cylindrical boiler and the feed water heater were great improvements, and they laid the foundation of success in the high pressure engine—a success which led to the introduction of the locomotive and the railroad system.

The accompanying engraving represents Evans' "Oruktor Amphibolos," which was planned in 1803, and constructed in the course of the following year.



He had applied to the Legislature of Pennsylvania, in 1785, for a patent on a steam wagon, but the committee to whom his petition was referred considered him insane. The Board of Health of Philadelphia, however, being more rational, furnished him with capital in 1804, to build an engine for dredging the docks. To show that it was capable of propelling land carriages, digging mud, and driving vessels, he built the Oruktor Amphibolos. Evans was a cranky yet genial man, and enjoyed a good joke. As a rivalry existed between him and Col. John Stevens, of Hoboken, N. J., in the inventive line, he astonished the colonel with the name as well as the construction of this ancient Philadelphia dredger. It consisted of a large scow with an engine of five-horse power on board, to lift the mud into punts. Wheels on wooden axles were put under it, and by means of chain belts, connecting the wheels with the engine, it transported itself from the place where it was constructed to the Schuylkill river—a distance of a mile and a half—where the paddle wheel was secured to its stern.

The second figure represents Evans' engine and boiler applied to drawing wagons on railroads. The sketch is taken from "Gregory's Mathematics," republished by Carey & Hart, Philadelphia, in 1848. The description in that work refers to an engraving represented on page 461 in "Stewart's Anecdotes of the Steam Engine;" we therefore infer that this locomotive is something of a fancy sketch. It has the cylindrical boiler; two working cylinders are secured



to its top, and the furnace is in front of the flue which runs through the interior of the boiler. It has a smoke pipe, valve boxes, and carriage springs. The wheels are yoked together by an endless chain. Each piston rod is connected with a crosshead on the outer end of which, on each side, is the long rod extending down to the crank pin on each wheel; there is the feed pump which takes the water from the tank to the boiler.

Evans also proposed to employ a combined engine for carrying the products of combustion from the furnace, mixing them with the steam, and working them in the cylinder. He also used a blast for the furnace of his engine, so that he was long in advance of some projects which are thought by many to be novel in the year 1861. Respecting the benefits which Evans conferred upon the world, Robert Stewart, in his work before referred to, says:—"The practice of Evans and his publication on the subject, the first which was professedly of a practical nature, has produced a general impression in favor of using steam of a high temperature in North America; and by thus dispelling the vulgar prejudice which still exists against its use, in England, the foundation has been laid for the introduction of improvements on a principle which is yet thought to be capable of a great and beneficial extension."

So far as we have been able to ascertain, Evans never built a steam carriage that went into practical use, but he proposed to do so, and showed by the carriage which he moved through Philadelphia that this was practical, and he predicted that steam engines would be running on railroads after he was laid in the grave; this actually took place.

Inventors live in happier times now than they did sixty years ago, when Evans secured patents for valuable inventions. He was robbed and cheated out of them, and was harassed and ill used by the very people who should have honored, respected and rewarded him.

At 60 years he conceived the talent of invention had departed from him, and in 1819, when he had reached the age of 64, death closed his eyes. Oliver Evans was born at Newcastle, in the State of Delaware, but spent the greater part of his life in Pennsylvania. He was fertile in invention, had a good common education, was of an athletic form, and possessed open and frank manners.

AN inspection of the bones of Charlemagne took place at Aix-la-Cbapelle the other day. The remains were found in excellent preservation. Careful photographs were taken of the wrappers in which the remains of Charlemagne had rested for so many centuries; they were of a beautiful silken tissue. The larger wrapper, rich in color and design, was recognized as one of those *draps de lit* which were frequently mentioned by the Provençal troubadours, as well as by the cotemporary German Minnesangers, as *Palia transmarina*, *P. Saracenica*. It is, no doubt, a product of industry of the Sicilian Saracens from the twelfth century. The second small wrapper, of a beautifully preserved purple color, has been traced to Byzantine industry; the Greek inscriptions woven into the silk texture make it probable that the stuff was manufactured in the imperial gymnasium at Byzantium, in the tenth century.

Photographing Stars.

The following interesting remarks on this subject are condensed from the communication of a correspondent to the London *Photographic News*:—

Photographing the moon is a laborious undertaking, affording full occupation for one observer, who must pay unremitting attention to the condition of the various chemicals employed, so as always to be prepared for a cloudless night.

There are certain peculiar difficulties attendant upon photographing celestial objects, arising from the apparent motion of the objects. The photographic picture can never be so perfect as the optical image, with the same telescope, until we can obtain photographs of celestial objects instantaneously. If a fixed telescope be presented to a celestial object, the star will, in consequence of the earth's rotation, course along the field of the telescope, in a line parallel to the earth's equator; the image obtained is therefore a streak, representing the path of the star. We might suppose that this streak would, for short distances, appear straight and continuous; but it is broken up and distorted, and consists of a great number of undulating points, crowded in some places, and scattered in others. This distortion arises from disturbances in our atmosphere, which cause the star to flicker.

If the telescope be mounted so as to follow the star's apparent path, the picture obtained after some seconds' exposure, is not one single clear disc or point, but a conglomeration of points extending over a greater or less area, according as the atmosphere has, during the interval, produced more or less flickering.

The reflecting telescope has considerable advantages over the refracting telescope for celestial photography, on account of all the rays coming to a focus in the same plane; hence, the focus having been adjusted for the luminous image, it is correct for the chemical image also. Refracting telescopes can, however, be specially corrected for the chemical focus, in the same way as camera lenses.

Stereoscopic pictures of the larger planets may be obtained by allowing a sufficient interval of time to elapse between the taking of the two pictures. In the space of 26 minutes Jupiter will have rotated through the 15° 48′ necessary to produce the greatest stereoscopic effect. In 69 minutes, Mars would have rotated through the same angle, and as his markings are very distinct, we may hope to obtain stereoscopic views of that planet. The markings on the other planets are too faint to hold out a promise of similar results.

Perfection in lunar photography would result from the employment of Lord Rosse's large telescope. The size of the pictures of the moon taken by Mr. De la Rue is about $1\frac{1}{16}$ inches in diameter; these might be enlarged by means of an adaptation of the solar camera; impressions 8 inches in diameter have already been obtained in this manner; and if the lenses lately produced by Mr. Dallmeyer be employed, still greater enlargement might be obtained without any sensible distortion.

It will surprise many of our readers to learn that, although we have a full moon every month, a full moon is never visible to us, except just before or just after a lunar eclipse, or, at all events, except when the sun, earth, and moon are very nearly in the same plane; at all other periods of the full moon, we are unfavorably situated for seeing the whole of the illuminated hemisphere. This phenomenon, and that of the different apparent diameter of the moon at various times, dependent on her distance from the earth, come out prominently in a collection of lunar photographs. At the moon's mean distance, the pictures taken with Mr. De la Rue's reflector measure 1·0137 inches, the variation being from 1·0053 to 1·1718.

Stereoscopic pictures of the moon are obtained by combining two views taken at sufficiently distant periods. The light and shade in the photograph do not, in all cases, correspond with the light and shade in the optical picture. The reason is, that portions of the moon equally bright, optically, are by no means equally bright, chemically. Frequently, details are rendered visible photographically, which escape observation optically, and this fact is full of promise for future selenological researches. By the aid of photography we may reasonably hope to obtain a more perfect map of the moon than now exists. The

mass of curious details already displayed by photography is quite overwhelming. The relative actinic power and luminosity in the planet is remarkable. In the occultation of Jupiter by the moon, on November 8, 1856, Jupiter appeared of a pale, greenish tinge, apparently of about one-third of the general brilliancy of the moon; but the actinic power of Jupiter's light was subsequently found to be equal to fully four-sixths or five-sixths that of the moon. Saturn required twelve times as long as Jupiter to produce a photograph of equal intensity on an occasion especially favorable for making the experiment.

Electrified Locomotives.

Upon the Miss. & Milwaukee Railroad they have a locomotive in use that has become so thoroughly charged with electricity, as to give the engineer or firemen severe shocks, whenever they handle certain parts of the machinery. The first indications of this peculiarity were noticed in November, since which time the volume and force of its electric power has been constantly on the increase. Now when it stands upon the side track or is blowing off steam, the current of electricity flashes along the scale beam, and over the tops of the cab, while the report at times is as loud as that of percussion caps; at the same time throwing out globules of iron, something larger than ordinary shot, and at night the lightning flashes along the works in a manner that astonishes all beholders.

The company have 16 other engines of the same make, and it is possible the others may assume this same remarkable condition. In this event, and in case the "Farm Mortgagor's League" attach the equipments of the road, as they intimate in their Annual Address, it will only be necessary to open the valves, and let loose the bolts of Jove, and the showers of hot shot, to defend the equipment of the road from all depredation.—*Western Railroad Gazette.*

[The electricity in these cases must be set free by the steam issuing through the safety valve, and thus the locomotive becomes a hydro-electric machine. The most powerful known discharges of electricity have been obtained from a steam boiler.—Eds.

Saws for Cutting Timber.

Four different classes of saws are employed for sawing out lumber. These consist of the circular, the muley, the gate saw (all single), and the gang saw.

The circular saw cuts during its entire revolution, and it can therefore saw a great deal more lumber in the same space of time than a reciprocating saw. More power is undoubtedly required to operate them, but not in proportion to the greater amount of work done, when compared with a log saw. The muley is a stiff, long saw, not stretched in a gate; it is run at the rate of 300 strokes per minute, or nearly double the speed of gate saws. Muley saws are preferred in many places to all others, but they waste timber. A much thinner saw, however, than the former can be used in a gate, because it is stretched and held firmly to the work independent of its own weight.

There are two classes of gang saws; one is called the "flat" and the other the "round gang." The logs are first slabbed on two sides by separate saws for the flat gang, and the logs are laid flat upon the bed. The boards and planks come out of such a gang finished. The logs are fed without slabbing to the round gang. The boards thus produced are afterward trimmed at their edges by small circular saws. By this latter method of sawing, a greater quantity of valuable timber is saved.

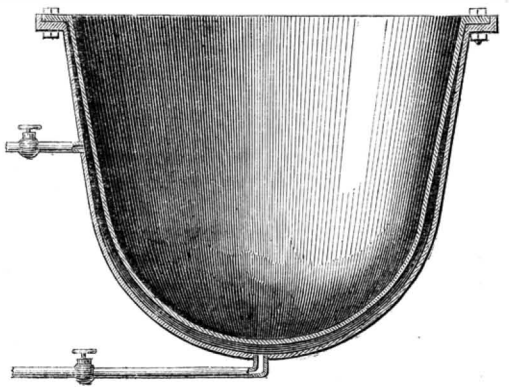
The lumber produced by gang saws is of a superior character, and sells for a higher price than that of single saws; thinner saws can also be used in gangs; therefore, whenever there is sufficient power to cut lumber from logs with a gang of saws ranging from two up to thirty, they should be used in preference to all others.

The trigonometrical survey of Great Britain and Ireland is about to be connected with those of the countries on the continent of Europe. This will permit the measurement of an arc of latitude extending from the west side of Ireland to the Ural Mountains; a fifth of the circumference of the earth.

The New Patent Law.—Copies of the Scientific American, containing the new Patent Law, may be had at our office. Price five cents.

Explosion of an Oil Kettle.

On the 20th of last month a very unusual accident occured at a manufactory of printer's ink in Ann-street, this city. A cast iron kettle 2 feet deep, 2½ feet in diameter, and one quarter of an inch thick,



was placed within an outer kettle, as represented in the cut, the rims ot the two kettles being bolted together and made watertight with cement. About 10 gallons of oil were put into the inner kettle, and the space between the two vessels was connected by a steam pipe with a boiler in which the pressure was about 75 pounds to the inch; the waste pipe being left entirely closed! As might have been anticipated, as soon as the full boiler pressure came upon the space between the two kettles, the inner one was blown out of its place and sent up against the ceiling, scattering the hot oil in every direction, and filling the room with steam. A few drops of oil fell upon the clothes of persons in the room, though not in sufficient quantities to do any material harm; but the scalding steam injured three of them severely, though it is hoped not fatally.

California Hydraulic Mining.

The following extracts are from a letter of Rev. T. Starr King, in the Boston *Transcript*, in which the operations of hydraulic mining in California are described in a very graphic and interesting manner:—

The inventor of this process is Edward Matteson, of Sterling, Conn., and he first applied it in Nevada, in 1852. Astronomers tell us that there are pits in the moon 17,000 feet deep; they say, also, that any object on the moon two hundred and fifty feet high may be detected by the most powerful glasses now in use. If there are astronomers on the moon with equally potent instruments, they will soon be able to detect changes in the surface of California, through the agency of hydraulic mining. All other methods of dealing with the soil for gold are "one-horse concerns" compared with the hydraulic process. It is fast changing mountains on the face of the State into pits. It is, too, an invention which, to the end of time, will defy all competition for tearing all beauty out of a landscape, and setting up the "abomination of desolation" in its place. Connecticut Yankees have been supposed to possess so little sentiment, or taste for beauty, that they would not hesitate, for profit, to "whittle the cedars of Lebanon into clothes pins;" and perhaps it is in accordance with the eternal fitness of things that a process like hydraulic mining, which so thoroughly blasts the beauty of a State and so largely enriches its treasury, should issue from a Connecticut brain. (It ought to be said in justice here, however, that Connecticut has more beautiful villages and towns, and displays more taste in them, than any State in New England.)

Most readers know, undoubtedly, how the tremendous hydraulic power is gained and applied. It is simply playing water through a pipe like a fire-engine, upon the side of a hill which contains gold in its soil, and is to be washed out through sluices. But the water is brought from such a hight, and with such a "head," that stones a foot in diameter, when struck with it, are thrown up ten feet, and a man, if fairly hit by it, might as well have been visited by a six-pounder in full force. Such a stream three inches in diameter tears into a hill as though it were a light heap of powder; and often to hasten matters, the hoseman directs its wrath at the base of a wall of earth, eats it out quickly and sees the whole upper-works tumble in with a frightful crash—perhaps paying the penalty of his boldness with his life. The rivers are already somewhat perceptibly affected, not only in color, but in sediment, by the wide ravage which this leveling of hills and choking of the smaller streams in the upper country is producing. By and by the Sacramento may not be navigable, owing to the rapid emigration of the interior hills to settle along its bed. But so long as the process pays, the navigation interest may plead and warn in vain. It is said that earth which yields only a cent's worth of gold to the pan returns good profit to the hydraulic companies, and that sometimes a thousand dollars a day is obtained out of the mud that rushes along a single sluice.

CIVIL WAR INAUGURATED.

Reluctantly we recall the deplorable fact that civil war has actually broken out in our own country, where peace, happiness and financial prosperity have so long existed.

For some time past a feeling of animosity has prevailed in some of the remote Southern States against the people of the Northern States, who have been charged with imbibing hostile feelings toward the South, for the sentiments there existing on the subject of African slavery.

Soon after the election of Abraham Lincoln to the Presidential Chair, the citizens of South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, and Texas formed themselves into a Southern Confederacy, and after meeting in convention, they adopted a constitution, and elected Hon. Jefferson Davis, formerly member of Congress from Mississippi, President of the Confederated States.

The first step of these Secessionists was the seizure of various forts, arsenals, custom houses, and other public buildings belonging to the Federal Government, and their occupation in opposition to the will of the Federal authorities. Fort Sumter, in the harbor of Charleston, South Carolina, and Fort Pickens, in the Gulf of Mexico, nearly opposite the city of Pensacola, Fla., the Secessionists were unable to obtain. Fort Sumter has been garrisoned with only about seventy men, under command of Major Anderson, for several months; the authorities of the Confederated Government objected to the garrison being reinforced.

The secessionist forces have been busily engaged during the last three months in erecting batteries around Fort Sumter, for the purpose of reducing it. About the time these batteries were completed and manned, the stores at Fort Sumter became nearly exhausted, and the privilege which had been conceded to Major Anderson to get supplies from the city was withdrawn. This step rendered it imperative in the Federal authorities to either surrender the fort or to resort to force to provision the garrison. The latter course was decided upon, and naval ships with stores and soldiers were hastily fitted out and sent to Major Anderson's relief.

The authorities of the Southern Confederacy, learning that it was the determination of the Federal Government to provision the forts at all hazards, made a hasty demand upon Major Anderson to surrender; this he refused to do, and at twenty minutes past four o'clock on the morning of April 12, before the vessels containing reinforcements arrived, General Beauregard, commander of the Southern forces, commenced a cannonade on Fort Sumpter. The fire was returned, and continued until Saturday afternoon, when Major Anderson struck the United States flag and surrendered.

The details of the battle have been telegraphed to our daily papers, but they are so conflicting in their tenor as to be unworthy of record.

It is proper to state that the history of our national troubles, of which we have only given an abstract, is not intended to instruct or enlighten our own people, who are thoroughly conversant with all the facts, but for our patrons in foreign countries, who find it difficult to understand our political affairs.

A telegraphic dispatch just received from Washington states that the President of the United States has issued a proclamation calling out 75,000 militia, and that the first service required of them will be the retaking of the fortifications. An extra session of Congress is also called to meet on the fourth of July next.

Dry clay is found to be the best substance yet experimented with for removing ammonia from coal gas in the purifying process.

Correspondence

Does a Saw Follow the Grain of the Wood?

MESSRS. EDITORS:—I saw, in No. 11 of the present volume of the SCIENTIFIC AMERICAN, a new mode of hanging circular saws, invented by an experienced sawyer. I do not see but what the invention is good, and no doubt will answer all purposes set forth; but there is one point I wish to notice, and if I am wrong, I wish to be corrected. Our practical sawyer says that in sawing crossgrained stuff, the saw is inclined to follow the grain of the timber, and should therefore be set in the opposite direction. I would say that I thought I knew some little about sawing, but I must admit that a saw running with the grain of the wood in a crooked stick is a new feature in sawing, as I invariably see them run the opposite of the crook in the stick.

The reason is, that when a saw is cutting in crossgrained stuff, the fibers or grain of the wood on the rounding side of the stick run off from the saw at an angle in proportion to the crook, and the saw, in cutting these fibers, will form a kind of lint or woolly surface on the kerf next the rounding side of the log, and this lint will eventually crowd the saw in a line that will crook the reverse of that of the log.

And, again: in sawing a stick that twists with the sun, if you stand at the head end of the log, the saw will bind on top of the log on the left hand side, and underneath it on the right hand side, because in these places it comes in contact with the fibers, as before described. WM. BARNES.

Boaz, Mo., April 4, 1861.

Rock Oil as Fuel for Steam Engines.

MESSRS. EDITORS:—An application of the rock oil of Pennsylvania for generating steam for motive power under steam engine boilers is exciting much attention in the oil region. The following is a description of the apparatus used: A series of iron pipes are laid in the fire arch of the boiler, which pipes are perforated in their upper surface with minute holes; the oil is supplied to those pipes by means of a force pump, aided by an air receiver, to preserve a constant pressure. A spray, so to speak, of oil is thus made to fill the space usually filled by the flame of wood or coal used to raise steam; this, once ignited, fills the fire arch and flues of the boiler, and maintains the desirable amount of heat in the boiler.

If this fuel is not found to be too expensive, it will prove a good thing for the use of steamers on sea voyages. Its practical use has been proved, and it remains for chemists and others to test it on ships, &c., in a large way.

There can be but little doubt that this oil will be ound cheaper than coal for gas-making for lighting dwellings, streets, &c.; its price, under the influence of the vast supply raised, will soon come down to a matter of 15 or 20 cents per gallon.

ADOLPH BERGER, C. E.

Buffalo, N. Y., April 9, 1861.

[The invention of a suitable furnace for burning coal oil is a desideratum. This seems to be an inviting field for inventors.—EDS.

A Successful and Satisfied Inventor.

MESSRS. EDITORS:—In the current volume, page 196, of your very valuable paper, I noticed that you made mention of my patent, among others in England, for an improved mode of attaching tools to handles. Allow me to inform you that I am now extensively engaged with my partner, Mr. J. S. Silver, Jr., under the name of Emerson & Silver, in the manufacture of the various tools made under that patent. We are meeting with unbounded success thus far, and have the satisfaction of knowing that tools made under our patents are meeting with universal favor and appreciation. Allow me to extend to you my sincere thanks for the many favors I have received at your hands. The cordial welcome, gratuitous council and advice, and unvaried attention always bestowed by you and your scientific and gentlemanly assistants, cannot meet with other than appreciation by inventors. I feel as free in your office as I do in my own counting room.

J. E. EMERSON.

Trenton, N. J., March 23, 1861

The Compliments of a Day—Not of the Season.

Young gentlemen, in their round of calls on New Year's Day, often congratulate their friends with the expression, "I wish you the compliments of the season," instead of saying "good morning," "good bye," &c.

It is in another sense that we employ the word "compliment" at the head of this article, with a confidence that there is far more heart in the expression of our correspondents than exists in those who use it in the first sense.

If we should publish all the complimentary letters we receive during a season, we should have room in our paper for little else; so we will take space to insert only those which were received during a single day. They are a fair specimen of such as come to hand nearly every day, and we annex them to speak for themselves:—

MESSRS. MUNN & CO.:—Your last favor is at hand, and I am glad to hear that you have met with success in procuring a patent for me. Please, gentlemen, accept my thanks for the efficient manner in which my case has been conducted, as I am sure that the case would have been rejected if in any other hands but yours. Expecting again to require your services, I remain yours most respectfully,

JOS. LOFVENDAHT.

South Boston, Mass., April 2, 1861.

MESSRS. MUNN & CO.:—I duly received my patent for facilitating the drying of pasteboard; thanks to you for your attentions and courtesy. It works equal to my most sanguine expectations. If the same promptness and fidelity marks all your patent business, inventors cannot do better than to commit their applications to your care and judgment. By so doing, I have avoided labor, anxiety and expense. Yours, J. H. PATTERSON.

Schaghticoke, N. Y., April 1, 1861.

P. S.—I want to add that professional men of every description need the SCIENTIFIC AMERICAN; every number adds to any reader's store of knowledge beyond appreciation. It should be placed in every college, academy and district school library. J. H. P.

MESSRS. MUNN & CO.:—I have to acknowledge, with great pleasure, the receipt of your note this morning, informing me of the success of my application for a patent for Enameling Photographs, and that my Letters Patent will be issued next Tuesday. As this intelligence reaches me five days before the papers will be issued from the Patent Office, I refer to it as further evidence of your promptness and your facilities for knowing how things are working in that institution. I long since discovered that a thing that is worth doing is worth doing well; and as I have learned by corresponding with other patent attorneys that your fees are as favorable for inventors as the best of them, I feel it my duty to advise all inventors to secure your services, assuring them that in no case is the old maxim, "The best is the cheapest," more applicable than in taking out a patent. Yours, with many thanks,

D. W. S. RAWSON.

Galena, Ill., March 28, 1861.

MESSRS. MUNN & CO.:—We have received your letter of the 26th inst., notifying us that our patent for an Improvement on Panel Machines is ordered to issue. We feel heartily thankful to you for the energy you have used in pushing our claims through, and if we should happen to have any more patent business to attend to, you shall have the preference. Very respectfully yours,

BAIN & BROWN.

Richmond, Ind., March 30, 1861.

MESSRS. MUNN & CO.:—I take pleasure in stating to you that I received my Letters Patent from Washington on the 3d inst. I feel indebted to you for your promptness in the prosecution of my case before the Patent Office, and I can assure you I will not lose a favorable opportunity to recommend your agency to my friends and acquaintances. I have already got three new subscribers to your most valuable paper in our shop. Respectfully yours,

M. JOHNSTON.

South Boston, Mass., April 4, 1861.

MESSRS. MUNN & CO.:—I thank you for the promptness exhibited in procuring a patent on my Wagon Tailboard; it proves what I have often heard to be true—that your agency was the only reliable one for a working man to employ. JOSEPH D. FARRELL.

Boston, Mass., April 4, 1861.

KEEP HOUSE PLANTS CLEAN.—The London *Cottage Gardener* relates an experiment, showing the advantage of keeping the leaves of plants free from dust. Two orange trees, weighing respectively 18 and 20 ounces, were allowed to vegetate without their leaves being cleaned for a year, and two others, weighing respectively 19 and 20½ ounces, had their leaves sponged with tepid water once a week; the first two increased in weight less than half an ounce each, while of the two latter, one had increased two and the other nearly three ounces. Except the cleaning, the plants were similarly treated.

SOURCE OF THE NORTHERN LIGHTS.—An oil well having been discovered at Aurora, N. Y., a wag writes that it has caused considerable of a sensation, and has afforded a scientific explanation of the source of the *Aurora bore-oil-is.*

Terrible Rope Sliding Feat.

On the road among the Himalaya mountains, I beheld a species of tight rope performances which might bring the color into M. Blondin's cheeks. The rope extended from an eminence on the hillside above the village over a ravine and down to a great knoll in the fields below, and was drawn as tight as several hundred men with their united strength could effect. They had just finished stretching it when we arrived, and I could scarcely believe a man was actually going to slide down it, the feat appeared to be so utterly impracticable with any chance of safety. Imagine a rope extended from the top of a rock, at least 500 feet high, to a pole some 2,000 feet from its base, and some idea may be formed of the undertaking. A great concourse of people of both sexes were assembled in all their holiday garb, and the man who was to slide was swinging round at the end of a long plank fixed on an upright pole as a pivot. Every few minutes he called upon some person among the crowd by name, and swinging round several times to the individual's honor, received from him a trifling gratuity. He no sooner noticed me than I was included in this category; and being told that it was in no way a religious ceremony, I gave him a rupee. When this was over, he was escorted to the eminence above, amid the loud lamentations of his family and the discordant music of the village band. With the glass, I saw him placed on a kind of saddle on the rope, and two individuals busied fastening something to his legs, which I afterward saw was filled with earth. The spectators, among whom I stood, were assembled in groups near the pole to which the lower end of the rope was attached, all intently watching for the descent. Presently he let go, and came down several hundred yards with terrible velocity, a stream of smoke following in his wake. As he approached us, the incline being gradually diminished, his career was less rapid, and became slower and slower near the end, where, the rope being sufficiently near the ground, he was taken down amid the shouts and congratulations of the villagers.—*Rambles in the Himalayas.*

RAISING EARLY TOMATOES, &c.—A correspondent of the *Country Gentleman* gives the following method for raising early plants:—Start the seeds in a box of moist earth, and when the plants are about two inches high, transplant them into a turnip, scooped out and filled with fine, rich mold. Set them out in your hotbed, and when the spring frosts are past, remove them to the garden. This is better than making a basket for the roots, as sometimes recommended, as the turnip decays and nourishes the plant. Tomatoes are benefited by an early transplanting, which causes them to throw out more roots and grow "stocky." Do not pinch out the center shoot, unless you wish a succession of lateral suckers all the season. If you start the seeds in a hotbed, the plants should still be moved, if only an inch or two, in the bed. Of cucumbers, melons, Lima beans, and other tender plants that suffer from transplanting, the seeds may be planted in the turnip. Sink the turnips in the soil, or they will dry up; or you can keep them in the house in a shallow box, surrounded with earth.

ARNICA HAIR WASH.—When the hair is falling off and becoming thin from the too frequent use of castor, macassar, oils, &c., or when premature baldness arises from illness, the Arnica hair wash will be found of great service in arresting the mischief. It is thus prepared: take elder water, half a pint; sherry wine, half a pint; tincture of arnica, half an ounce; alcoholic ammonia, one drachm—if this last-named ingredient is old, and has lost its strength, then two drachms instead of one may be employed. The whole of these are to be mixed in a lotion bottle, and applied to the head every night with a sponge. Wash the head with warm water twice a week. Soft brushes only must be used during the growth of the young hair.—*Septimus Piesse.*

COAL TAR SOAP.—M. Semeaux, in *Comptes Rendus*, recommends a new preparation of tar for disinfecting purposes, which is different from the emulsion made from tar. He prepares it by digesting equal parts of coal tar soap and rectified spirits in a water-bath until complete solution has taken place. The soap thus formed is said to be soluble both in warm and cold water.

RECENT AMERICAN INVENTIONS.

The following inventions are among the most useful improvements lately patented :—

GAS GENERATING STEAM BOILER.

This invention consists in combining one or more retorts with a steam boiler, in such a manner that, the same fire which is employed to convert the water in the boiler into steam, also heats the retort or retorts, and that by introducing suitable materials into said retort or retorts, steam and illuminating gas are produced simultaneously ; also, in the arrangement of a series of gaspipes and airholes, in combination with an additional fire-chamber, situated in close proximity to the ordinary or main fire-chamber, in such a manner that, by the action of the gas and air, thus introduced into said secondary fire-chamber, the smoke and other combustible gases escaping from the main fire-chamber are consumed, and an additional heating surface is obtained ; further, in the employment of a threeway cock, in combination with a conical vessel with a conical bottom, in such a manner that the oil and water used for the manufacture of the illuminating gas are mixed before entering the retort or retorts ; also, in combining with said threeway cock two gasometers, and a series of levers with weights or springs, in such a manner that, the supply of the oil and water to the retorts is regulated by the quantity of gas in the gasometers. John Laing, of Hoboken, N. J., is the inventor.

OIL DISTILLING APPARATUS.

This invention is more especially intended to be applied in connection with the apparatus for distilling crude petroleum, but is applicable also in connection with apparatus for the distillation of palm and other oils, and for the re-distillation and refining of crude coal oils. It consists principally in the employment of an inverted siphon, applied in combination with the still and the condenser, for the purpose, first, of enabling the distilling and refining of the oils to be effected at one operation, and by the same heat, without the use of agitators, pumps, or analogous machinery ; second, of serving as a safety valve in such cases as when paraffine or palm oil has been allowed to solidify in the worm, by the neglect of the operator ; third, of serving as a vacuum chamber, to prevent oil boiling over from the still into the condenser and mixing with distilled oil in the receiver ; and fourth, as a means of running back a portion of the oil to the still. Abraham Quinn, of New York city, is the patentee of this device.

WATCH ESCAPEMENT.

It has been long acknowledged by experienced watchmakers that, of the many kinds of escapements that have been tried, two, viz., that known as the "lever" escapement, and that known as the "chronometer" escapement, excel all others in durability, strength, ease of action and general excellence of performance. Nevertheless there are some slight objections to both of these as usually applied, each being in some respects inferior, though in others superior to the other: as, for instance, the chronometer escapement is superior to the lever, inasmuch as it gives the impulse to the balance more directly, it acts with less friction and imparts more power, but is inferior inasmuch as it gives the impulse only in one direction, is liable to overbank, and is more expensive to make. This invention consists in a certain novel construction of the escapement, whereby the advantages of both the lever and chronometer escapements are combined without the disadvantages of either. The patentee of this invention is George P. Reed, of Roxbury, Mass.

CORK-CUTTING MACHINE.

This invention relates to improvements in machinery for cutting bottle corks, wherein an automatic reciprocating frame is employed, to which two straight knife-blades are secured, one of which knives rounds the cork, while the other knife finishes it ; and in conjunction with these knives, the common rotating heads are used for embracing and holding the *blanks* during the operation of the knives in rounding the corks—said rotating heads are made adjustable, and are mounted on adjustable beds, whereby the machine is adapted to cut large, medium or small corks of any degree of taper. Alexander Millar, of New York city, is the inventor of this machine. The machine to which this improvement applies was illustrated on page 152 of our current volume.

APPARATUS FOR DISINFECTING VESSELS.

This invention consists in combining a fanblower or other device for creating a current of air with a refrigerating chamber, and with suitable suction and discharge pipes, in such a manner that, by the aid of said fanblower or its equivalent, the infected air of a vessel or other closed space can be passed once or several times through the refrigerating chamber, until its temperature is brought down to such a degree, that the miasma or other impurities which cause the infection are destroyed, without allowing any portion of the infected air to escape to the open atmosphere. It consists, also, in the peculiar arrangement of a series of hollow revolving drums or a hollow shaft, the interior of which is divided into several channels, in combination with the fanblower and refrigerating chamber, in such a manner that, the current of air created by the fanblower is compelled to make a long circuit in the interior of the refrigerating chamber, and that its temperature is reduced considerably before it is permitted to pass out on the opposite side of said refrigerating chamber. The credit of this invention is due to Alois Peteler, proprietor of Peteler's Hotel, Staten Island.

APPARATUS FOR MAKING EXTRACTS.

This invention consists in the arrangement of a globe, which communicates with the steamspace and with the waterspace of a steam boiler by a series of pipes, in combination with a vessel intended to receive the substance to be boiled or extracted, and with a receiver, in such a manner that the heated liquid from the steam boiler rises to the globe, from which it can be passed through the substance in the extracting vessel, either from above or from below, acting on said substance, under a hydrostatic pressure determined by the hight of the globe above the extracting vessel, and that the extract or infusion thus obtained, when passed into the receiver, is kept in a heated state by the action of the steam from the boiler, until it is drawn off by suitable faucets. The apparatus is of particular value for making tea or coffee in large quantities, and a great saving in fuel, and also in tea or coffee, is effected by its use. The patentee of this apparatus is A. A. Burlingame, of New York city.

HOOK AND EYE.

This invention relates to an improvement in that class of hooks and eyes, the hooks of which are provided with snaps or spring-guards to prevent the casual detachment or unfastening of the hooks and eyes. The object of the invention is to facilitate the unhooking or detaching of the hooks from the eyes when necessary, and also to prevent the bending and injuring of the snap or spring-guard, a contingency consequent on the difficulty and embarrassment frequently attending the unhooking of the hooks provided with the usual snap or spring-guard. The invention consists in having the end of the snap or spring-guard bent, so as to extend obliquely into a loop or opening in the hook, whereby the desired end is obtained. The inventor of this ingenious device is Alvin Childs Mason, of Springfield, Vt., who has also obtained patents in France and England for the same invention.

SKATE.

This invention relates to a novel means for attaching and detaching skate irons directly to the soles of boots, whereby straps, and the objections attending their use, are obviated—the skates are made much lighter, and more compact and portable, and can be readily put on and taken off. The invention consists in two or more hooks hooking backwards into the sole of the boot, in connection with a spring latch for securing the skate to the heel of the boot. The inventor of this skate is J. A. de Brame, 707 Broadway, New York city.

COTTON PRESS.

This invention is a new and improved vertical lever press for pressing cotton by steam power. It consists in the arrangement of a horizontal sliding rack-bar, which is moved back and forth by a train of spur gearing, in combination with two jointed parallel levers, which are attached to the rack-bar and the follower-block ; and which move the follower up and down in the press-box, as the rack-bar is moved back and forward, thereby giving a gradually increasing upward pressure to the cotton which is placed within the press-box. This invention was patented by Tilman Gilbert, of Natchez, Miss.

DOUBLE SHUTTLE MOTION FOR WEAVING SEAMLESS BAGS, &c.

This invention consists in a novel and very simple means of raising and dropping the shuttle boxes, to permit the simultaneous throwing of two shuttles, and the weaving, at the same time, of the upper and lower portion of a bag or tube, thus doing double work at the same expense, and as quickly as single. The inventor has other patents of looms for weaving tubular fabrics, such as bags, hose pipe, &c., to which subject he has devoted many years' attention. His loom turns off six two-bushel bags per hour, with 28 threads of filling to the inch, and has woven sixty-six twilled seamless bags in ten successive hours. The inventor of this improvement is George Copeland, of North Gray, Me.

SHAPING AND EMBOSSING HATS.

This invention consists in shaping or embossing a hat or cap, by placing it in a suitably formed shell or concave mold of metal or other suitably hard, strong, and smooth substance, filling its interior with sand or other granular or pulverous material and subjecting such material to pressure, by which means the felt or other fabric of which the hat or cap is composed is driven against or into the figure or figures of the shell or mold, and so caused to take a corresponding form. This invention was patented by A. L. Bagley, of Salisbury, Mass.

HAND-HEMMER.

This improved hemmer is composed of two plates and a flexible strap, one plate resembling, in most respects, the hem folder used in sewing machines, and being attached to the other plate, which is of such form that, by the aid of a strap placed on the thumb, it may be held in the left hand, in such manner that the cloth to be hemmed may be worked freely through it by that hand, to effect the folding of the hem as fast as the stitching is proceeded with by the needle used in the right hand. The patentee of this device is James O. Whitcomb, of New York city.

Application for the Extension of a Patent.

Harvesters.—Wm. F. Ketchum, of Buffalo, N. Y., has applied for the extension of a patent granted to him on the 10th of July, 1847, for an improvement in the above-named class of inventions. The testimony will close on the 10th of June next ; and the petition will be heard at the Patent Office on the 24th of same month.

A CALIFORNIA paper says that a large number of men are in a disabled condition at and around the Enriqueta quicksilver mine, in Santa Clara county, who have been salivated to a terrible extent in working the mine. Some of them are reported to be unable to lift a bowl of tea or raise a hand to their mouths. This is the result, it is said, of carelessness by ignorant laborers.

THE plunder of the British and French armies in China amounted to about $30,000,000. Gold watches, and gems of great value, were thrown at one another by the soldiers in the emperors' palace. Several of the soldiers got 20 lbs. of gold, and pearls and precious stones of unknown value.

THE "GREAT EASTERN."—Grinnell, Minturn & Co. announce that the steamship *Great Eastern* is to sail from England for New York on the 1st of next month; and returning, is intended to leave this port with passengers on or about the 24th of May.

To test the presence of silver in suspected coin, apply a little chromic acid. A reddish purple hue soon appears, which is the bichromate of silver. German silver, as it is called, will not show this color when so tested.

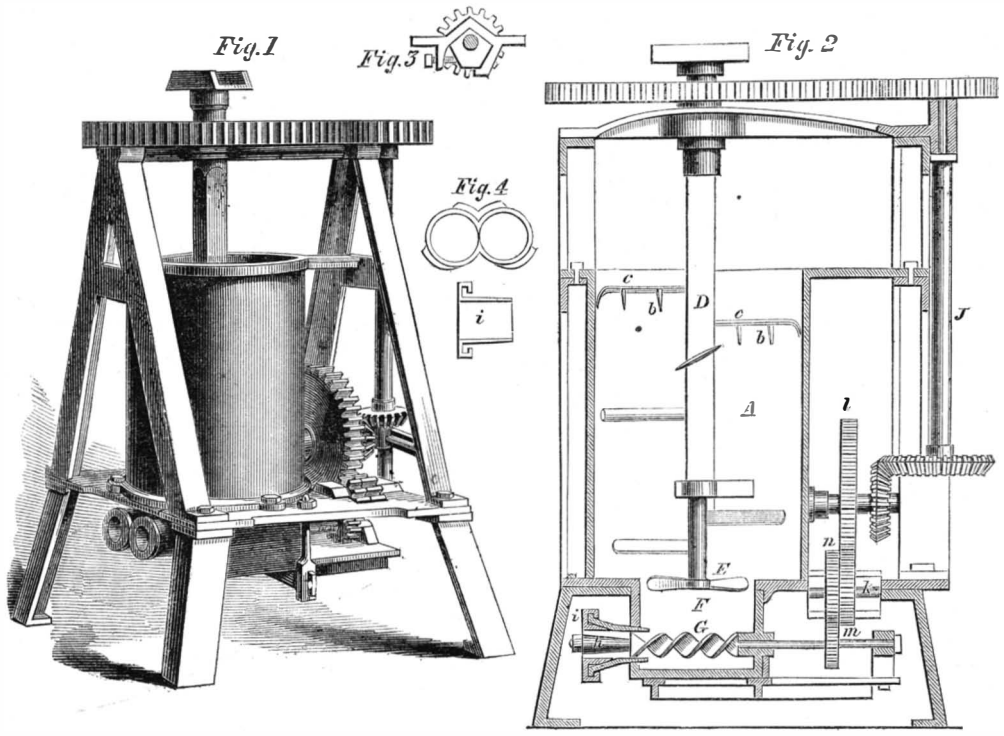
GREASED LIGHTNING.—In the coal oil regions, thunder has disappeared. The atmosphere is so saturated with oily vapor that it greases all the lightning, and enables it to slide down hill from the upper regions as gently as a "cooing dove."

A CURIOUS ITEM.—In the list of contingent expenses of the Treasury Department at Washington for the last year, the following entry occurs : "Varnishing Mr. Buchanan $3.50," supposed to refer to His Excellency's portrait.

Two comets are now looked for by astronomers—the De Vico comet, which appeared in 1855, and the celebrated comet of Charles V.

Improved Tile-Making Machine.

In England, a great deal of land too wet for cultivation has been ameliorated by underground draining. Pipes, made of porous material which will allow the water to filter through their walls, are buried at sufficient depth in the earth to be out of the way of plows, and thus the redundant moisture is removed. Within a few years the practice has been extensively introduced into this country, and the increased demand for drain pipes or tiles is leading to improvements in their manufacture. The accompanying engravings illustrate one of the recently patented improvements, and they will also enable the general reader to form a very good idea of the mode of making drain tiles.

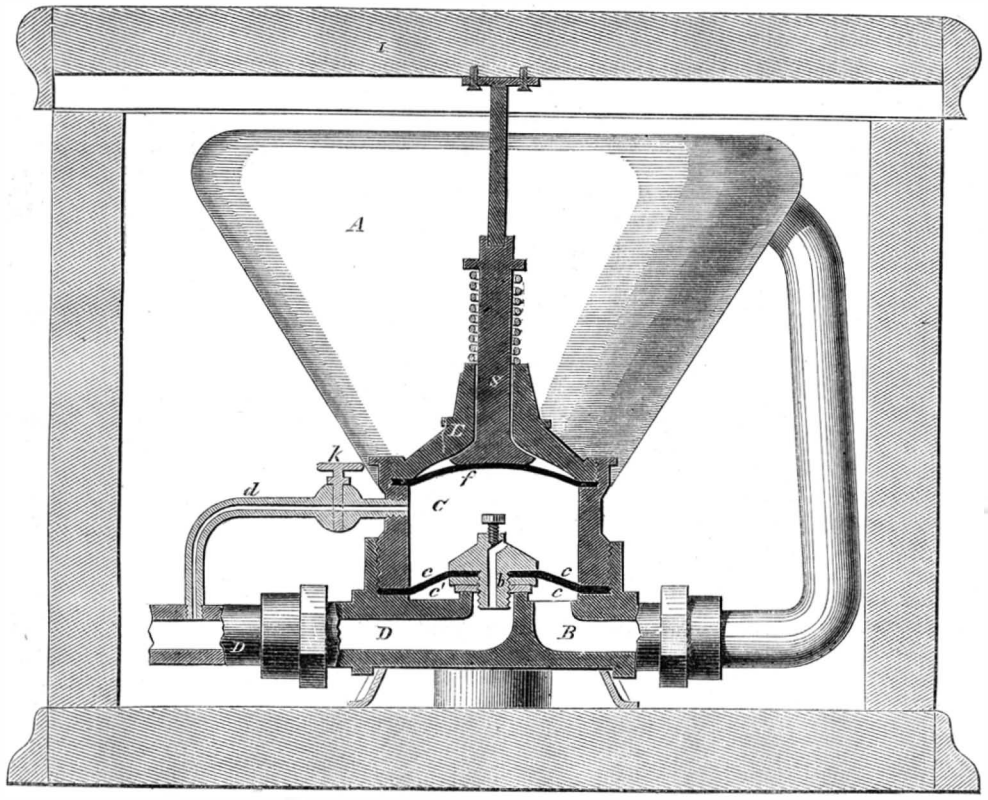


TIFFANY'S IMPROVED TILE-MAKING MACHINE.

The clay or aluminous earth of which the tiles are made is placed in the cylinder, A, Figs. 1 and 2, where it is cut to pieces by the revolving knives, *b b*. These knives are fastened to the lower sides of the arms, *c c*, which are secured rigidly to the rotating shaft, D, and are set at an inclination, so that they will press the clay downward. To the lower end of the shaft, D, is fastened the spiral screw, E, which forces the clay into the square box, F. Passing horizontally through the box, F, are two augurs, G, Fig. 2, for forcing out the clay in a pipe from the machine, making two pieces of pipe at the same time. Each of these augurs has a conical shaped extension, *h*, at its outer end for forming the bore of the pipe, and this is surrounded by a movable thimble, *i*, Figs. 2 and 4, for forming the outside of the pipe. These thimbles, with the conical extensions, *h*, may be changed to form pipes of various sizes. As the clay by the revolutions of the augur forced out around the conical extension, *h*, it is powerfully compressed, whereby it is made more compact, and consequently less liable to break either in baking or in the handling before it is baked. This compressing also makes a stronger and better pipe. This is one of the features of this invention. The mode of fastening the thimble, *i*, to the conical tube around the extension, *k*, is clearly shown in Fig. 4. A lip upon the thimble hooks over a spiral projection on the end of the tube, which curves in the proper direction for the rotations of the augur to keep the thimble in place. The thimble is, of course, removed by simply turning it in the opposite direction.

A second improvement by this invention is the mode of regulating the speed of the augurs, G, in relation to that of the shaft, D. The motion is communicated from the shaft, to the augurs, G, through the intervention of the shaft, J, and gearing, as shown, and the speed is varied by reversing the ends of the axle, *k*. This axle has rigidly secured to it the two gear wheels, *m* and *n*, of different sizes, and when it is desired to vary the motion by taking the wheel, *m*, out of gear with the wheel, *l*, and substituting the wheel, *n*, this is readily done by reversing the ends of the axle, *k*. Bringing a wheel of a different size, however, upon the axle, *k*, into gear with the wheel, *l*, makes it necessary to change the position of this axle in relation to the wheel, *l*. This is done by making the journal boxes of the axle in the form of a prism with five equal sides, as shown in Fig. 3, with the holes for the axle near one side, so that by turning the boxes over in their supports the position of the axle is changed.

This improvement was patented by George S. Tiffany, through the agency of the Scientific American, February 26, 1861. Further information in relation to the matter may be obtained by addressing the patentee, at Palmyra, Mich.



M'GHAN'S IMPROVEMENT IN WATER CLOSETS.

Improvement in Water Closets.

The invention here illustrated will attract the attention of plumbers by its simplicity and efficiency, and it will interest mechanicians generally by the novelty and ingenuity which it displays. It is an improved mode of introducing water into the pans of water closets for the purpose of washing them out after use. The seat is hung upon hinges in the rear, and beneath its front edge is arranged the apparatus represented in the engraving.

The watertight cylindrical chamber, C, is closed by an elastic india-rubber diaphragm, *c*, at the bottom, and by a similar sheet, *f*, at the top. The portion, *c'*, of the cylinder, C, which is below the diaphragm, *c*, communicates with the supply pipe, D, and also with the pipe, B, which rises at an inclination backward to carry the water into the upper part of the pan, A. The opening from the pipe, D, is closed by the valve, *b*, which is held down by its upper surface offering a larger area for the pressure of the water than its lower surface; the water being led into the chamber, C, by the pipe, *d*. But when the sheet, *f*, is pressed down by the weight of a person on the seat, I, a portion of the water is forced out of the chamber, C, through the pipe, *d*; and when the downward pressure upon the sheet, *f*, is removed, as the water cannot flow through the small pipe, *d*, as rapidly as it can through the large pipe, D, the pressure upon the upper side of the valve is diminished, allowing it to rise and permit the flow of the water from the pipe, D, through the chamber, *c'*, into the pipe, B. This flow continues until the chamber, C, is again filled by the passage of the water through the pipe, *d*, restoring the pressure to the upper side of the valve and closing it. By means of the stop cock, *k*, the time occupied in filling the chamber, C, and consequently the time of the flow through pipe, B, may be adjusted to any length desired.

The patent for this invention was granted Nov. 3, 1857; and for the purchase of rights, or for any further information, the inventor, Francis McGhan, may be addressed at Washington, D. C.

New Canadian Dye.—We have seen it stated in several of our exchanges that Professor Lawson, of Kingston, C. W., has prepared a new dye, of great beauty, from an insect found on the common black spruce. The new dye is said to resemble that of cochineal, which latter is now employed to impart rich red, scarlet and crimson colors to woolen and silk fabrics. If this dye can be obtained in sufficient quantities to be afforded at a reasonable price, the discovery will be of importance. Cochineal costs about $1 per pound, wholesale; it is very rich in coloring matter, one ounce being sufficient to color one pound of wool, and two ounces one pound of silk. If the Canadian dye can be afforded as cheap as Indian lac dye, of which we think it must be a variety, it is an important discovery.

The Boston Mechanical Bakery has been suspended It is stated that this was owing to bad management

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VOL. IV. NO 17.....[NEW SERIES.]....*Seventeenth Year.*

NEW YORK, SATURDAY, APRIL 27, 1861.

THE REAL STRENGTH OF OUR NAVY.

On page 198, of our current volume, we gave an accurate list of the vessels belonging to the United States navy. From that mass of statistics, we now sift out the elements which show the actual extent of our naval power.

We must first strike from the list every ship which is not furnished with steam. No argument is required to make good this assertion; for it is now the practice of every naval power to build steamers only, and to convert all sailing ships (that are capable of it, of course), into steamers. Our sailing vessels, *without* steam, could not overtake steamships of *less* force, nor escape from those of *greater* force. This operates as a tremendous reduction, for it deprives us at once of 1,800 guns out of 2,300. But there is no help for it, and the fact is as stubborn as it is disagreeable. The conversion of the best of these vessels naturally suggests itself, but even this process requires time, which is precisely what our necessities do not admit of; indeed, if the work were begun to-morrow, it is doubtful whether a single one of these ships could be got to sea in eighteen months. The larger experience of other nations offers us no encouragement to enter upon this mode of renovation; for it has been found that after much outlay, generally equal to two-thirds that of a new ship, the results have been the saddling of the navies with very slow coaches and consequently inefficient ships.

The navy, then, upon which the Union must rely to represent it to foreign nations, if it were required to do so immediately, consists of seven screw frigates, five screw sloops, four side-wheel sloops, and eight gun sloops, making a total of twenty-four vessels, carrying 386 guns. This is absolutely the entire national fleet of the United States, and no other statement of the case can make it greater. With few exceptions, they are, however, fine ships. The frigates are superb, sail very fast, and can carry heavy batteries; such as the *Minnesota*, 32 of 9-inch Dahlgren guns on the gun deck, 14 of 9-inch and 2 of 11-inch on the spar deck. They have now only 40 guns mounted. Their defect is want of steam speed, which may be 8 to 9½ knots. If it were 12 to 13, these ships would be unrivaled. The *Niagara* (by Steers) is a fine model, and can reel off from 14 to 15 knots under canvas—could steam 12 knots easily if she had a proper propeller. The present one can only expend two-thirds her engine power. Her spar-deck battery of twelve 11-inch cannon, should have the addition of a gun deck, with 30 of nine-inch. The *Lancaster*, which is in reality a frigate, steams better than the *Merrimac* class, but does not sail well. Her battery is suitable to her tonnage, which is about three-fourths that of the larger screw frigates.

The screw sloops are well built, and one of them, the *Brooklyn*, a contract-built ship, is very superior, sails and steams fast, and carries a powerful battery. The *Pensacola* is probably quite equal to her. But the *Richmond* is very slow and uneasy at sea, the *Hartford* is not remarkable, and the *Jacinto* is a serviceable, strong ship.

The side wheelers (*Powhatan*, &c.) are well tried and reliable steamers, but not of the greatest speed.

Of the gun sloops, the *Iroquois* is certainly an admirable sample, steaming 12½ to 13 knots, uses her moderate canvas to the best advantage, and is a good sea boat. The *Dacotah* may be her equal; the *Mohican* and *Wgoming* not quite so fast. The *Narragansett* and *Seminole* are very inferior to the *Pocahontas*, a re-build, which is a sufficient indication of her efficiency. The *Pawnee* carries a very heavy battery for a draft of ten feet.

All of the screw frigates, sloops and gun sloops, and the *Powhatan*, are armed with 9-inch, 10-inch, and 11-inch cannon of Captain Dahlgren's model, except the *Jacinto*.

This, then, is the total effective force of the United States by sea, and if concentrated under one command on our own coasts, would ensure them from foreign insult during present troubles, and repress Spanish designs in the West Indies or Mexico. No measure would be so impressive, and it should be carried out immediately.

Again, is there power to increase this force in a reasonable period? One frigate alone (*Franklin*) is in process of construction, and seven sloops-of-war are *authorized;* but it is not probable that any one of these ships could be got to sea in twelve months, with every possible exertion.

To command this fine fleet of 24 steamers, would, no doubt, be the highest ambition of the best of our naval officers; and yet, new ideas are now in course of execution, which, if successful, will produce vessels far in advance of these. The attention of the profession is now fixed upon iron-plated ships with rifled cannon,—themselves impenetrable to the heaviest calibers at short distances, and yet able to destroy the largest ships at distant ranges.

This is the proposition, and the trials of the *La Gloire* seem to prove the principal fact in regard to a combination of invulnerability, speed and buoyancy, in the same hull. The *Warrior* is close on the heels of the *La Gloire*, and is expected to be free from some of the defects inseparable from the first execution of a plan, embracing so much of novelty and of detail.

Is there an intelligent citizen in the country who is not anxious to know what steps we are to take in this matter? By executive document No. 25, House of Representatives, XXXVIth Congress, 2d Session, now before us, we learn that the question of metallic protection against shells was submitted, in a practical form, to our naval authories, so far back as 1852, by Capt. Dahlgren; but to this date no measure seems to have been taken towards a solution, or even inquiry. The British are astonished at this, and the *Times* infers from it some sagacious and substantial doubts on our part of the value of iron-clad ships, based peradventure on ascertained facts.

By another document we see that rifled cannon will not be wanting when required, but surely no time is to be lost in commencing a *ship-in-proof*. Such a vessel would have steamed into Charleston harbor any day, and kept up a permanent communication with Fort Sumter, regardless of the fire of the batteries, if they had rained shot and shell on her, and that without carrying a single gun, or needing a shot from Sumter to cover her.

ATMOSPHERIC ELECTRICITY.

A lecture was recently delivered before the Royal Institution of Great Britain, by Professor William Thomson, of Glasgow, on the above subject, in which we find some very interesting information. He stated that during serene weather the earth's surface is generally found negatively electrified, and from this fact it might be supposed that the globe is electrified as a whole with a negative charge, and that it is left insulated as it fleets through space. But although the earth is insulated with the atmosphere, which is considered a non-conducting envelope, it cannot be so insulated as to hold a charge in interplanatery space. It has also been supposed by some persons that outside of the earth's atmosphere there is a void space constituting a perfect insulation, because there is no substance to conduct off the electricity. This is an erroneous conjecture, based upon the idea that electric conductivity is a power of matter rather than a mere quality of non-resistance. By experiments with the air-pump and "vacuum tubes" for exhibiting the electric light, according as we obtain a vacuous space, it appears to be a conductor rather than an insulator.

Professor Thomson is a believer in the Franklin hypothesis of a single electric fluid. He said:—"We now look on space as full. We know that light is propagated like sound through pressure and motion. We know that there is no substance of caloric; inscrutable minute motions cause the expansion which is marked by the thermometer; these stimulate our sensations of heat. Fire is not laid up in coal any more than in a Leyden jar, but there is potential fire in each. We can conceive that electricity is an essence of matter, but whatever it is, one thing is quite certain, electricity in motion *is heat.*"

THE EFFECT OF WAR UPON A NATION'S WEALTH.

The firing of a 9-inch shell gun, like those used on most of our naval steamers, costs $9.34 at each discharge. Now, the burning of $9 worth of coal in one of our cotton, or carpet, or steam-engine manufactories, generally results in the production of from $10 to $20 worth of value in some other kind of property; but the burning of powder in warfare does not produce any other property; its only products are noise, and smoke, and death, which are not saleable in any market. Of all modes of consuming wealth unproductively, the most rapid are conflagrations and war.

It is frequently the case that the productive power of a people is so great that the aggregate of individual savings more than counterbalances the public waste of wealth in war, and thus the national wealth may increase even during the continuance of expensive wars. Macaulay says that this has been the case with England in all of her wars; and was most conspicuous in the most expensive one that she ever engaged in, the long contest against the opinions of the French Revolution which continued, with two brief intervals, from 1793 to 1815. In this gigantic struggle, England not only supported her own armies, but she also contributed vast sums to her allies—the other governments of Europe—to enable them to keep up the fight. It is true that a large portion of this money was raised by borrowing, the national debt having been increased during the period about two thousand millions of dollars. But a government cannot borrow unless somebody has it to lend, and this whole immense sum was saved by the English people right in the midst of the war, and loaned to the government.

If we put aside the vail which the interposition of *money* throws over the transaction, we shall find that what really took place was this. It does not require the whole of the labor in any community to produce the food and clothing needed; and when a sufficient number of laborers are employed in the production of these first necessaries, the remaining labor of the community is directed to making such articles as are most desired. In times of peace this surplus labor is principally devoted to making machinery, constructing steam engines, building railroads, and, in short, in increasing the various kinds of active capital which facilitate industrial operations and thus augment the annual production of wealth. But in war, this labor is diverted to the production of food, clothing, powder, muskets, cannon, &c., to be worn out and destroyed by the armies; and thus the accumulation of wealth is stopped, or at least, checked.

In some cases, indeed, so large a portion of the community is taken from productive labor and put to the work of destroying property in fighting, that the national wealth is rapidly diminished. When Frederick the Great, of Prussia, was contending with Austria for the possession of Silesia, he said that he would fight as long as there was a potato in the kingdom, and Macaulay says that he did fight till the great mass of the people had nothing to eat but potatoes, and every private fortune in the country was destroyed. Louis XIV., too, kept France at war with combined Europe till the very nobles were reduced to a diet of black bread, and numbers of the people died of starvation.

NO SECESSION IN PATENTS.—The number of patents issued during the week ending April 9, amounts to 98. Of this number, 35 were procured through the Scientific American Patent Agency.

THE glass steam engine, on exhibition by the Bohemian troupe of glass blowers at the Cooper Institute, is well worth seeing. It is a complete transparent, low pressure, working engine, with all the inner parts, valves, &c., of course, visible.

A NEW asteroid was discovered by Mr. H. P. Tuttle, of Harvard College, on the night of the 10th of April. This is now the 66th small planet that is known to exist between the orbits of Mars and Jupiter.

Our Editorial Correspondence.

WASHINGTON, April 10, 1861.

I alluded in my last letter to the examination of persons who are appointed to places in the Patent Office. This is required by a law of Congress passed in 1853, which provides for a proper classification and examination of the clerical force employed in the several departments. There are four grades of salaries established by this act, viz. : $1,200, $1,400, $1,600 and $1,800.

This examination is conducted with reference to the duties which are to be required of the appointee. Inwardly chuckling over his successful experiment in office-seeking, the candidate is summoned to appear before the examining tribunal; he begins to realize that Jordan may possibly be "a hard road to travel," and sets about to summon from every corner of his cranium, all those special qualifications which his friends recommended him to possess, for now his mettle is to be tested. The Examining Board,

"Whose visages do cream and mantle like a standing pool,
With purpose to be dressed in an opinion of wisdom, gravity, profound conceit,"

proceed to a sort of intellectual tilt with the subject. He must fight his way to the spoils in reserve for him, for it is evident that he is to be handled without mittens.

He is questioned as to his knowledge of the mother tongue—whether he can spell, read, write and compose correctly. The examination in Lindley Murray being completed, he may be expected to tell what he thinks about the reinforcement of Fort Sumter, and to answer all such questions in military science as may be put to him touching the feasibility of that scheme, and as to whether he would shoot from the right or from the left shoulder. He may then be examined in the higher branches of mathematics; one sample question will suffice. "Suppose corn is worth 65 cents per bushel, and you feed a hog three times a day for three months, and sell your pork for $7 per cwt., how much do you gain by the operation?" Then geography, topography and hydrography, including Maury's wind and current charts, philosophy and law. If the candidate shows proficiency in these learned sciences, he is supposed to be qualified without special reference to the soundness of his theological views. Fearing a little want of *sharpness* in the candidate, he is asked how he would proceed to survey the Patent Office? Discovering what he regards as a sort of *gum game* in this proceeding, he replies, "I would hire a surveyor to do it!" Lest it might appear as though I am disposed to make light of so grave a subject, I will state that one of the candidates informed me that the two questions I have quoted were actually put to him on his trial. It is reported that one candidate ran aground on the question: if he knew how to manage a certain kind of printing press? It is evidently in the power of this Board to put an extinguisher on the ambition of many youths who seek office.

The new law authorizes the Commissioner to cause to be printed ten copies of the specifications and drawings of each patent. A contract for this work has already been made with Gideon & Co., of this city. The specifications are to be printed in royal octavo pamphlet form, something after the style of the English patents. The drawings are to be traced on linen and attached to the printed specification. The law provides for ten copies; but it was supposed that an arrangement could be made so that the contractor would be able to furnish all such duplicate copies as might be ordered either by Congress or by patentees, upon the payment of a fair compensation for them. As the contract is now given out, this expectation is completely frustrated, and there is some disappointment about it. Five copies of the ten, at least, will be needed for the use of the Patent Office, leaving but five for such disposition as the Commissioner may see fit to make of them. It is to be hoped that it is not too late to correct this difficulty, and I believe the Commissioner will give more attention to it.

As I stated in my last letter, Mr. Harding, who was appointed one of the Examiners-in-Chief, has not accepted the office. I am reliably informed, however, that he has not formally resigned, and may decide to act temporarily, with a view to get the Appeal Board into efficient working order. It deserves honorable mention that the President selected Mr. Harding solely on the ground of fitness. In spite of this, there is nothing connected with the position that can encourage a well-known patent lawyer to abandon a good practice in order to accept an office with small pay, moderate honors, and severe labors. Mr. Harding, from the fact of being retained as counsel in several important patent law cases, could not act independently in the Patent Office without abandoning his clients unreservedly. He will probably hesitate before he takes a step like this.

Commissioner Holloway, in the meantime, has requested D. C. Lawrence, Esq., who has long been connected with the Appeal Board, to assist Messrs. Hodges and Theaker in their duties. This is certainly a creditable move. It shows that the Commissioner means to take good care of the interests of the Office; at the same time, he recognizes the services of an able and upright officer.

The Patent Office is now supplied with printed copies of all the English patents, except a single one (No. 12,054), which have been granted by that government from 1617 down to May, 1860; and if bound up according to the English system, there will be 408 volumes of specifications and 408 volumes of drawings. Professor Jillson, the accomplished Librarian of the Patent Office, informs me that he intends to reduce the number of drawings.

During my stay here I have made a hurried visit to the navy yard, and was not long in discovering the fact that I was in a busy place. The Ordnance Department, especially, presented a scene of unwonted activity indicative of stirring times ahead. This branch of the service is under the superintendance of Capt. John A. Dahlgren, a brave and gallant man, the inventor of the famous gun which bears his name. He seems to be fully alive to all that relates to solid progress in naval science, properly holding all theories in subordination to rigid, practical tests. Without disparaging the services of a single valuable officer in the navy, I think it but just to say that Captain Dahlgren deserves great credit for his untiring efforts to put our navy in the most efficient condition possible to support the civil power. Mr. Russell, the able correspondent of the London *Times*, whose graphic letters to that journal from the Crimea gave him so much celebrity, recently visited the navy yard, inspecting all its departments with deep interest. Captain Dahlgren gave to Mr. Russell an exhibition of the howitzer drill of this country. The howitzer is a short, light cannon, mounted on wheels, and is generally used for field service, but has been adapted to our navy by the efforts of Captain Dahlgren. It is a most destructive weapon in skillful hands. The shrapnell shells can be fired from the howitzer at the rate of four discharges a minute, projecting by their explosion hundreds of musket balls a distance of nearly 200 yards beyond the longest reach of the shell. Mr. Russell expressed much surprise at the rapidity of the firing.

As at this time all matters of science connected with the army and navy are interesting, more attention will be given to the subject.

CAVEAT FEES AND APPLICATIONS FOR PATENTS.—The twenty dollars paid into the Treasury on caveats filed in the Patent Office prior to the passage of the new law, will be allowed toward the completion of the application for a patent, but not as the first fee required on the application. Every application for a patent, except for *design* patents, must be accompanied with fifteen dollars in payment of first fee, and on a patent being ordered to issue, twenty dollars more is required to be paid, except in cases where caveats were filed in the same invention previous to the new law, which went into effect March 4th, 1861. In such cases no second fee is required.

A CURIOUS anecdote is told of Francis II., late King of Naples. A person having despatches for the Minister of Justice, wandered about Gaeta to find his office. Entering a dismantled building, he saw a man sitting on a pile of papers, who answered his inquiries by saying he was the minister. He then asked where he could find the minister of war. "Here," was the reply, "I am the minister;" adding, "Finding myself betrayed by every one I trusted, I am my own minister of war in the morning, chancellor in the afternoon, and prefect of police at night." It was, indeed, Francis II. himself.

THE POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE.

[Reported for the Scientific American.]

The usual weekly meeting of the Polytechnic Association of the American Institute was held, at their room, in the Cooper Building, this city, on Thursday evening, April 11, 1861—Mr. Bull in the chair.

BEER COOLER.

Mr. G. B. TURRELL exhibited a model of Baudelot's beer cooler. The wort is caused to descend from one to another of a series of horizontal water pipes connected at the ends, through which a supply of cold water continually ascends, being gradually heated as it rises, so that the boiling wort first encounters a water pipe nearly of its own temperature, and, as it is cooled and descends, passes over cooler pipes. The beer is thus cooled gradually, both by contact and evaporation. The water thus heated may be used for the next brewing.

INCRUSTATION IN STEAM BOILERS.

Mr. H. N. WINANS exhibited specimens of boiler scale, and stated that he had invented a remedy therefor—a powder to be put into the water used. It is a secret preparation, acting first upon the oxyd of iron so as to remove the scale, and afterwards upon the matters held in solution by the water. Whether it would answer for marine boilers he was unprepared to say.

Professor SEELY, after asking questions with regard to the properties of this powder, said that he was not acquainted with any chemical substance possessing the properties claimed for this.

Mr. STETSON remarked that, in consequence of the necessity of frequent blowing-off at sea to get rid of the salt, such a powder could not well be used for marine boilers, the quantity required would be so great.

HYDRAULIC PNEUMATIC INKSTAND.

Mr. ROWELL exhibited this inkstand, there being a reservoir for the ink communicating by two passages with the bowl where the ink is to be used. Whenever the ink, by use or evaporation, falls below the upper passage, a bubble of air enters and an equal quantity of ink enters the bowl through the lower passage, keeping the bowl always supplied at a uniform hight.

COMPRESSED AIR FOR RAILROADS.

Mr. FISHER, from the Committee on Carson's Plan of Propelling Cars by Compressed Air, made the following report thereon :

The Committee to whom was referred Mr. Carson's plan of a street rail car to be propelled by compressed air have examined the plan so far as it is developed, and have examined reports of experiments that have preceded Mr. Carson's plans, and respectfully report as follows :—

In 1799 a patent was granted in England to Mr. Medhurst for propelling machinery by compressed air. In 1819, Mr. Murdoch, of Soho, and Mr. David Gordon, made calculations and experiments with a view to propel carriages by compressed air; but were discouraged by the difficulties of compression, which was not then well understood. In 1828, Mr. Lemuel Wright, an American resident in England, patented a plan, and built an air carriage; and a Mr. Morin, in 1829, patented a plan for an air carriage. Mr. Alexander Gordon, in his Treatise on Elemental Locomotion, in 1834, gives his opinion that there was then no plan of air propulsion that could safely be engaged in as a speculation. Since that time there have been trials in France on railways and common roads; but although they have been favorably noticed in newspapers, no permanent results have followed them.

The most successful trials of which there are authentic accounts are those of Arthur Parsey and the Baron Von Rathen, in England, about 12 years ago. Parsey worked on a railway, and attained a speed of 20 miles per hour with a small and imperfect engine, under a pressure of 160 lbs., 200 lbs. being the limit prescribed to him, which is too low for practice. Von Rathen worked with 800 lbs. in his receiver on a common road; and arrived at the conclusion that he could run five miles on a turnpike, or 40 miles on a railway, with one charge. Parsey thought that 20 miles was the useful limit for a charge.

So far as appears, both these estimates are mere opinions, and not based on the high rate of speed demanded on railways, which increases the resistance to nearly double that of the speed attained by Parsey.

A first-class express train consumes five tuns of water in a stage of 40 miles. Air being denser than steam in the proportion of 17 to 8, and, so far as your Committee are informed, a cubic foot of steam being equal to a cubic foot of air, it would require 10⅜ tuns of air for 40 miles. The vessel to hold this air, even if welded, must be eight times heavier than the air; hence, 95 tuns will be the weight of the charged reservoir for 40 miles; and a cylinder 6 feet feet diameter and 100 feet long would be required for it at the pressure of 1,000 lbs. per inch. This excessive bulk is impracticable; a quarter or third of it is as much as could be allowed in practice; and at least two stops would be required in 40 miles.

To stop and start such a train involves a loss of $1.20, and $2.40 for two stops, or six cents per mile, which is three-quarters of the cost of coke on such trains. Besides, the time of passengers is of much greater value than the whole motive power; if the two stops should waste eight minutes, it would waste eight dollars in the time of pas-

sengers, or 20 cents per mile, which would drive the best class of passengers to the steam railways.

These considerations are sufficient to account for the disappointment of those projectors, even if there be no other defect in their system, and all they claim—a saving of one-half—be unquestionable. Mr. Carson, aware of these objections, devised a means of charging the air holders while the train is running, so that the air locomotive need not be heavier than a steam locomotive without its tender. It was this idea which induced him to engage in this means of propulsion in England. But on seeing our street railways, which are so short that there is no occasion to re-charge between the termini, he thought it advisable to introduce the air system first on these lines; and for this purpose he has designed a car whose frame is composed of 6-inch lap-welded tubes, in which the air is held.

If we reduce the distance to a tenth we may reduce the weight to a tenth, or 9½ tuns. for a 100-tun train. The boiler and water weigh 16 tuns. Hence, we find an advantage in favor of air on short lines.

As to the cost of compression, it is less at a low density than at a high density, and there is room in a car for air at 300 or 400 lbs. But double this density is necessary for 10 miles; and at most high pressures, four times the power it can give out, when worked without expansion, is required to compress it. But it is practicable, with the link, to work it expansively, so as to give double the power attainable without expansion. Hence, theoretically, half the power will be lost. But this is expected to be balanced by the inferior cost and more thorough use of the fuel at the stations. Locomotives vaporize about 8 lbs. of water with 1 lb. of the best coke; but stationary engines vaporize 12 lbs. with 1 lb. of fuel that costs less than two-thirds as much. And when stops are frequent and long, there is a loss of heat from steam but not from air; and the fireman is not needed for air.

It has been stated that in compressing air the pumps become red hot, unless cooled by water; and that in working it, the expansion cools it so fast as to form ice on the cylinders and pipes; and that a considerable per centage of power is thus lost. The committee have no authentic data on this point; but it is evident that city cars that stop frequently are less liable to freezing than those that run fast and steadily; and that the low pressure practicable on short stages is less liable to such loss than the high pressure necessary on long stages.

The Committee, in view of all the evidence they have seen, deem that, for short lines, air may be better than steam. It is perfectly cleanly. It is likely to cost less; but if it costs more, it may still be advantageous to use it.

Compared with horsepower, it is likely to be both cheaper and more agreeable. A car propelled by air will make no dust; but the dirt made by horses is a costly nuisance. To maintain a given standard of cleanliness in a city without horses, like Venice, costs less than one-third as much as in New York for mere washing; and the wear of clothing is nearly in proportion to the washing; and if all wheels ran on iron, and by elemental power, New York might be as cleanly as Venice; and the saving of clothing, furniture and goods would more than pay for all the cost of riding, rails, pavements, and all else required for the streets.

The cost of horses, compared with steam, is much greater than people suppose, especially at high speed. The English coaches used to cost 36 cents per mile for the horses, to draw 15 passengers at eight miles per hour. Locomotives cost 12 cents per mile, and can draw 300 passengers at 40 miles per hour. On the New York Central locomotives cost 20 to 22 cents per mile, burning wood; on the Baltimore and Ohio, 15 cents per mile with coal; and some of the best engines, with 16-inch cylinders, on a southern road, have worked for 12 cents per mile. The wages, fuel, repairs, stores—all but the interest on engines, shops, and engine houses—is included; but the coachmen used to get no pay from the proprietors, and were paid by the passengers.

Now, if we in this country pay less for horses, it is because we never have kept the high speed of the English. We waste the time of passengers, which is as good as money. Even on city railways, a third of the time might be saved by engines that can start quickly and keep the maximum speed up the grades. But poor as our speed is, it costs more than steam. Mr. Eastman states the cost per mile of running cars on the horse railways near Boston at 25 to 28 cents per mile: or as much to draw a horse car at eight miles per hour as to draw seven large cars at 30 miles per hour by steam.

The plan referred to the Committee claims to be considered as a competitor of horsepower for city railways. Those who suppose that steam is objectionable in cities will probably be glad to find that compressed air can be used as a substitute for it, and can work at much less cost than horses, and thus drive them from street railways, and so get rid of a considerable part of the dirt.

Some of the projectors of steam carriages expected that compressed air would be substituted for steam for small carriages after steam carriages had become numerous enough to warrant the establishment of compressing stations wherever they are wanted; but until such stations are established, it is evident that compressed air cannot be used for general purposes. There are also other means known to chemists. Lardner stated that there were over twenty substances which philosophers regarded as capable of being used instead of steam, and he ventured the prediction that the steam engine would some time exist only in history. While your Committee do not deem themselves warranted in assenting to such anticipations, they certainly consider that such authorities should outweigh the mere skeptics who discourage all attempts at improvement. And they believe that the application of compressed air to street railways is worthy of trial.

J. K. Fisher, John Johnson. } Committee.

Mr. Dibben objected to the use of compressed air; there is a serious loss due to the heat generated by the compression. We have a loss by friction in compressing the air; then this loss from the generated heat, and still a third loss by friction in using the compressed air.

The report was accepted and ordered on file.

PROJECTILES—RIFLED CANNON.

Mr. Babcock resumed his remarks upon the results attained by the shot invented by General James. He objected to the shot, first, on account of its necessary want of accuracy. The belt of soft metal around the shot flies off as it leaves the gun, in consequence of the expansive force of the gases; and unless this belt should separate into equal pieces, their reaction would necessarily turn the shot from its course. If these pieces could perfectly balance each other, the reaction would be balanced; but this does not occur in practice, and therefore the ball must necessarily deviate from its true trajectory. The results attained confirm this statement. Mr. B. exhibited a sketch of the target at Watch Hill, R. I., 13 by 17 feet, placed at a distance of 2,000 yards from the gun. Sixty-five shots had been fired with 80-lb. shots, and there were but ten marks upon the target, a portion of these having been produced by ricochet hits. Captain Dahlgren, in an official report made last December, compares the results which were attained by trials in the Navy Yard at Washington of other rifled cannon with the results attained by the Board of United States Artillery Officers appointed to test General James' projectile, giving the preference to the former. The next objection is that General James' shot is deficient in penetration. This Mr. B. attributed to the honey comb structure of the rear of the shot, causing a serious resistance to the atmosphere. No man would make the stem of a vessel in such a form. In the experiments upon Watch Hill, it was claimed that one shot had passed through 52 inches of oak timber. This was the only shot which passed through the target. The target was three feet thick, composed of squared oak timber 12 inches square, and tied together; and this shot had happened to pass between these timbers, after which it passed through a support 12 inches thick, and another target four inches in thickness. The next best shot was imbedded 18 inches, the next best 15 inches, and the next best but three inches. In throwing shell upon the deck of a vessel, it would be necessary that the angle of elevation should be considerable. The rotation would have a tendency to cause the line of the axis to remain parallel to itself, and consequently the shell would strike the vessel partially upon its side.

Lieutenant Bartlett said that the Minié balls fired at an elevation of 15° or 16°, all strike point on.

Mr. Montgomery thought it improbable that, in the experiments at the Navy Yard, the projectile of General James should have had a fair trial, on account of the disinclination of the department to encourage civilians in such inventions.

Mr. Babcock explained that the projectile of General James was not tried at the Navy Yard at Washington, but Captain Dahlgren merely compared his own results there with other pieces, with the results before obtained by the Board at Watch Hill.

Lieutenant Bartlett said that there seemed to have been a misapprehension with regard to the Dahlgren report, since it had been used by the press to discredit General James' invention. General James aims at precision in the long range; and the great question is, whether he secures that. The French government have introduced the "Carabine à tige," which operates against field artillery, the accuracy of the aim in the long range being such that a section of French riflemen are able to hold in check artillery men that approach them over an open plain. The French government will not give up this range under any circumstances. Their sharpshooters are trained to pick off single men at from 800 to 1,200 yards; and even beyond that range they have perfectly authenticated reports of single shots which have killed single men.

THE GREAT EASTERN.

Mr. Montgomery suggested that the *Great Eastern* should be the subject for discussion at an early day.

NEW SUBJECT.

Mr. Stetson moved that the subject for consideration at the next meeting be "Heating by Steam," which was agreed to.

On motion, the Association adjourned.

The London Exhibition for 1862.

The charter for the Exhibition of the Industry of All Nations has been granted by the English government, and the contract for the building is made. It is to cost £300,000, and will cover a little over 26 acres. It will be 1,200 feet long by 700 broad, exclusive of the space set apart for the display of agricultural implements, which is in rough numbers 1,000 feet long by 220 broad. The walls are to be mostly of brick, with a clear story at the top 25 feet in hight, of iron and glass. The roof is to be of painted wood. The building is to be ornamented with two domes of iron and glass, larger than any others that have ever been built. They will each be 160 feet in diameter, and will rise to the immense hight of 250 feet. The exhibition will open on Thursday, the 1st of May, 1862.

Occupation of Women in France.

In France woman is permitted to engage in many occupations which are performed with us entirely by the male sex. She often acts as ticket-dispenser at railway stations, as bookkeeper at hotels and shops, and as attendant on the heaped tables of the reading room.

The watchmaker consigns to her delicate touch the finer parts of his mechanism, and the jeweler the setting of his costly gems. The wood engraver expects his most delicate and tasteful cuts from her hands; and the picture dealer invites her to plant her easel in the Louvre of Luxembourg, to reproduce, as she well can, the masterpieces of ancient or modern art.

Nor is the mallet of the sculptor considered to disgrace the hands of a princess—one of the noblest statues of modern times, representing Joan of Arc clasping the consecrated sword, being the production of a daughter of the late citizen king. The individual and social advantages which the honor that is thus paid to labor brings are incalculable. Pride is never permitted to interfere with usefulness; and many a young woman, who would have been debarred, as with us, by its pernicious influence, from the honorable employment of her powers, is enabled, by the wiser and more merciful arrangements which obtain in France, to secure a virtuous and comfortable independence.

Science Aiding Justice—Hunt for a Criminal.—The murderer of the solitary passenger, Judge Poinsot, in France, was tracked, after jumping off the railway train, in the following manner:—An exact impression of his foot-mark was taken, a few hours subsequently, by the following ingenious process: A sort of gridiron, made of wire, was placed over the imprint, an inch from the ground. On this gridiron was deposited a thin piece of tin, covered with burning charcoal. In a short time the ground beneath was heated to the desired extent. The gridiron was then removed, and with the aid of a hair sieve the impression was sprinkled with a layer of stearine, reduced to an impalpable power, by dissolution in alcohol and sudden immersion in cold water. The powder obtained by the precipitation of this mixture is so light that its fall does not change the position of a grain of sand. As soon as it touched the hot ground it melted and disappeared. The soil was then given time to cool, after which the imprint, fully impregnated with stearine, was dug up entire, and placed upon a square piece of cloth, whose corners were then gathered together, so as to form a kind of sack. Moulding plaster was then poured upon the imprint, and the operation was complete. Such is the accuracy of this process, that it not only reproduces the general outline of a foot, or its covering, but every minute particularity. If a bare foot, it shows the exact shape of the sole, and the relative position of the toes; if a boot or shoe, the amount of wear sustained by the sole and heel, the number of nails, &c.

Curious Animal.—Australia is a land full of natural wonders to us. Great tracts of that country are covered with balls of quartz, shot, as it were, from some lunar battery; the natives kill the jumping kangaroo by shooting the boomerang "round the corner;" and there is the *ornithoryncus*, which puzzles naturalists to classify by its paradoxical peculiarities. It appears to be a link between the quadruped, bird and reptile. Its body is something like that of a beaver; it has four short legs and is web footed, and on its little flat head it has the bill of a duck. These creatures live a great deal in water; their resorts are quiet creeks fringed with weeds, among which they search for food. They burrow in the banks of streams like moles; in disposition they are timid, playful and harmless, and they have been made very amusing pets.

Patent Claims

ISSUED FROM THE UNITED STATES PATENT OFFICE

FOR THE WEEK ENDING APRIL 9, 1861.

Reported Officially for the Scientific American.

*** Pamphlets giving full particulars of the mode of applying for patents, under the new law which went into force March 4, 1861, specifying size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

935.—E. H. Bailey, of Philadelphia, Pa., for an Improved Key Fastener:

I claim connecting the handle to the key of the lock by the pieces, E F and G, or their equivalents, arranged for attachment to and detachment from the handle and key of a lock, substantially as set forth for the purpose specified.

936.—Calvin Auborn, of Watertown, N. Y., for an Improvement in Cheese Presses:

I claim, first, The toothed operating segment or sector and platen pressing cam, combined to form but a single device, and the one being concentric and the other eccentric to or with the shaft which carries them and otherwise peculiarly constructed for operation by a lever and pawl to communicate pressing force to the platen, essentially as shown and described.

Second, The combinaiion of the peculiarly constructed and combined toothed operating segment and platen driving cam. with the rollers which serve to guide the platen at its sides or ends and the roller interposed between the cam and platen and against which the cam is made to bear, all for operation together, as set forth.

937.—D. N. Allard, of McConnelsville, Ohio, for an Improved Horse-shoe Machine:

I claim the combination of a vertical and a horizontal wheel working together and furnished with dies, for the purpose of swadging out a horseshoe, substantially in the manner set forth.

I also claim, in combination with a vertical and horizontal die-wheel, the tipping bar, K, for the purposedescribed.

938.—Ransom Bartle, of Independence, Iowa, for an Improvement in Water Elevators:

I claim the arrangement of the silding treble-flanged drum, constructed as shown with the brake lever, G, shaft, D, straps, h l, separated strips, N N, and bucket, K, all in the manner and for the purposes shown and described.

[This invention consists in combining with a plunged drum which turns loosely on a crank shaft, and which is allowed to receive an end play on said shaft, a friction brake and rest, and a clutch wheel, arranged whereby the drum may be kept under perfect control in windingup the bucket strap, and also in lowering the bucket into the well. It consists in attaching the strap by which tbe bucket is hung to the flanged drum by a strip of some elastic material of a suitable length and strength for the purpose of preventing the bucket strap from breaking should the bucket descend suddenly into the well.]

939.—J. B. Bausman, of Rochester, Pa., for an Improved Car Ventilator:

I claim the arrangement of the self-acting fans, D, with the tanks, C E, and curved trunk, B, in the manner and for the purposes shown and described.

[The object of this invention is to supply railroad cars while in motion or during the course of travel with pure air or air deprived of dust and light impurities, which are thrown up by the motion of the cars.]

940.—A. L. Bayley, of Amesbury, Mass., for an Improvement in Shaping and Embossing Hats and Caps:

I claim the shaping or embossing of hats or caps by placing them in a suitable, die, A, filling them with sand, or other granular or pulverous material, and subjecting such material to pressure, substantially as specified.

941.—J. A. Bazin, of Canton, Mass., for an Improvement in Bobbins for Spinning Machines:

I claim, first, The improved bobbin, constructed substantially in the manner and for the purposes described.

Second, I also claim the method of holding the coils of yarn or strands, so that they can be safely removed from the spindles on which they are wound, and applied to the creel or other part of the machine in which they are to be used, by means of connecting the movable heads of the bobbin with clamps, or their equivalents, substantially as and for the purpose set forth.

Third, I also claim combining the movable heads with the core, or its equivalent, in the manner and for the purposes described.

942.—Henry Beagle, Jr., of Philadelphia, Pa., for an Improved Safety Hook for Harness:

I claim the arms or bars, A A, connected together by a pivot, a, and provided with curved ends, b, in connection with a ring, B, arranged to fit within the curved ends, b, and form a lock for the arms or bars, substantially as and for the purpose set forth.

[The object of this invention is to obtain a hook that cannot be casually detached or unfastened, and thereby serve as a safe fastening or snap for harnesses and other articles which require a simple but secure means for fastening or attaching their parts together.]

943.—Joseph Bell, of Belleville, Ill., for an Improvement in Bolting Chests:

I claim the interior construction of the chest, shown and described with the ventilators, arranged substantially as described for the purpose specified,

954.—Samuel Boorn, of Lowell, Mass., for an Improvement in Pickers for Looms:

I claim the improved manufacture of raw hide picker as made with a tapering cushion, a backing plate, a. and the case, b, arranged and applied together, substantially as specified.

945.—Edward Brown, of Waterbury, Conn., and H. Van Gieson, of Paterson, N. J., for an Improved Machine for Making Butt Hinges:

I claim, first, The combtnation of the swages, 21, yielding supporting plate, 20, and fixed stop, 24, substantially as described for the purpose set forth.

Second, The combination of the fixed stop, 33, dies, 30, and sliding support, 29, substantially as and for the purpose set forth.

Third, The combination with the files, 45, operating substantially as described, of the overhanging stop, 51, and support, 44, substantially as and for the purpose set forth.

Fourth, The combination of the vibrating support, 44, set screw, 47, and springs, 60, arranged substantially as described for the purpose set forth.

Fifth, The combination with the swages and files described for turning and finishing the joint of the hinge of the fingers, 8, 9 and 10, substantially as described for the purpose set forth.

Sixth, The combination in the manner described of the clutch for disconnecting the power from the machine, with the fingers for moving the blanks forward into position, the fingers being so connected to the clutch lever as to cause an undue strain upon the fingers, 8, 9 and 10, or any one of them to release the clutch lever, 70, and thus disconnect the driving power, substantially as described and shown.

Seventh, The guides, 75, so constructed and arranged in connection with the slides, 76, 77, as to turn the parts of the hinge over and deliver them upon the slides, 76, 77, substantially as and for the purpose set forth.

Eighth, The construction of the slides, 76, 77, 79, 80, and their arrangement in connection with the apparatus for driving the wire by which the parts of the hinge are brought into and held in the proper position to receive the wire which forms the axis of the hinge, substantially as and for the purpose set forth.

Ninth, The combination with the said slides, 76, 77, 79, 80, of the guide, 84, substantially as and for the purpose set forth.

Tenth, The combination with the driving clamp, 93, of the supporting slides, 104, 105, and springs 106, substantially as and for the purpose set forth.

Elevenlh, The combination of the supporting slides, 76, 77, 79, 80, or other support, for the hinge during the operation of driving the wire, and with the clamp, 93, or other device for driving the wire, to form the axis of the hinge, of the stop, 114, said stop being connected with the disengaging apparatus in such a manner that an undue pressure in driving the wire will disconnect the driving power, substantially as and for the purpose set forth,

Twelfth, The combination with each other and with a machine for making hinges of the pliers or cutting nippers, 107, and chisel, 108, operated and operating substantially as described for the purpose set forth.

946.—G. W. Brush, of Brooklyn, N. Y., for an Improvement in Floating Derricks:

I claim the float or vessel, A B C, which carries the derrick or hoisting or lifting apparatus, constructed of two or more movable sections which can be brought into line with each other to form a navigable vessel, or to a position parallel with or at a suitable angle with each other to make their bow and stern ends counterbalance the derrick or hoisting apparatus, substantially as specified.

[This invention consists in so constructing in two or more parts or sections, a float or vessel carrying a boom derrick or other hoisting or lifting apparatus that the said sections may be brought in line with each other, and in that condition present a suitable form for navigation from place to place like any ship or other vessel propelled by sail, steam power or other means, or may be brought to positions parallel or at any requisite angle to each other to produce the stiffness or steadiness in all directions necessavy for the purpose of using the derrick or other lifting or hoisting apparatus.]

947.—A. A. Burlingame, of New York City, for an Improvement in Apparatus for Making Extracts under Pressure:

I claim the arrangement of the globe, A, pipes, C D E F, and steam boiler, B, in combination with the extracting vessel, G, pipes, f g, and receiver, H, constructed and operating substantially in the manner and lor the purpose specified.

948.—C. W. Cahoon, of Portland, Maine, for an Improvement in Seeding Machines:

I claim the combination of a hopper, centrifugal seed discharger, and their appurtenances, with a breast plate, substantially as set forth.

I also claim the combination of a centrifugal seed discharger with a bag hopper by means of a conductor that receives the seed from the bag and conducts it to the seed discharger, substantially as set forth.

949.—Caroline H. Carnes, of New York City, for an Improvement in Reels:

I claim a reel composed of double pivoted levers, E E, collars, d e, slide, D, and shaft, A, and otherwise made as shown and described.

[The object of this invention is to obtain an article for the intended purpose (the winding of silk), of much greater uil ty than those previously constructed, and which may be manipulated with greater ease, and also folded more compactly.]

950.—G. E. Chenowith, of Baltimore, Md., for an Improvement in Raking Attachments to Harvesters:

I claim, first, The combination of the endless belt or chain, F, and operating mechanism, as described, with a reciprocating rake head, H, for the purpose described.

Second, The combination with the belt, F, ot the wrist pin, L, and slotted rod, K, substantially as and for the purpose described.

Third, The depositing apron, O, constructed as described and operated by means of the connecting rod, K, on the endless belt, F, substantially as and for the purpose specified.

951.—J. B. Cooper, of Brooklyn, N. Y., for an Improvement in Plows:

I claim, first, The attaching of the land side, I, to the standard, E, by means of the screw, g, and strap, H, substantially as shown, to admit of the adjustment of the land side, I, as described.

Second, The described arrangement of the foot or standard, L, sector arm, N, bar, K, and pin, l, operating in connection with a plow in the manner and for the purpose set forth.

[This invention relates to improvements in that class of plows which are designed for very general use, that is to say, those plows which may be adapted to perform various kinds of work, such as turning the sod, loosening the subsoil, or performing the work of an ordinary shovel plow or cultivator.]

952.—George Copeland, of North Gray, Maine, for an Improvement in Looms

I claim the employment, in connection with the lever, E, of the inclined plate, g, the springs, f and h, and the tripping piece, i, the whole applied and combined to operate substantially as and for the purpose specified.

953.—Herbert Curtis and Albert Tufts, of Charlestown, Mass., for an Improvement in Door Alarms;

We claim the escutcheon, d, and the disk, E, in combination with an alarm apparatus operating substantially as described, when the disk, E, is used not only to sound the alarm, when it is revolved in either direction, but also as a fastening for the door, as specified.

954.—Ezekiel Daniels, of Owego, N. Y., for an improvement in Fracture Bedsteads:

I claim, first, The combination of the hinged frame, G, with the thigh plane, D, and back plane, H, in the manner and for the purpose shown and described.

Second, The arrangement of the axis, C, with the thigh plane, D, leg planes, F, frame, G, and back plane, H, in the manner shown and described.

Third, The combination of the sliding bar, J, and rods, I, or their equivalents, and screw, K, with the thigh plane, D, parts, F H, and axis, C, in the manner and for the purpose substantially as shown and described.

Fourth, The construction of invalid bedsteads or ambulances with the thigh plane, back plane, and leg pieces made simultaneously adjustable, in the manner substantially as shown and described.

[This invention relates to an improvement in invalid bedsteads for which Letters Patent were granted to this inventor bearing date May 29, 1855. The object of the invention is to perfect and simplify the patented machine above alluded to, and render the same capable of being manipulated and adjusted to suit the patient with greater facility.]

955.—W. E. Dawson, of Lynchburg, Va., for an Improvement in Soaps:

I claim the combination of ingredients forming the composition set forth, which I believe is a new and useful composition of matter.

956.—T. B. De Forest, of Birmingham, Conn., for an Improvement in Thread-winding Guides:

I claim a portable thread-winding guide, substantially such as described.

957.—William Dripps, of Coatsvillle, Pa., for an Improvement in Waterwheels:

I claim, in combination with a spiral cased water wheel, the making of a water chamber between the bottom of the wheel and the bottom of the case that is supplied by ingress at the joint, for the purpose of raising the toe of the wheel, as set forth.

I also claim the converting of that part of the casing, e c, into a spring, so that it, as well as the continuation of it, d, may yield to any hard substance that may get into the wheel, substantially as described.

I also claim, in combination with the buckets of a water wheel, the flanges, f, for the purpose of preventing the water, when there is but a small supply, from rising up on the bucket, and thus wasting much of its force, substantially as described.

958.—H. W. Eastman, of Baltimore, Md., for an Improved Portable Folding Bedstead:

I claim the arrangement of the bed frame, A, sliding posts, B, the head board, C, slot plates, G, bolts, F, and thumb nuts, E, substantially as described for the purposes specified.

959.—W. T. Farrar, of Concord, Mass., for an Improved Adjustable Ladder Hook:

I claim a removable ladder hook to be clamped to a ladder when required, one of its clamps being made adjustable, substantially as specified.

960.—Peter Faver, of New York City, for an Improvement in Mill Picks:

I claim the arrangement of the head, A, sockets, a, slots, C, set screws, D, chisels, B B′, and handle, F, when these several parts are constructed and combined in the manner and for the purpose specified.

961.—G. C. Flagg, of Tanktown, Ohio, for an Improvement in Gates:

I claim a gate, constructed substantially as described, with the hinge bar inclined to the gate post, in combination with a double jointed hinge, arranged as described, to connect the upper end of the bar with the gate post, for the purpose as set forth.

962.—W. C. Ford, of West Salem, Ohio, for an Improvement in Corn Planters:

I claim, first, Lever, a, plow, b, and sliding discharge spout, c, when combined and operated in the manner and for the purpose set forth,

Second, The combination of lever, d, spring, e, main rod, f, and lever, g, when operated in the manner and for the purpose described.

Third, Grain slides, m m, regulators, n n, main rod, f, levers, h d and g, spring, e, and slide, i, when the whole shall be constructed, arranged and operated in the manner and for the purpose set forth.

963.—Tilmon Gilbert, of Natchez, Miss., for an Improvement in Cotton Presses:

I claim the arrangement of the sliding rack, F, and hinged bars, H H, with each other and with the follower, I, and gearing, h k l, all in the manner and for the purpose shown and described.

964.—Anderson Godley, of Ithaca, N. Y., for an Improved Refrigerator and Water Cooler:

I claim the combination of a water cooling reservoir, G, and pipe, H, with a refrigerator, A, when located in the ice chamber thereof, so that the ice shall be packed around and in contact with them, substantially as and for the specified.

965.—W. H. Gray, of Dover, N. H., for an Improved Let-off for Looms:

I claim the combination of the balanced rod, D, the arm, B5, disk, B4, and jaw, B6, or their equivalents, for determining the tension under which the loom shall operate and the amount of let-off to be effected after each beat of the lay.

966.—Suspended.

967.—J. O. Haight, of Albany, N. Y., for an Improvement in the Pistons of Steam Engines:

I claim the combination of a divided packing ring or rings with a piston, by means of a spring made out of a flat bar or ribbon of steel bent into a Z-shape, substantially as described, so as to attain the advantages set forth, the spring used in the combination being as an entirety, substantially such as described.

968.—Charles Hardy, of Biddeford, Maine, for an Improvement in Lubricators for Spinning Machinery:

I claim the oil can or feeder having upon its exterior projecting guides or gages, so placed with reference to the saturated cloth, or other fibrous substance that covers the oil hole, that, as the guides traverse upon the fixed parts of any machine, the oiled cloth may cover in contact with those parts of the machine that require to be lubricated.

969.—E. F. Herrington and Josiah Herrington, of West Hoosick, N. Y., for an Improvement in Mowing Machines:

I claim the adjustable lateral brace rod, K, applied and operating in connection with the shoe brace, J, substantially as and for the purposes set forth.

Second, The foot rack, N, operating in combination with the segment, L, or other suitable hoisting device, to hold the heel of the finger bar while raising the point, as explained.

Third, The spring bar, n, operating to hold the aforesaid foot rack out of gear when not in use, to permit the finger bar to rise and fall freely with the uneven surface of the ground.

Fourth, The reversible wedge-shaped plate, i, applied between the finger bar and shoe, in the manner and for the purpose explained.

Fifth, The combination of the spring pins, d, disks or yokes, d2, bosses, c, and loose ratchet pinions, B, operating in the manner and for the purposes explained.

Sixth, The wedge, d5, operating in connection with rods, d4, clutch levers, d3, and yokes, d2, to retract the pins, d.

970.—Chas. Hoffman and Wm. Graichen, of Clinton, Mass., for an Improvement in Temples:

We claim the described loom temple, as constructed, with two separate toothed rollers arranged on one spindle, and having the lesser or salvage roller supplied with a ratchet and pawl, as specified, the other roller being free to revolve on the spindle independently of the said salvage roller.

971.—B. W. Hood, of Pawtucket, Mass., for an Improvement in Thimbles:

I claim a thimble, such as described, having its shell, A, made of several sections, a, covered with enamel and secured together by a ring, b, and cap, C, in the manner and for the purpose specified.

[By the aid of this invention thimbles of an exceedingly rich and beautiful appearance can be produced at a comparatively small expense.]

972.—Edward Horalek, of New York City, for an Improvement in Boilers for Hot Water Apparatuses:

I claim the cast metal head, b, and flange, e, provided with the groove, d, receiving the metallic cylinder or casing. a, combined with the wrought iron ring, e, shrunken for the purposes and as specified.

973.—Jonathan Howard, of West Bridgewater, Mass., for an Improved Garden Hoe:

I claim the said weeding hoe, as constructed, with the guides, d d, and the handle, B, arranged and combined with the peculiar salient and re-entering angular blade, A, essentially in the manner and for the purpose as specified.

974.—J. W. Howlett, of Greensboro, N. C., for an Improvement in Transmitting Motion:

I claim the employment in transmitting motion from one wheel to an other of a beveled elastic wheel, constructed and arranged upon its shaft with compressing collars, in the manner shown and described, so that the diameter of said elastic wheel may be increased or diminished at pleasure, and the transmission of the power may be thus regulated as desired, all as set forth.

[This invention consists in clamping, between two suitable plates, an india-rubber (gutta-percha or other like material) double-beveled wheel, in such a manner that the diameter of the wheel may be increased, and thus made to bear upon the sides of a corresponding grooved driving wheel, or driven wheel, for the purpose of increasing the rolling friction of the two wheels, so that casual slipping will be prevented.]

975.—Eli Huddleston, of Lawrence, Kansas, and B. M. Harrison, of Terre Haute, Ind., for an Improvement in Presses:

We claim the particular arrangement of the follower, F, screws, H H H H, gearing, J J K K, and rods, L L, with the box, A, top, f, screws, d d d d, bars, b b, nuts, e, head, E, and bars, D, as and for the purposes shown and described.

[The object of this invention is to obtain a ver simple and powerful press for general purposes, and one that will not monopolize much space, and may be manipulated by any one of ordinary ability.]

976.—Duane Hull, of Newburgh, N. Y., for an Improved Clothes' Dryer:

I claim the concave surfaces of said block, B, in combination with said four pieces or arms and line or cord, substantially as and for the purpose specified.

977.—Andrew Hunter, of Solano county, Cal., for an Improvement in Grain Separators:

I claim a vibrating trough, B, suspended by adjustable chains, in combination with screws, c c', and screen, D, adjustable by means of plate, d, and box, F, and spout, G, arranged in relation to each other, as described, and for the purpose of separating grain.

978.—J. J. Johnston, of Alleghany, Pa., for an Improvement in the Distillation of Hydro-carbon Oils:

I claim the process and method of purifying, decolorizing and deodorizing rock or petroleum oil by distilling it with common wood charcoal, in proportions substantially described.

989.—Anson Judson, of Brooklyn, N. Y., for an Improvement in Lamps:

I claim the contraction of the cone, A, or its equivalent of glass or other transparent material, as and for the purpose described.

980.—J. K. Kilbourn and E. E. Kelbourn, of Norfolk, Conn., for an Improvement in Knitting Machines:

We claim, first, The combination of a traveling needle in a knitting machine, with automatic mechanism for causing it to travel along the gang of needles of the machine, substantially as set forth.

Second, The combination of a traveling needle with mechanism for withdrawing the needle, whose place the traveling needle is to occupy from the gang at work previous to the substitution of the traveling needle in its place, substantially as set forth.

Third, The combination of a traveling needle with mechanism for re-inserting the other needle of the gang, whose place the traveling needle has occupied after the traveling needle has been removed therefrom, substantially as set forth.

Fourth, The combination of a traveling needle with a mechanical instrument for transferring the stitch from the needle that is withdrawn from the gang at work to an adjacent needle, substantially as set forth.

Fifth, The combination of a traveling selvage needle with a thread guide, by means of devices which cause the thread guide to vary its delivery of yarn in correspondence with the change in the position of the traveling selvage needle relative to the other needles of the machine, substantially as set forth.

Sixth, The combination of a traveling needle with a series of needles which move to and fro past a thread guide, but do not travel laterally to each other, substantially as set forth.

Seventh, The combination of a traveling selvage needle with mechanism for reversing the movement of the needle carriage in such manner that the time at which the movement is reversed depends upon the position of the traveling selvage needle, substantially as set forth.

Eighth, The combination of the series of sinkers of a knitting machine with a traveling instrument for withdrawing the sinkers which happen to be at the selvage of the fabric from their positions in the series, substantially as set forth.

Ninth, The combination of the series of sinkers of a knitting machine with a traveling instrument for withdrawing a portion of the sinkers outside of the gang at work from their positions in the series, substantially as set forth.

Tenth, The combination of instruments for griping the yarn with mechanism, that causes them to act at the time the selvage needles are forming their loops, substantially as set forth.

Eleventh, The combination of griping instruments with mechanism for operating them and the needles in such manner that the gripe is relaxed in time to prevent the breaking of the yarn by the action of the needles, substantially as set forth.

Twelfth. The combination of the thread guide with mechanism for depressing it immediately after the last needle in the series at work has been fed with yarn and before the needle is withdrawn into its nosing, substantially as set forth.

Thirteenth, The combination of traveling temples with a knitting machine for forming work of variable width in such manner that the position of the temples is varied as the number of needles at work increase or diminish, substantially as set forth.

Fourteenth, The combination of a whip roll of unequal diameter at different parts of its length with the take-up rolls of a knitting machine, substantially as set forth.

Fifteenth, The combination of instruments for varying the strain upon the fabric between the place where the knitting is effected and the take-up rolls with a knitting machine for forming work of variable width, substantially as set forth.

Sixteenth, The combination of under supports, having bearings for the needles outside of the sinkers, with a depressible thread guide, constructed and operated substantially as set forth.

981.—John Laing, of Hoboken, N. J., for an Improved Gas Generating Steam Boiler:

I claim, first, Combining one or more retorts, A, with a steam boiler, C, substantially in the manner and for the purpose specified.

Second, The arrangement of a series of gas pipes, E, and air holes, d, in combination with the secondary fire-chamber, D, of a steam boiler, G, constructed and operating substantially in the manner and for the purpose shown and described.

Third, The arrangement of the three-way-cock, N, and conical vessel, Q, in combination with the tanks, P P', and retort or retorts, A, constructed and operating substantially in the manner and for the purpose set forth.

Fourth, Mixing the oil and water before it passes into the retort or retorts, as and for the purpose described.

Fifth, The arrangement of the two gasometers, L and O, rod, m, weighted arm, p, or its equivalent, three-way-cock, N, and rockshaft, o, in combination with the supply tanks, P P', and retort or retorts, A, constructed and operating substantially in the manner and for the purpose specified.

982.—Mark Levy, of New York City, for an Improvement in Retorts for the Manufacture of Gas from Wood:

I claim the arrangement and use of the elliptic-shaped retort, A, with the central unremovable reheating flues, E E' E, &c., dividing said retort in two parts, constructed and combined together in the manner and for the purpose substantially as described.

983.—R. B. Light, of Dunkirk, N. Y., for an Improved Machinists' Instrument for Determining Geometrical Lines, Centers, &c.:

I claim the combination of devices arranged substantially as described, so as to constitute one instrument, whereby the several operations referred to and illustrated may be executed as set forth.

984.—W. A. Lightfall, of New York City, for an Improvement in Feed Water Apparatuses for Steam Boilers:

I claim the combination of the delivery pipe, F, and the feed pipe, H, when arranged and located, in relation to each other and to the hot well, G, as described and for the purposes set forth.

985.—Linus Merrill, of Janesville, Wis., for an Improvement in Grain Separators:

I claim the screens, C D, when subdivided into smaller screens, a*, provided with central troughs, F G, and chutes, a, and used in connection with a screen, E, to operate as and for the purpose set forth.

[The object of this invention is to obtain a simple and efficient machine whereby foreign substances may be thoroughly separated from grain, and different kinds of grain separated from each other, such as oats from wheat, &c.]

986.—Alexander Millar, of New York City, for an Improvement in Cork-cutting Machines:

First, I claim the laterally adjustable bed plate, G, arranged on table, A, and combined with the blank holder, g, and its accessories; and, in combination therewith, the second adjustable plate, G', arranged on bed plate, G, and pivoted at one end, f, substantially as set forth, for the purpose of adjusting the blank holders during the operation of the knives in cutting the corks.

Second, I claim, in combination with the horizontal reciprocating knife frame, B, the inclined plate, p, pivoted arm, n, shaft, m, arm, l, and the grooved collar, l', an arbor, g, with the pivoted arm, l, horizontal bar, 5, on frame, A', spring, 6, and the bar, 7, on knife frame, B, all arranged and operating in harmony substantially as described and represented.

Third, I claim securing the horizontal knives, D D', to the knife frame, B, substantially in the manner set forth, so that these knives may be adjusted vertically and at the same time, so that they may be pitched to any desirable angle with a vertical line.

Fourth, I claim the extension arms, 20 and 21, adjustable stem or post, 17, tube, 23, and blank carrier arm 24, adjustable pivoted arm, 30, pulley wheel, v, with its weight and cord, 2725, in combination with a cam, K, on knife frame, B, all arranged and operating as and for the purposes set forth.

987.—Henry Napier, of Brooklyn, N. Y., for an Improvement in Apparatuses for Manufacturing Turpentine and Resin:

I claim the arrangement together for joint operation, in the manner substantially as shown and described, of the jacketed vacuum straining vessel, A, retort, B, boiler, C, and condenser, D, for the purposes set forth.

[The object of this invention is more especially to obtain a very superior and colorless resin.]

988.—John Nobbit, of Philadelphia, Pa., for an Improvement in Hair Cloth Looms:

I claim driving the nippers in a hair cloth loom, by means of the rod, J, and rockshaft, I, when the latter is caused to oscillate by a crank on the same shaft which drives the lay, substantially as described.

989.—Samuel Orr, of East Springfield, Ohio, for an Improvement in Apparatuses for Dressing Feathers:

I claim, first, The combination with the steam jacket of a feather-dressing machine, of screens covered with slides, arranged and operating substantially as described.

Second, The combination with a steam chamber and steam jacket, arranged as described, of the pipes, B F, and cocks, C f, arranged and operating as described.

Third, The combination with a feather-dressing machine, constructed as described, of a fan arrangement, and operating in the manner set forth.

990.—Henry Pennie, of Brooklyn, N. Y., for an Improvement in Roller Skates:

I claim a roller skate provided with two rows of tubular adjustable rollers, and the whole constructed and operating as shown and described.

[The object of this invention is to increase the rolling surface laterally without materially increasing the friction thereof, thereby giving the skate a firmer bearing than has been obtained by the employment of a single line of rollers, and enabling the beginner in the art of skating to balance himself and stand on the skates with perfect ease. It also has for its object a novel mode of applying two sets of rollers to the foot stand, whereby said rollers may be adjusted transversely, and brought nearer together or set farther apart, for increasing or diminishing the lateral bearing surfaces, according to the degree of proficiency which the wearer has attained in using the skates.]

991.—C. H. Perkins, of Providence, R. I., for an Improved Toe Calkin for Horseshoes:

I claim the improved toe calkin described, consisting of a steel piece, A, provided with one or more tapering steel spurs, b b, placed midway between the two extremities, or nearly so, for the purposes described.

992.—Alois Peteler, of New Brighton, N. Y., for an Improved Apparatus for Disinfecting Foul Air in Vessels:

I claim, first, The arrangement of a fan blower, B, or its equivalent, in combination with the refrigerating chamber, F, and tubes, C and H, passing through the deck, A, of a vessel or other closed space, substantially in the manner and for the purpose set forth.

Second, The arrangement of the rotary hollow shaft, E, with channels, e, apertures, g g', and drums, G, with abutments, h, in combination with the fan blower, B, or its equivalent, tubes, C and H, and with the refrigerating chamber, F, constructed and operating in the manner and for the purpose described.

993.—Thomas Phillips, of Ann Arbor, Mich., for an Improved Handle for Hammers, &c.:

I claim dividing the handle into two parts, and applying a spring (either lever or spiral) in such a manner as to spread the two parts of the handle apart, allowing them to spring together, and vice versa, when a blow is struck, and the surrounding of the whole with some pliable or springy substance, as india-rubber, the whole being arranged as described for the purposes specified.

994.—Abraham Quinn, of New York City, for an Improvement in Apparatuses for Distilling Oils:

I claim the rectifier, composed of the inverted siphon, E F, with its faucets and other appendages, substantially as described, applied in combination with the still and condenser, in such a manner as to be capable of effecting the several operations and purposes set forth.

995.—G. P. Reed, of Roxbury, Mass., for an Improved Watch Escapement:

I claim so applying the lever, in combination with chronometer escapement, that the whole impulse given to the balance in one direction is transmitted through the lever, and the whose impulse in the opposite direction is transmitted directly to the "chronometer impulse pallet," substantially as described, locking and unlocking the scape wheel but once at each and every impulse given by said wheel.

996.—M. T. Ridout, of Milwaukie, Wis., for an Improved Railroad Indicator:

I claim described combination and arrangement of reversible dial plate and hand, with its actuating mechanism, substantially as set forth.

997.—Horatio Rodd, of Chestnut Hill, Pa., for an Improved Linen Smoother:

I claim the combination and arrangement of the frame, a a a a, cross bars with springs, B B, the bed, C C, the roller, D, the bars, E E, the drums, F F, and the bands, G G, substantially as and for the purpose specified.

998.—Benj. Russell, of Brooklyn, N. Y., for an Improved Door Bolt:

I claim the arrangement of the sliding button, C, with the locking pin, e', and inclined plane, d, in combination with the drop catch, D, and ratchet teeth, e, on the edge of the bolt, A, constructed and operating in the manner and for the purpose specified.

[This invention consists in arranging the button which serves for sliding the bolt in and out in such relation to a drop catch, which, by entering into ratchet teeth on the edge of the bolt, retains the same in any desired position, that, by pushing in said button, the drop catch is made to release the serrated edge of the bolt, thus allowing the latter to slide freely in either direction, and that by turning said button after the bolt has been pushed out, it, together with the bolt, is firmly locked.]

999.—E. B. Savage, of Cromwell, Conn., for an Improved Mode of Attaching Gun Stocks to Pistols:

I claim the lever-like and longitudinally-moving hooked clamping dog, C, and its set screw, D, applied in connection with the lock frame of a pistol, to operate in combination with suitable locking devices on the neck piece of the stock, substantially as and for the purpose specified.

[This invention consists in an improved mode of applying and operating a clamping dog arranged within the lock frame of the pistol, in combination with suitable holding devices on the neck piece of the stock and in or on the lock frame, whereby a very firm attachment of the gun stock is made and facility for discharging it is provided.]

1,000.—I. D. Seely, of Milford, N. Y., for an Improvement in Water Wheels:

I claim the stop or cut-off, E, in connection with the buckets, a', cylinder, C, and chute, F, arranged relatively with each other for joint operation as described.

[This invention relates to an improved water wheel of that class in which it is designed to obtain power from both the direct and reacting force of the water; or, in other words, by impact and reaction. The object of the invention is to obtain a very simple wheel of the kind specified; one that may be economically constructed, and will give a large percentage of the power of the water employed to operate it.]

1,001.—O. W. Seely, of Albany, N. Y., for an Improvement in the Construction of Salt Kettles:

I claim the combination of the central arch, B, containing the fire grate, with the two inverted arches at b b, to form the bottom part of the boiler in the shape represented and described, and for the purpose set forth.

1,002.—Porter Seward, of Chaseville, N. Y., for an Improvement in Wagon Brakes:

I claim the arrangement of the crank, G, pulley, e, chain, f, and adjustable rod, H, with the draft pole, F, lever, I, spring, K, brake bars, J J, rods, g g, and pivoted rubbing blocks, n n, all in the manner and for the purposes shown and described.

[The object of this invention is to so combine the brakes with the pole of the wagon that when the driver checks the horses, the brakes will be automatically applied, and when the horses are started the brakes will be released from the wheels.]

1,003.—H. L. Shaw, of Milan, Ohio, for an Improvement in Sewing Machines:

I claim the special arrangement of the slider, O, operated as shown, with its pins, P and Q, for the purpose of operating therewith either the looper shown in Fig. 4 or that shown in Fig. 5, to make a single or a double chain stitch, in the manner substantially as described.

1,004.—W. H. Short, of Brooklyn, N. Y., for an Improved Inlet for Sewers:

I claim the cast iron basin head, formed of the trap box, D, the mud sill, E, and arched curb, G, constructed and combined in the manner substantially as described for the purposes set forth.

1,005.—D. E. Somes, of Biddeford, Maine, for an Improvement in the Method of Preserving Meat:

I claim the described mode of curing meats, &c., by cutting off side currents of air and introducing into the building a cooler, a drier and a purer air than that near the surface of the earth, substantially as and for the purpose specified.

1,006.—J. A. Spear, Jr. (assignor to Wm. J. Kane), of Manchester, Pa., for an Improvement in Cultivators:

I claim the arrangement of the draft beam, a, second beam, e, scraper, d, and slots, 1 2 3 and x, when constructed substantially as described, for the purpose set forth.

1,007.—David Stewart, of Annapolis, Md., for an Improvement in Coffee Pots:

I claim combining such a biggin with a chamber of decoction and chamber of condensation, in which the water of condensation is returned to the magma in the manner set forth.

1,008.—J. I. Storer, of Philadelphia, Pa., for an Improvement in Desulphurizing Coal and Ores:

I claim the employment, in the manner specified, of ammonia in connection with steam in the process of desulphurizing coals and ores.

1,009.—C. F. Taylor, of New York City, for an Improvement in Apparatuses for Reducing Spinal Curvatures:

I claim, first, The combination of the bench, 1, adjustable supports, 3, and adjustable pad or strap, 4, substantially as described, and in such a manner as to accomplish the purpose set forth.

Second, The head rest represented in Fig. 4, constructed as described, by which the weight of the head is made to exert a pressure upon one shoulder and a lifting force under the other, substantially as described.

1,010.—C. F. Taylor, of New York City, for an Improvement in Apparatuses for Reducing Spinal Curvatures:

I claim, first, The combination of the posts, 1 and 6, with their adjustable supports, 8 and 2, one being hinged to the floor to allow of lateral adjustment, and the other either hinged to the floor or stationary, as may be desirtd; the whole being constructed, combined and arranged substantially as set forth.

Second, The combination with the two posts, 1 and 6, and their adjustable supports, 8 and 2, above referred to, of a third post, 16, constructed in a similar manner to the first two and hinged at the bottom, as and for the purpose set forth.

1,011.—C. F. Taylor, of New York City, for an Improvement in Apparatus for Reducing Spinal Curvature:

I claim the combination of the vibrating upright or support, 2, pad, 6, and handles, 7 and 8, substantially as described for the purpose set forth.

1,012.—W. R. Thomas and M. Emanuel, Jr., of Catasauqua, Pa., for an Improvement in Composition for Blasting Powder:

We claim the composition or blasting powder made of nitrate of soda, flower of sulphur, ground bark, and water, in the proportions and manner set forth.

[This invention consists in the employment of a composition made of nitrate of soda or Chili saltpeter, mixed with sulphur and ground bark, for blasting purposes.]

1,013.—G. B. Turner and J. A. Vaughn, of Cuyahoga Falls, Ohio, for an Improvement in Grain Separators:

We claim the combination of the series of screens inclined in one direction and the series of directing boards inclined in an opposite direction, with the receiving boxes and fan blast, and a shake motion, substantially as and for the purpose set forth.

We also claim a device for giving a rapid shake motion to the riddles or screens, without jarring them, an eccentric and yoke, constructed, arranged and operating as described and represented.

1,014.—T. G. Voorhis and W. B. Whiteman, of New York City, for an Improved Mosquito Net:

We claim the combination of the cam catch, D, with the jointed frame and netting, as described and for the purpose set forth.

1,015.—S. H. Walker and M. C. Walker, of Boston, Mass., for an Improvement in Gas Retorts:

We claim a horizontal retort formed with a flat bottom and cylindrical flanged ends, and tapering gradually in size from the center toward each end, in the manner shown and described, and for the purposes explained.

[This improvement is more particularly designed for retorts for generating gas from melted rosin or other hydrocarbons which are in a naturally liquid state or become liquefied by heat. Its object is to obtain a more equal distribution of heat throughout the whole length of the retort, and to this end it consists in making the retort of larger caliber and with greater generating surface at the middle of its length or decreasing in caliber from the middle toward either or both ends.]

1,016.—G. R. Wilmot, of West Meriden, Conn., for an Improved Head for Screws and Tacks:

I claim the screw or tack described, as a new article of manufacture when constructed in the manner described and involving the features of advantage and novelty set forth.

1,017.—J. S. Winson, of Providence, R. I., for an Improvement in Machines for Tentering and Drying Cloth:

I claim a machine for tentering textile fabrics, constructed substantially as described, combined with and traveling in a hollow ve[r]shaft, through which a continuous current of heated air is p[a]substantially as described.

1,018.—S. E. Woodworth, of Murphy's, Cal., for an Improved Amalgamator:

I claim an airtight vessel, A, partially filled with mercu[r]bination with two concentric tubes, B E, and table, C, all co[n]as and for the purposes described.

1,019.—Theodore Burr, of Battle Creek, Mich, assign[or] himself, Augustus Rower, and Parcel Brinkerhoff, Michigan, for an Improvement in Sewing Machines:

I claim the combination of the cam, G, the levers, H and I, operating upon the horizontal shaft, K, having forked prongs, d d and b b, and spiral twist, and the fork, a, as described and for the purpose set forth.

And also the cog or spur, F, in combination with the shaft, E, provided with feathers, R R, and hook fork, P, operated upon by spring, o, substantially as and for the purpose set forth.

1,020.—J. A. De Brame (assignor to himself and Benjamin Gurney), of New York City, for an Improvement in Skates:

I claim, first, The hook or hooks, a, turned backward, as shown and described in Fig. 1 of the drawings, in combination with the heel spur or spurs, c, fitting loosely into a hole made in the heel of the boot, for the purpose of retaining the hook, a, in its plate, as set forth.

Second, Combining with the hook, a, and heel spur, c, the spring latch, d e, when the latter is arranged on the back part of the heel of the boot and catches into a recess in said heel, as set forth.

1,021.—John Fowler, Jr., of Leeds, England, assignor to W. P. Tatham, of Philadelphia, Pa., for an Improvement in Machinery for Plowing and Tilling Land. Patented in England Sept. 8, 1856:

I claim combining the pulley on the anchor carriage which receives motion from the engine by the pulling of the plows or other implements, with the drum that operates the anchor rope, by means of the intermediate mechanism described, or any equivalent therefor, as described and for the purpose set forth.

1,022.—John Fowler, Jr., of Leeds, England, assignor to W. P. Tatham, of Philadelphia. Pa., for an Improvement in Machinery for Plowing and Tilling Land by Steam. Patented in England Sept. 8, 1856:

I claim combining with the central pair of sustaining wheels and with the frame which carries the two gangs of plows or other tilling instruments, a steering apparatus, substantially as described.

1,023.—John Fowler, Jr., and David Greig, of Leeds, England, assignors to W. P. Tatham, of Philadelphia, Pa., for an Improvement in Machinery for Plowing and Tilling Land. Patented in England Feb. 28, 1856:

We claim mounting two gangs of plows or other tilling instruments in suitable framework, and connecting them with a pair of sustaining and gaging wheels interposed between the two gangs, substantially as described, when this is combined with the pulling ropes or chains and suitable means of attachment thereto, substantially as described, so that by the operation of an engine on one side of a field and suitable anchoring apparatus at the other side, the said instruments can be drawn across the field alternately in opposite directions, as described.

And we also claim mounting the frame which carries the two opposite gangs of instruments on a central axis, so that it may be tilted thereon, substantially as described, in combination with the mode of connecting the ropes or chains with the said tilting frame, or the equivalent thereof, on opposite sides of the axis of vibration, as described, so that by reversing the pull on the ropes, the frame shall be tilted to lift one gang out of action at the end of each course, and draw down into action the other gang for the return course, as set forth.

1,024.—B. F. Hooper, of Birmingham, Conn., assignor to E. N. Baldwin, of Huntington, Conn., for an Improved Machine for Making Braces for Carriage Tops:

I claim the clamping dies in combination with the swaging or shaping dies working in succession, substantially as described, for the purpose set forth.

1,025.—C. L. Johnston, of Little Falls, N. Y., assignor to A. M. Colver, of Albion, Mich., for an Improvement in Rotary Pumps:

I claim the pistons, H H, passing through the cylinder, I, and revolving around a center, G, in the manner specified, when said pistons, H H, are formed thinner in the middle, and with the curved sides, for the purposes and as specified.

1,026.—G. W. Martin, of Morrisania, N. Y., assignor to himself and William Sheppard, of Tremont, N. Y., for an Improvement in Pumps:

I claim the pipes, b and c, valves, n and o, arranged as specified, in combination with the air vessel, d and piston, e, for the purposes and as set forth.

And, in combination therewith, I claim the arrangement of the deflectors, l and m, in the reservoir, h, for the purposes specified.

1,027.—A. C. Mason (assignor to himself, H. H. Mason and D. M. Smith), of Springfield, Vt., for an Improvement in Hooks and Eyes:

I claim the forming of the snaps or spring guards, c, with bent ends, d, which extend into openings, e, in the hooks at the back of the bills, substantially as and for the purpose set forth.

1,028.—J. H. Merrill (assignor to the Merrill Patent Fire-arm Manufacturing Company), of Baltimore, Md., for an Improvement in Breech-loading Fire-arms:

I claim the combination of the shoulders upon the levers and upon the casing of the gun, to take the recoil of the breech plug upon, instead of allowing it to come entirely upon the pivots, and for security against the springing up of the lever, substantially as described.

1,029.—J. H. Merrill (assignor to the Merrill Patent Fire-arm Manufacturing Company), of Baltimore Md., for an Improvement in Breech-loading Fire-arms:

I claim, first, In combination with the lever by which the breech is opened and closed, a projection upon or over which the hammer rests when down upon the nipple, to prevent said lever from rising or opening the breech accidentally, substantially as described.

Second, I also claim, in combination with the lever by which the breech of the gun is opened and closed, a projection which extends under the cap when on the nipple, so that the raising of said lever preparatory to recharging the gun shall throw off the exploded cap and leave the nipple free for a fresh cap, substantially as described.

1,030.—Langdon Sawyer., of Springfield. Vt., assignor to himself, and A. M. Billings, of Wethersfield, Vt., for an Improved Shade or Curtain Roller:

I claim making the rod or roller, G, so that it can be extended or contracted longitudinally, when the same is combined with the other fixtures, for operating the shade or netting, substantially as and for the purposes described.

[The object of this invention is to so construct the bar under which the netting or shade passes from a spring roller which winds up the netting or shade, as the case may be, that the whole fixture may be applied to window frames varying in widths, and secured therein with very little labor, without employing the usual fixtures which are secured to the window casing and mutilate it. The nature of the invention consists in making said rod under which the netting or shade passes, adjustable longitudinally, and in securing to the ends of this rod the plates or brackets on which the spring roller has its bearings, whereby the roller and bearing plates may be thus extended and thus adapted to, and secured within any ordinary window frame in a substantial manner.]

1,031.—J. O. Whitcomb (assignor to himself and Joseph Dodin), of New York City, for an Improvement in Hemmers for Hand Sewing:

I claim, first, The plate, A, with its rest, e, tongue, c, and thumb strap, B, for holding the folder, C, and supporting the fabric while the hem is folded, substantially as described.

Second, Providing an opening, i i, in the scroll of the folder for the admission of the end of the thumb, substantially as and for the purpose specified.

—Hunter Davidson, of the United States Navy, for Improved Hook for Attaching and Detaching Boats their Davits:

catch, C, the strap, S, and the particular form of hook as it to be fitted to the boat's stem or stern post, so as to with their usual outlines; the whole combined and arscribed.

RE-ISSUE.

N. Wyckoff, of Brooklyn, N. Y., and T. M. Fell, of elville Mines, Va., for an Improvement in Gold Amalgamators. Patented July 26, 1859:

e claim the process of separating gold or silver from other subances by mixing the whole with water, confining it together with mercury within suitable containing vessels, and there by the action of heat commingling the mercury throughout the entire body of water and substances containing the precious metals, substantially as set forth.

[The nature of this invention consists in a process by which the metals gold and silver can be more economically and effectually separated from their ores or the earthy matter in which they are found than has yet been done.]

DESIGNS.

Charles Prosbt, of Hudson City, N. J., for a Design for Window Glass.

W. W. Stanard (assignor to Jewett & Root), of Buffalo, N. Y., for a Design for Stoves (3 cases).

Notes and Queries

J. W., of N. Y.—Good copal varnish is the best known to us for coating the seams of tin buckets used for carrying maple sap, to prevent them from rusting. The varnish, after being applied, should be dried in a warm place, such as an oven heated to a temperature of boiling water. Put it on in two or three successive coats, and dry each time.

F. H. A., of Mass.—It would require volumes of our paper to enumerate all the "wants of the world in the way of chemical processes and manufactures." Any improvement in dyeing, tanning, sugar making, or any of the chemical arts; in the process of making paints, cements, bread, beer, wine, cider, and thousands of other articles, the world is ready to pay for it as soon as it is produced. The field is boundless.

H. R. S., of Pa.—No. 2 of your minerals is red hematite, a good iron ore. No. 1 is magnesian limestone in process of disintegration. The little crystals in it are quartz.

E. R. R., of Ill.—The characters on the slab are merely accidental; similar ones are quite common on mica.

U. B. D., of Mass.—Your idea about the employment of fusible metal in air engines is not new. You will find that it has been used for this purpose by reading page 217 of the present volume of the SCIENTIFIC AMERICAN.

U. B., of Pa.—The boiler feeder to which you refer as having seen at Chester is Giffard's injector. You will find it illustrated and described on page 260, Vol. II. (new series), of the SCIENTIFIC AMERICAN.

W. N., Jr., of Mass.—The silver soap to which you refer has been patented. Sand mixed with soap is not a patentable feature, as some soaps are now made in which there is a mixture of ground pumice stone.

M. M., of Mo.—Lard oil is not an artificial mixture; it is obtained from lard by submitting it to severe pressure in presses constructed for this purpose. You will find the process fully described in Morfitt's work on soaps and candles. It requires a peculiar apparatus to manufacture it.

E. W., of N. Y.—For a complete equation of time several circumstances must be taken into account, such as the change in the earth's orbit, the precession of the equinoxes, &c.; but the most important of these, next to the elliptical form of its orbit, is the inclination of the earth's axis to the plane of its orbit.

C. S. P., of N. Y.—We have never seen an explanation of the twinkling of the stars that was at at all satisfactory.

P. H. W., of N. Y.—We also have observed that acorn-shaped rifle bullets make a smooth round hole in a target.

W. N. R., of Wis.—We should perhaps be better able to give the reason of water rising in your wells during a south wind, if we were familiar with the topography of the region.

J. S. M., of N. Y.—The yeast plant will produce fermentation in suitable liquor. If the fermentation is allowed to continue, it first turns starch into sugar, then the sugar into alcohol, and lastly the alcohol into vinegar.

J. P., of Ala.—We do not remember the particulars relating to the anesthetic effects of the oxyd of glycerine, but we consider it a very unsafe substance to tamper with.

A. H. S., of N. Y.—We have not seen a weighing device such as you describe, and we think a patent may be obtained for it.

A. H. P., of Iowa.—We are not aware that any machine has ever been constructed for punching metal, for the purpose you describe, although the work could undoubtedly be done by machinery provided the demand would warrant it.

T. D., of Pa.—We advise every person who wishes to purchase advertised machines, to examine them for himself and not trust altogether to to the opinions of others, as regards their qualities. There is no patent on the common mode of making enameled cloth. You will find a detailed description of the French process for making it on page 265, Vol. XIV. (old series), of the SCIENTIFIC AMERICAN.]

F. D. H., of Md.—Boil a strong solution of fustic and add a very minute quantity of the sulphate of copper and a little logwood, and apply it warm to the leather with a sponge; it makes a good dark olive-green color.

H. & V., of Ind.—The portable engine illustrated on page 408, Vol. I., present series, of the SCIENTIFIC AMERICAN, affords an answer to your inquiries respecting the advantages of securing the mechanism to a bed plate. You surely have not examined it carefully, or you would have perceived that the power is taken equally from both sides of the boiler, so as to prevent racking on one side.

Money Received

At the Scientific American Office on account of Patent Office business, for the week ending Saturday, April 13, 1861:—

S. E. A., of N. Y., $15; J. D. B., of N. Y., $15; E. B., of N. Y., $40; M. J. K., of N. Y., $15; J. N. D., of Iowa, $15; L. H. D., of Iowa, $15; G. B., of N. Y., $25; L. S. B., of N. Y., $25; S. M. S., of Iowa, $30; F. F., of N. Y., $15; S. F., of Ohio, $25; S. W., of Mass., $35; L. F. B., of N. H., $10; S. S. H., of N. Y., $40; T. C., of N. Y., $20; M. & L., of Conn., $15; L. A. B., of N. Y., $10; J. J. K., of Ill., $25; J. A. H., of Ind., $20; E. R. B., of Ill., $20; W. B., Jr., of N. Y., $100; F. C., of N. Y., $20; J. R., of N. Y., $20; G. W. S., of Maine, $20; I. P., Jr., of N. Y., $25; J. G. W., of N. Y., $40; G. G. C., of Mich., $15; E. G., of Mass., $12; H. L. B., of Conn., $25; J. T. S., of Wis., $100; A. B. C., of N. Y., $15; E. H., of Vt., $10; D. S., of Mass., $15; G. S. R., of Ill., $15; S. S. H., of Maine, $10; C. R., of Ill., $25; A. M., of Pa., $25; H. L. P., of Mich., $15; S. C. D., of Conn., $25; C. C., of Ind., $20; C. & P., of Ill., $10; M. L. P., of Ind., $15; W. C. F., of Maine, $15; H. W., of N. Y., $15; W. K., of N. Y., $20; B. D. H., of N. Y., $25; K. & T., of N. Y., $30; C. F., of N. Y., $30; H. Y., of N. Y., $40; N. C., of N. Y., $20; J. W. H., of N. J., $15; D. E. S., of Maine, $15; F. G. L., of Iowa, $15; J. H., of N. Y., $15; C. R., of Vt., $15: N. L. A., of N. Y., $25; S. D. L., of Mass., $10; T. C. H., of N. Y., $15; C. & W., of Maine, $16; D. O. F., of Mass., $40; R. R., of N. Y., $15; J. L. A., of N. Y., $15; J. G., of N. Y., $15; L. O. W, of N. Y., $25; H. W., of N. Y., $15; G. W. D., of Ohio, $25; J. E. M., of Pa., $25; E. D. C., of Vt., $10; A. H. T., of N. J., $50; J. H., of N. J., $10; C. E. L. H., of Conn., $22; A. B. C., of N. Y., $15; J. R. R., of Mass., $40; J. H. F., of Ky., $50; W. W., of Cal., $25; A. E. K., of Pa., $25; P. H. S., of Cal., $106; W. C. & J. D., of N. Y., $25; C. H. C., of Mass., $25; F. B. B., of N. Y., $25; R. W., of Vt., $25; J. A. W., of N. Y., $25; H. N., of N. Y., $25; E. W. G., of Mass., $25; L. F. L., of Cal., $20; J. K. P., of Mich., $15; S. P., of N. Y., $25; T. H., of Cal., $75; P. S. of N. Y., $25; C. W. S., of Maine, $15; A. C. K., of N. Y., $28; I. W. H., of N. J.

Specifications, drawings and models belonging to parties with the following initials have been forwarded to the Patent Office during the week ending April 13, 1861:—

K. & T., of N. Y.; G. B., of N. Y.; W. & F., of Tenn.; E. H., of Vt.; F. W. L., of N. Y.; C. R., of Ill.; C. W. C., of N. Y.; N. C., of N. Y.; B. D. N., of N. Y.; C. & P., of Ill.; L. A. B., of N. Y.; J. S. McC., of N. Y.; J. H., of N. Y.; S. D. L., of Mass.; G. & S., of Ohio; L. S. B., of N. Y.; I. P., Jr., of N. Y.; S. F., of Ohio; A. M., of Pa.; S. C. D., of Conn.; J. J. K., of Ill.; J. E. M., of Pa.; J. J. H., of Ky.; C. E. L. H., of Conn.; E. G., of Mass.; H. L. B., of Conn.; C. F., of N. Y.; H. Y., of N. Y.; R. R., of N. Y.; J. R. M., of Texas; P. C., of N. Y.; H. W., of N. Y.; C. C., of Ind.; G. R. B., of Ill.; G. W. T., of N. Y.; W. C. & J. D., of N. Y.; A. H. T., of N. J. (2 cases); R. W. of Vt.; P. A. M., of France; S. P., of N. Y.; J. A. W., of N. Y.; W. W., of Cal.; A. E. K., of Pa.; A. C. K., of N. Y.; I. W. H., of N. J.

New Books and Periodicals Received.

THE BIBLIOTHECA SACRA. Published by Warren & Draper, Andover, Mass.

The number of this most able theological review for the present quarter contains a profound article by the Rev. James McLane, D.D., of Brooklyn, on "Geology and the Bible." It is one of seven essays by different learned authors on as many subjects.

THE TRIUMPHS OF INVENTION AND DISCOVERY. By J. Hamilton Fyfe, published by Nelson & Sons, London, Edinburgh and New York.

This is a very neatly printed and illustrated volume, containing short biographies of the great European inventors of modern times, justly commencing with Coster and Guttenberg, the inventors of printing with single movable types. The histories of printing; the steam engine; the iron manufacture; the electric telegraph; the cotton manufacture, &c., are given briefly and written well; but Mr. Fyfe does not seem to be acquainted with American inventions, which is a great loss to himself and his countrymen.

Foreign Chemical Color Patents.

The following are condensed descriptions of several patents lately taken out in England, connected with the chemical art of manufacturing and applying colors:—

Purples from Coal Tar Products.—R. Smith, a well known chemist, has obtained beautiful colors, not only from aniline, but other bases found in coal tar. He takes a saturated solution of aniline, toluidine, xylidine, cumidine, or either of them in water, and adds a solution of chlorine in water. The proportions are from 1 to 3 equivalents of chlorine to one equivalent of the bases. The mixture is allowed to stand for twelve hours, when a black precipitate is found at the bottom of the vessel. This is washed with water, then mixed with a solution containing about five per cent of soda. In about two hours the solution is filtered. The precipitate is now boiled until the coloring matter is dissolved, when it is filtered, and a small quantity of the chloride of calcium added. This separates the coloring substance, which is collected in a filter, and washed well with cold water. The coloring matter is now dried, and may be afterward dissolved in alcohol, or wood spirit, and is then ready for dyeing or printing. The color so obtained is a bright purple, similar to that called *mauve*, which is obtained from aniline by mixing it with manganates, or the bichromate of potash.

Coloring and Gilding Leather and other Fabrics.—A patent has been secured by R. A. Brooman (being a communication from abroad) for an improvement in printing in relief, and in color, and in gold or silver. The material or fabric to be ornamented or colored is passed between a pair of rollers, one of which is metal, and has the desired pattern sunk or cut out on it, while the other roller is the counterpart, and is formed of gutta-percha or hard paper, with the pattern in relief. For printing with one color only, a distributing roller is placed in contact with the relief roller, and as it revolves, the color is supplied to its surface. For printing in several colors, the inventor uses what he terms "cliche" rollers of gutta-percha, which have their surfaces in relief. The fabric is passed through in a piece as in calico printing, and the pattern is printed in color, and embossed at one continuous operation. When portions of the pattern are to be gilded, the rollers print sizes or mucilage on the parts, and when the fabric passes through, the gilding is applied in powder dusted upon it. This adheres to the prepared surface, and when dried it may be run between pressure rollers to smooth it down.

Panphiteic Acid—New Color Agent.—H. Johnson has obtained a patent (communicated from abroad) of a peculiar new coloring matter obtained from several plants and vegetables. When vegetables are treated with steam, or boiling alkaline water, a coloring substance is extracted from them, and precipitated. This is placed in a stoneware vessel, mixed with nitric acid, and evaporated. The residuum thus obtained contains panphiteic acid, and it is now placed in distilled water, and washed. Resins, gums, wax, and all vegetable exudations may be converted into panphiteic acid, by first dissolving them in alcohol, ammonia, or bisulphuret of carbon, then submitting such solutions to the action of strong nitric acid; or the wax, &c., may be first treated with nitric acid, and secondly, with the alcohol or other solvent. Panphiteic acid produces a yellow dye, and by mixing it with the prussiate of potash, it imparts a light green color to silks and woolens, by simply dipping them into a solution of it. Panphiteic acid, obtained from catechue, can be employed for dyeing shades of olive green on cotton, by preparing the fabric first in a bath containing a solution of nitrate of iron.

Purple-blue Color.—Mr. Johnson has also obtained a patent for a new purple-blue color, derived from indigo, and designed for dyeing and printing on textile fabrics. Take, say 20 lbs., of anhydrous bisulphate of soda, and heat it until it becomes fused. In this condition, about one pound of pulverized indigo is added to it gradually, and the mixture constantly stirred to prevent it from sticking to the bottom of the vessel, which may be a cast iron kettle. The mass now swells, and becomes very dark in color, and disengages a great deal of gas. By taking a little of it out occasionally upon a glass rod, and stirring it among some clear water in a glass tumbler, the progress of the operation is tested; as soon as it colors the water a violet red, no more indigo should be added. The mixture should now be of a pasty consistency. About 147 gallons of hot water are then placed in a cask, and the mixture poured into it and actively stirred; this precipitates the coloring matter, which is a beautiful purple-blue, of a peculiar and brilliant color.

FISHER'S CARRIAGE WHEEL.

The improvement here illustrated has received the commendation of persons familiar with the art of carriage making, and promises to be extensively introduced. In the description, similar letters represent corresponding parts in both figures.

The wheels, D, are composed of several metallic truss felloes, *f*, the tire, *t*, tubular spokes, *s s*, with the binding rods, *c*, the hub, H, and its enclosing cap, C. The axle is composed of two spindles *s' s''*, and the shell or tube, B. The hub, H, is cast of brass or other suitable material in form of a cup or hollow cylinder, and has a stem in its center as seen in Fig. 2, with a square taper hole in it, to which the shank of the spindle, *s*, is fitted; being secured thereto by the nut, *h*, outside. The felloes represented by the several letters, *f*, are made in skeleton form, as seen in Fig. 1 and in segments, each being of a length corresponding with two of the spaces between the spokes, so as to receive one spoke in the middle, the felloes having a rim nearly as wide as the tire with a web, *w*, in the middle, extending from one spoke to another. The holes in the felloes which receive the outer ends of the spokes, *s*, are contracted so as to form the shoulder, *i*, seen in Fig. 2, against which the ends of the spoke rest.

The binding rods, *c*, are provided with a center sunk head *c'*. The tire is drilled to match the spoke holes in the felloes, and the rods, *c*, are put in through the tire, *t*, the hollow spokes, *s*, and the rim of the hub, H; receiving the nuts, *g*, on the inside of

Fig. 1

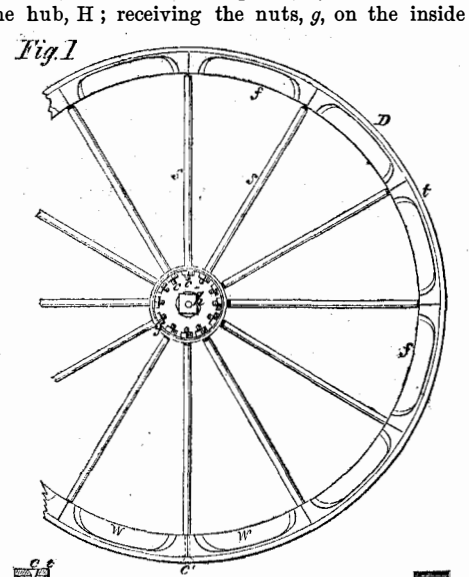
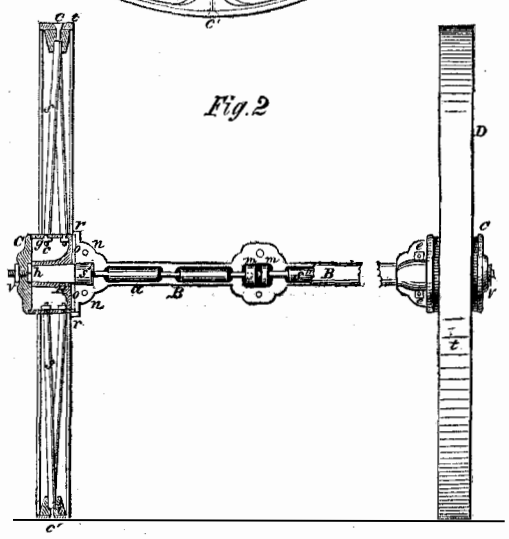


Fig. 2



the hub; by means of which arrangement the several parts are drawn together securely, and then the open end of the hub is closed by the ornamental cap, C, which is securely attached by the nut, *v*. The spokes, *s*, should be connected alternately with the outer and inner end of the hub as shown in Fig. 2. The tube of the axle, B, is made in two parts with recesses, *a a a*, for the lubricating material. It is provided with flanges, *n*, in the center and at each end, through which the bolts, *e*, pass to secure the parts together. On each end of the tube is a rim, *r*, which encircles the inner end of the hub, H, to prevent sand, &c., from working in between the revolving parts. A washer, *o*, is placed between the end of the tube and the hub, for the purpose of diminishing the friction of these parts. The spindles, *s'* and *s''* are made alike except at the ends where they meet, where the point of *s''* enters the end of *s'*, as shown by the dotted lines. The end of each spindle is enlarged to prevent the wheel from spreading apart; the enlargement coming against the shoulder, *m*, of the tube. The reach and side braces for connecting the front and rear axle may be attached to the tube, B, by the bolts, *e*.

By the construction of this wheel it will be seen that it is both light and strong, and as it is made wholly of metal, if it is kept properly painted, it will be very enduring.

The patent for this invention was procured through the Scientific American Patent Agency, December 18, 1860, and further information in relation to it may be obtained by addressing the inventor, J. P. Fisher, Rochester, N. Y.

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