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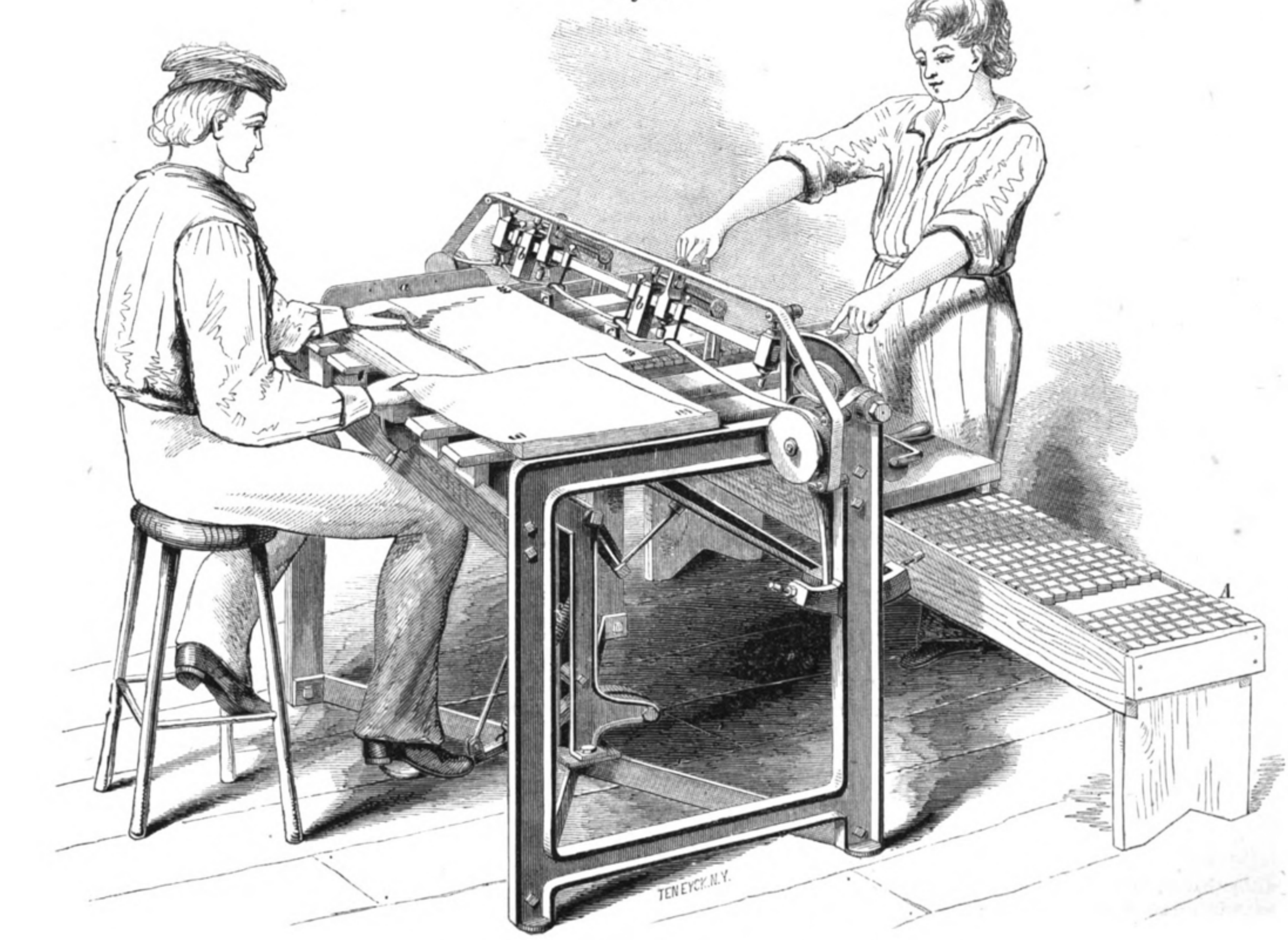
Improved Paging Machine.

The manufacturing of account books, as is well known, is an important and rapidly increasing branch of industry in this country, and, among the newly invented facilities introduced in the trade, this machine is considered the most important.

Fig. 1.



TOWN'S IMPROVED PAGING MACHINE.

Previous to the introduction of this invention, the only method of paging books known to the trade was by means of machinery adapted to the paging of books after binding. This process is necessarily slow and tedious, the work is less perfectly done, and the necessary handling of the books, after being finished, defaces and soils them, detracting more or less from their market value.

By noticing the operation of this machine, it will be readily seen that all these defects and difficulties are obviated by its use. The work being done as the next operation after ruling the paper, the machine counts the paper into books of the desired number of pages, so that the folder has only to fold the paper as it lies when taken from the machine, and he finds his books all "made up," correctly paged and ready for binding.

In addition to these advantages, the invento.s claim that this machine is capable of doing at least twice the amount of work in a given time that c n be done by the most expeditious of the other class of machines, while the execution of the work is grea'ly superior. The speed of this machine is limited only by the ability of the pager to handle the paper. Twenty-five to thirty reams of paper is considered an ordinary day's work for one of these machines when operated by a practical hand. Six reams have actually been paged in one hour.

The operation of the machine is extremely simple, as will be seen by the following description, with reference to the engravings.

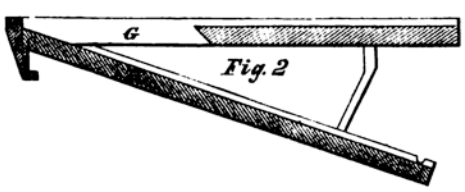


Fig. 2

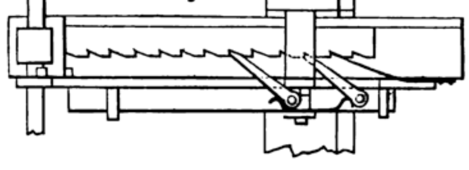


Fig. 3

Fig. 1 is a perspective view of the machine, showing the type form, A, with the type placed upon it, and ready for work. Fig. 2 is a vertical section of one of the bed pieces (the two being exactly alike) and discharging box, showing the course of the type as they work through the machine. Fig. 3 is a view of the slide and click which drive the type through the machine.

Operation.—Type of sufficient quantity to print the required number of pages are first placed upon the form, A, correctly arranged according to their numbers. The type are then inked by the assistant boy (who is called the feeder) with a common hand roller. The feeder then places them in the machine, one section after another, the sections being suitably numbered to designate their places on the form, so that No. 1 shall be the first placed in the machine, No. 2 second, and so on through the series.

When the first pair of type blocks are placed in the machine, so that the first numbers are under the stampers, *b b*, the pager, having a quantity of paper lying before him on the machine, takes up the first sheet and slides the edge under the stampers, *b b*, placing the head and side against the gages, *c c* and *a*. He then depresses the treadle, E, which brings down the stampers on the two upper corners of the sheet, printing the first two pages on the under side of the sheet. He then releases the treadle, and the action of the spring, *f*, returns it to its former position, and at the same time drives the type blocks forward, bringing the next numbers under the stampers by the action of the slides and clicks shown at Fig. 3. At the same time, also, the pager has seized the sheet of paper with his right hand and turned it over, and placed it against the gages as before, ready to receive the impression on the other side. When the second impression is made the sheet is laid off with the right hand while the left is placing the next sheet to the gages, and this operation is continued till the work is done.

As the type are driven through the machine, each section, as it comes to the proper position, drops through the slot, G, Fig. 2, in the bed-piece, and falls into the discharging box, H, and runs down to the back of the machine, where it is taken out by the feeder and replaced on the form to be inked and ready for the next book ; the feeder having sufficient time, while feeding the type to the machine, to take them out and replace and ink them, so that the pager can continue on from book to book without any interruption whatever.

This invention is secured by Letters Patent granted to Edward and Calvin E. Town, on the 5th of October, 1858. The machines are now in successful operation, and are considered indispensable articles in the principal blank book manufactories of this city and neighboring States.

Further information may be obtained of John R. Hoole, No. 124 Nassau-street, this city, who manufactures these machines for sale, and is prepared to fill all orders for machines or type from any part of the United States.

Absinthe Drunkenness.

We described this dangerous stimulant on page 377, Vol. III. (new series), of the Scientific American, and referred with some degree of alarm to its pernicious influence and effects upon men devoted to mental pursuits in France. The correspondent of the *World*, of this city, in a letter dated Paris, March 1, 1860, states that the frightful effects of absinthe drinking are now exciting a great deal of attention among the medical classes of France. He relates that in front of the *cafés* in the Boulevards, between three and five in the afternoon, hundreds of men may be seen sipping this villainous green liquor as an appetizer for dinner, and many of the women have also become habitual drinkers of it. It is used to an enormous extent in all the French colonies, and "statistics of importation show that immense quantities of it are sent to America." This liquor is stated to be as wonderfully seductive as it is dangerous, and many ladies of distinction have fallen victims to its use. It is said to be made by soaking wormwood, flag root, aniseed, angelica root and sweet marjoram in alcohol of very high proof for about eight days ; after which the mixture is distilled, and half an ounce of the essential oil of anise is then added to every three gallons of the liquor. This is essentially a very stimulating poisonous liquor, and Dr. Motet, of Paris, says that its frequent use terminates in insanity and death. The nervous system of a person addicted to it becomes disorganized, the knees tremble, the skin becomes the color of green coffee, the mucous membrane assumes a violet hue, the hair falls off and the man becomes prematurely old, with a diseased brain, which nothing can cure. We trust this terribly injurious poison may never be used by our people, but we are credibly informed that many of the French residents in several of our cities are much addicted to it.

New Process for Separating Gold.

The New York *World* of the 25th ult. states that a newly invented amalgamated process has been brought into use in California, and that it promises to be very successful in separating gold from the quartz. It describes the invention as consisting of cleaning copper plates with the cyanide of potassium instead of nitric, muriatic, and sulphuric acid. It also states that the cyanide purifies the mercury, and that copper plates being placed in it immediately become amalgamated. How such an invention for amalgamating the plates of a galvanic battery can be applicable to the recovery of gold is not stated. Gold cannot be separated from quartz by mercury without bringing the latter in a liquid condition into direct contact with the finely subdivided gold in the quartz. The person who furnished the paragraph for the *World* was wrongly informed regarding the nature of the invention.

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.

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

A lady who honors me by her presence at these lectures has conferred a still further obligation by sending me these two candles which are from Japan, and, I presume, are made of that substance to which I referred in a former lecture. You see that they are even far more highly ornamented than the French candles, and, I suppose, are candles of luxury, judging from their appearance. They have a remarkable peculiarity about them, namely, a hollow wick—that beautiful peculiarity which Argand introduced into the lamp and made so valuable. To those who receive such presents from the East, I may just say that this and such like materials gradually assume a change which gives them on the surface a dull and dead appearance; but they may be easily restored to their original beauty if the surface is rubbed with a clean cloth or silk handkerchief, so as to polish the little rugosity or roughness ; this will restore the beauty of the colors. I have so rubbed one of these candles, and you see the difference between it and the other which has not been polished, but which may be restored by the same process. Observe, also, that these molded candles from Japan are made more conical than the molded candles in this part of the world.

I told you, when we last met, a good deal about carbonic acid. We found by the lime water test that when the vapor from the top of the candle or lamp was received into bottles and tested by this solution of lime water (the composition of which I explained to you, and which you can make for yourselves), we had that white opacity which was in fact calcareous matter, like shells and corals, and many of the rocks and minerals in the earth. But I have not yet told you clearly and chemically the history of this substance, carbonic acid, as we have it from the candle, and I must now take you to that point. We have seen the products, and the nature of them, as they issue from the candle. We have traced the water to its elements, and now we have to see where are the elements of the carbonic acid supplied by the candle ; a few experiments will show this. You remember that when a candle burns badly, it burns with smoke ; but if it is burning well there is no smoke. And you know that the brightness of the candle is due to this smoke which becomes ignited. Here is an experiment to prove this: so long as the smoke remains in the flame of the candle and becomes ignited, it gives a beautiful light, and never appears to us in the forms of black particles. I will light some fuel which is extravagant in its burning ; this will serve our purpose —a little turpentine on a sponge. You see the smoke rising from it and floating into the air in large quantities, and remember now, the carbonic acid that we have from the candle is from such smoke as that. To make that evident to you, I will introduce this turpentine burning on the sponge into a flask, where I have plenty of oxygen, the rich part of the atmosphere, and you see that the smoke is all consumed. This is the first part of our experiment, and now what follows? The carbon which you saw flying off from the turpentine flame in the air we have now entirely burned in this oxygen, and we shall find that it will, by this rough and temporary experiment, give us exactly the same conclusion and results as we had from the combustion of the candle. The reason why I make the experiment in this manner is solely that I may cause the steps of our demonstration to be so simple that you can never for a moment lose the train of reasoning, if you only pay attention. All the carbon which is burned in oxygen, or air, comes out as carbonic acid, whilst those particles which are not so burned show you the second substance in the carbonic acid, namely, the carbon, that body which made the flame so bright whilst there was plenty of air, but which was thrown off in excess when there was not oxygen enough to burn it.

I have also to show you a little more distinctly the history of carbon and oxygen in their union to make carbonic acid. You have now a right to know this to a far greater extent than before, so I have three or four experiments for that purpose. I have here a jar filled with oxygen, and here is some carbon which has been placed in a crucible, for the purpose of being made red hot. I keep my jar dry, and venture to give you a result imperfect in some degree, in order that I may make the experiment brighter. I am about to put the oxygen and carbon together. That this is carbon (common charcoal pulverized) you will see by the way in which it burns in air [letting some of the red hot charcoal fall out of the crucible]. I am now about to burn it in oxygen gas, and look at the difference. It may appear to you at a distance as if it were burning with a flame ; but it is not so. Every little piece of charcoal is burning as a spark, and whilst it so burns it is producing carbonic acid. I specially want these two or three experiments to point out what I shall dwell upon more distinctly by and by—that carbon burns in this way and not as a flame.

Instead of taking many particles of carbon to burn I will take a rather large piece, which will enable you to see the form and size, and to trace the effects very decidedly. Here is the jar of oxygen, and here is the piece of charcoal, to which I have fastened a little piece of wood, which I can set fire to and so carry in the combustion, which I could not conveniently do without. You now see the charcoal burning, but not as a flame (or if there be a flame, it is the smallest possible one, which I know the cause of, namely, the formation of a little carbonic oxyd close upon the surface of the carbon). It goes on burning, you see, slowly producing carbonic acid by the union of this carbon or charcoal (they are equivalent terms) with the oxygen. I have here another piece of charcoal, a piece of bark, which has the quality of being blown to pieces—exploding—as it burns. By the effect of the heat, we shall reduce the lump of carbon into particles that will fly off; still every particle, equally with the whole mass, burns in this peculiar way—it burns as a coal and not like a flame. You observe a multitude of little combustions going on, but no flame. I do not know a finer experiment than this to show that carbon burns with a spark.

Here, then, is carbonic acid formed from its elements. It is produced at once, and if we examine it by lime water, you will see that we have the same substance which I have previously described to you. By putting together 6 parts of carbon by weight (whether it comes from the flame of a candle or from powdered charcoal) and 16 parts of oxygen by weight, we have 22 parts of carbonic acid ; and as we saw last time, the 22 parts of carbonic acid combined with 28 parts of lime, produce common carbonate of lime. If you were to examine an oyster shell and weigh the component parts, you would find that 50 parts would give 6 of carbon and 16 of oxygen combined with 28 of lime. However, I do not want to trouble you with these minutiæ ; it is only the general philosophy of the matter that we can now go into. See how finely the carbon is now dissolving away [pointing to the lump of charcoal burning quietly in the jar of oxygen]. You may say that the charcoal is actually dissolving in the air round about, and if that were perfectly pure charcoal, which we can easily prepare, there would be no residue whatever. When we have a perfectly cleansed and purified piece of carbon there is no ash left. The carbon burns as a solid, dense body, that heat alone cannot change as to its solidity, and yet it passes away into vapor that never condenses into solid or liquid under ordinary circumstances ; and what is more curious still is the fact that the oxygen does not change in its bulk by the solution of the carbon in it. Just as the bulk is at first, so is it at last, only it has become carbonic acid.

There is another experiment which I must give you before you are fully acquainted with the general nature of carbonic acid. Being a compound body, consisting of carbon and oxygen, carbonic acid is a body that we ought to be able to take asunder. And so we can. As we did with water so we can with carbonic acid—take the two parts asunder. The simplest and quickest way is to act upon the carbonic acid by a substance that can attract the oxygen from it and leave the carbon behind. You recollect that I took potassium and put it upon water or ice, and you saw that it could take the oxygen from the hydrogen. Now, suppose we do something of the same kind here with this carbonic acid. You know carbonic acid to be a heavy gas ; I will not test it with lime water, as that could interfere with our subsequent experiments, but I think the heaviness of the gas and the power of extinguishing flame will be sufficient for our purpose. I introduce a flame into the gas, and you will see whether it will put it out. You see the light is extinguished. Indeed, the gas may, perhaps, put out phosphorus, which you know has a pretty strong combustion. Here is a piece of phosphorus heated to a high degree. I introduce it into the gas, and you observe the light is put out, but it will take fire again in the air, because there it re-enters into combustion. Now let me take a piece of potassium, a substance which, even at common temperatures, can act upon carbonic acid, though not sufficiently for our present purpose, because it soon gets covered with a protecting coat; but if we warm it up to the burning point in air, as we have a fair right to do, and as we have done with phosphorus, you will see that it can burn in carbonic acid; and if it burns, it will burn by taking oxygen, so that you will see what is left behind. I am going, then, to burn this potassium in the carbonic acid as a proof of the existence of oxygen in the carbonic acid. [In the preliminary process of heating the potassium exploded.] Sometimes we get an awkward piece of potassium that explodes, or something like it, when it burns. I will take another piece, and now that it is heated I introduce it into the jar, and you can perceive that it burns in the carbonic acid—not so well as in the air, because the carbonic acid contains the oxygen combined, but it does burn and takes away the oxygen. If I now put this potassium into water, I find that besides the potash formed (which you need not trouble about) there is a quantity of carbon produced. I have here made the experiment in a very rough way, but I assure you that if I were to make it carefully, devoting a day to it, instead of five minutes, we should get all the proper amount of charcoal left in the spoon, or in the place where the potassium was burned, so that there could be no doubt as to the result. Here, then, is the carbon obtained from the carbonic acid, as a common black substance; so that you have the entire proof of the nature of carbonic acid as consisting of carbon and oxygen. So now, I may tell you that whenever carbon burns under common circumstances, it produces carbonic acid.

Suppose I take this piece of wood, and put it into a bottle with lime water. I might shake that lime water up with wood and the atmosphere as long as I pleased, it would still remain clear as you see it; but suppose I burn the piece of wood in the air of that bottle. You, of course, know I get water. Do I get carbonic acid? [The experiment was performed.] There it is you see, that is to say, the carbonate of lime, which results from carbonic acid, and that carbonic acid must be formed from the carbon which comes from the wood, from the candle, or any other thing. Indeed, you have, yourselves, frequently tried a very pretty experiment, by which you may see the carbon in wood. If you take a piece of wood and partly burn it, and then blow it out, you have carbon left. There are things that do not show carbon in this way. A candle does not so show it, but it contains carbon. Here, also, is a jar of coal gas, which produces carbonic acid abundantly—you do not see the carbon, but we can soon show it to you. I will light it, and as long as there is any gas in this cylinder it will go on burning. You see no carbon, but you see a flame, and because that is bright it will lead you to guess that there is carbon in the flame. But I will show it to you by another process. I have some of the same gas in another vessel, mixed with a body that will burn the hydrogen of the gas, but will not burn the carbon. I will light them with a burning taper, and you perceive the hydrogen is consumed, but not the carbon, which is left behind as a dense black smoke. I hope that by these three or four experiments you will learn to see when carbon is present, and understand what are the products of combustion, when gas or other bodies are thoroughly burned in the air.

Before we leave the subject of carbon, let us make a few experiments and remarks upon its wonderful condition, as respects ordinary combustion. I have shown you that the carbon in burning burns only as a solid body, and yet you perceive that after it is burned it ceases to be a solid. There are very few fuels that act like this. It is in fact only that great source of fuel, the carbonaceous series, the coals, charcoals, and woods, that can do it. I do not know that there is any other elementary substance besides carbon that burns with these conditions, and if it had not been so, what would happen to us? Suppose all fuel had been like iron which, when it burns, burns into a solid substance. We could not then have such a combustion as you have in this fireplace. Here, also, is another kind of fuel which burns very well—as well as, if not better than, carbon—so well, indeed, as to take fire of itself when it is in the air, as you see. [Breaking a tube full of lead pyrophorus.] This substance is lead, and you see how wonderfully combustible it is. It is very much divided, and is like a heap of coals in the fireplace; the air can get to its surface and inside, and so it burns. But why does it not burn in that way now when it is lying in a mass? [Emptying the contents of the tube in a heap on to a plate of iron.] Simply because the air cannot get to it. Though it can produce a great heat, the great heat which we want in our furnaces and under our boilers, still that which is produced cannot get away from the portion which remains unburned underneath, and that portion, therefore, is prevented from coming in contact with the atmosphere, and cannot be consumed. How different is that from carbon! Carbon burns just in the same way as this lead does, and so gives an intense fire in the furnace, or wherever you choose to burn it; but then the body produced by its combustion passes away, and the remaining carbon is left clear. I showed you how carbon went on dissolving in the oxygen, leaving no ash; whereas, here [pointing to the heap of pyrophorus] we have actually more ash than fuel, for it is heavier by the amount of the oxygen which has united with it. Thus, you see, the difference between carbon and lead or iron, if we chose iron, which gives so wonderful a result in our application of this fuel, either as light or heat. If when the carbon burnt here the product went off as a solid body, you would have had the room filled with an opaque substance, as in the case of the phosphorus; but when carbon burns, everything passes up into the atmosphere. It is in a fixed, almost unchangeable condition before the combustion; but afterwards it is in the form of gas, which it is very difficult (though we have succeeded) to produce in a solid or liquid state.

Ventilating and Salting Ships.

Great care has been taken of late years to ventilate ships with free openings between the decks and frames. Owing to the improved agencies adopted for the better ventilation of vessels, many shipbuilders have given up the old practice of salting the timbers. They have supposed that ventilation obviated the necessity of using salt to prevent rot; but this, according to the *Commercial Bulletin* of Boston, appears to have been a delusion. The editor of the *Bulletin* states that he has lately examined vessels comparatively new, which were greatly affected with dry rot; they were all well ventilated, but had not been salted. Nearly all the timbers of one of them, which had a frame of good white oak and was only four years old, were rotten from the turn of the planksheer. He says that, in conversation with the builder of one of these vessels, when asked his opinion as to the cause of the rot, stated he could assign no other reason than the absence of salt from the timbers. He had inspected and repaired several vessels during the past year which had been affected with the rot; none of them had been salted; but all were well ventilated. On the other hand, it was found that all the vessels of the same age, which had their timbers salted, were perfectly sound. The brig *Cronstadt*—30 years of age—is still perfectly sound in her timbers; she has been frequently salted. A number of other old vessels, having sound frames, were also examined at Boston, and it was stated that they had been salted frequently. The dry rot in the unsalted vessels referred to was chiefly found in those timbers above the line not frequently exposed to the action of salt water. It would therefore seem that, without the salting of ship timber, ventilation will not prevent dry rot in vessels. Shipbuilders universally should act upon this information and salt their timbers.

The engines of the first new British mail clad frigate, the *Warrior*, were put on board and fitted up by Messrs. John Penn & Sons, London, in six weeks after the vessel was launched. They are the largest engines ever put into a steamer, being 1,250 nominal horse-power, and capable of working up to about 6,000 horses.

Cincinnati Water Works.

When water can be conveniently obtained for cities by gravitation, it is the cheapest mode of supply, because water wheels and steam engines are not required for its distribution. It has been found more economical to convey water a distance of 50 miles by an aqueduct from an elevated situation than to pump it by a steam engine a distance of one mile, even where coals could be obtainted at $2 per tun. It is not every city or village, however, which is so favorably situated as to derive a sufficient supply of water from a natural elevation; hence, steam engines or water wheels must be used to pump it up from a low to a high situation, in artificial reservoirs, for general distribution.

In Philadelphia, water wheels are used for this purpose upon the low falls of the river Schuylkill, but in most of our cities steam power is employed for this purpose; and in such cases the very best engines should be employed. This is not always the case, we regret to state, as we learn by the late report of the trustees of the Cincinnati Water Works, that several steam engines of inferior construction are used in that city for pumping. The engineer—Mr. George Shield—states that the duty performed by these engines amounts to about 347,699 lbs., lifted 1 foot high, with 1 lb. of coal, or about one-half the average duty of Cornish pumping engines. Cleveland, Ohio, Louisville, Ky., Detroit, Mich., and Chicago, Ill., have all first-class Cornish engines for pumping water; and in this particular feature they should operate as a stimulant to the authorities of Cincinnati. We are surprised that, in the city which took the lead in introducing steam fire engines, there should be such delay in adopting the Cornish pumping engines.

Changes in the World's Highways.

A very interesting lecture was recently delivered in this city, by Dr. Solger, before the American Geographical and Statistical Society, in which he pointed out the causes which led to the rise and fall of certain cities in various ages as great marts of commerce. In reference to these, he said:—

> "We are now approaching another great change—the beginning of the Pacific civilization. The Valley of the Mississippi being between two great commercial links, that of the Atlantic and Pacific, is destined to become the great commercial center of the world."

He also expressed the belief that the seats of the ancient civilization of Asia and Western Europe would be reclaimed, and the commerce of Jaffa, Beyrout, Smyrna, as well as that of the north coast of Africa where old Carthage flourished, would be revived and increased a hundred-fold. The commerce of the Mediterranean had declined by the diversion of trade with India from thence around the Cape—a canal across Suez or communication by rail would revive it.

Great Improvement in Street Lanterns.

Degrand's lenses are attracting a great deal of attention in Paris. They produce the same effects on a much smaller scale, and at a comparatively trifling cost, as the famous lenses of Fresnel, which are generally used in lighthouses throughout the world. In ordinary street lamps, a large portion of the light is sent up overhead into the atmosphere where it does no good, and it is very plain that if this light could be reflected or bent down into a horizontal sheet, it would be utilized, and add much to the light of the streets. M. Degrand has found that thin lenses answer the purpose, and that these may be made cheaply by softening the glass by heat and pressing it in a mold. Careful experiments have shown that by the interposition of these lenses, the light of an ordinary lamp is increased more than fivefold—from 1 to 5.49.

Condensation of the Vapors of Zinc.—In the various modes of manufacturing zinc, there is nearly always considerable loss from the escape of the oxyd of zinc in the form of vapor. M. Dréner, of Liege, proposes, in *Génie Industrial*, a plan for preventing this loss. His plan is simply to pass the gases which escape from the furnaces through an alkaline solution, either potash, soda or ammonia, giving the preference to the ammoniacal waters from gas works. The solution may be allowed to drip over a tub full of coke, like the scrubber in gas-works, or it may be simply contained in a series of casks. In the latter case the gas would be forced through the liquid by means of an air-pump.

A Look Through the Great Telescope.

In a recent number we gave some account of Mr. Fitz's great telescope, and remarked that we might, on another occasion, say something of the most remarkable objects to be seen through it. The first thing for our inspection toward which Mr. Fitz turned the long tube was the great nebula in Orion, one of those distant clusters of stars that have been revealed by the telescope, and the study of which has led the minds of men to larger conceptions of the extent of the material universe than would have ever been possible without this study. This nebula is invisible to the naked eye, and even through Mr. Fits's monster tube it looks like a mere wisp of shining cloud—as a spectacle less brilliant and less impressive than an anthracite fire in a grate. But that brush of diamond dust is really a collection of countless myriads of blazing worlds. If there are any eyes like our own anywhere in that nebula, and if they are aided by instruments sufficiently powerful to penetrate the awful distance that separates us—then, all the stars that we see in the sky, all the innumerable host of suns that make up our own stellar system, will present an appearance similar to that which the great nebula in Orion presents to us.

It is probable that not even Sir William Herschel, nor Mädler, nor any other man ever formed an adequate idea of the distances of the nebulæ from us; still, the mere effort to do this, however imperfectly successful, has a powerful influence in enlarging our deas.

We have frequently thought that but one man ever fully realized the size of the United States; and that was the man who, in 1850 and 1851, went from Maine to California with an ox team. If it requires so much exertion to understand the meaning of 3000 miles, how utterly impossible must it be to form any conception of 192,000. And yet this is the distance through which a ray of light moves in a single second of time.

Directly in line between us and the great nebula in Orion are four stars, entirely invisible to the naked eye, and called, from the geometric figure which they form, the Trapezium. Now, since the ray of light which entered our eye from those stars started forth into space, children have been born, have slowly grown to manhood, have moved through the varied scenes of life, have passed to old age, and died; they have been succeeded by their children, their grand-children, their great-grand-children, through many generations; and still this ray of light was speeding ever onward in its straight track, till at last, at 20 minutes past 9 o'clock in the evening of March 1st, 1861, it darted through the great lenses of the telescope, and its long journey was ended. The more the mind dwells upon the subject the larger will be our ideas of the distance required for the passage of light through such length of time and with such velocity. And yet this distance is inconsiderable in comparison with that which separates us from the nebulæ. When the light by which we saw the great nebula in Orion had arrived at the Trapezium, or the outermost stars of our stellar system, its course was nearly completed. Its swift flight had continued through the growth and decay of empires. It started on its journey in ancient times—before the pyramids were built—probably long before the human race was created. Sir William Herschel estimated that some of the nebulæ which were faintly visible by the aid of his great reflector, were so remote that light, in coming from them to us, would occupy two millions of years.

The numbers of the stars in the system to which our sun belongs are beyond the power of computation, and those in some of the nebulæ are probably more numerous still. The numbers of the nebulæ themselves which we can see increase regularly with the power of our telescopes, and how many of these vast groups of stars there may be in the whole universe, no astronomer presumes to conjecture.

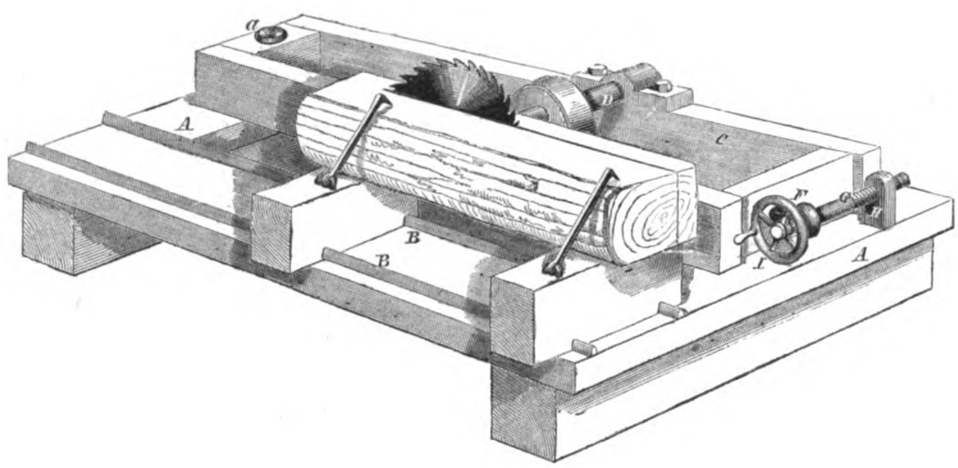
"When I consider Thy heavens, the work of Thy fingers, the moon and the stars which Thou hast ordained; what is man that Thou art mindful of him?"

Auld's Mode of Hanging Circular Saws.

In the illustration of this invention on page 168 of the present volume of the Scientific American, the teeth of the saw are represented as turned in the wrong direction, and we therefore present here a correct engraving. The object of the improvement is to make the saw adjustable, with its plane either parallel to the log carriage, or slightly inclined, so that the cutting edge of the saw may be turned at a small angle toward the log. In sawing thin boards the saw will run more easily if its cutting edge is inclined a little towards the log, so that it will touch the log in no other part; the board also being wedged off to keep it clear from contact with the side of the saw. But in sawing timbers or thick stuff, the saw must run in a plane parallel with the ways of the carriage. By this invention the saw is made readily adjustable in either of these positions.

The saw frame, C, is secured to the solid framing, A, by a pivot, *a*, at one end, while the other end is movable horizontally by means of a screw, G. This screw works in a smooth staple, F, secured to the frame, C, and by a thread in a staple, H, which is rigidly attached to the timbers, A. Thus, by turning the hand-wheel, L, the end of the frame, C, is moved horizontally, and thus the plane of the saw is brought into a position either parallel with the ways, B B, of the carriage or inclined at angle with them, at the will of the operator.

Further information in relation to this invention may be obtained by addressihg the patentees, W. H. Auld and R. C. Brown, at Fairfield, Iowa.



AULD & BROWN'S MODE OF HANGING CIRCULAR SAWS.

American and Cornwall Copper Mines.

The *Lake Superior Miner* publishes statistics of the yield of copper in the famous Cornwall mines and those of Lake Superior, in which it is shown that our copper products are fast coming up in extent to those of England. The product of the Cornwall mines for 1859 was 13,245 tuns of ingot copper; that of Lake Superior mines, 8,592 tuns. In 1846 only 29 tuns of American copper were raised; since that time it has rapidly risen, and in five years from the present date, judging from the past, it will amount to about 18,000 tuns per annum. American copper is said to be the purest in the world. The largest mass of native copper obtained thus far weighed 450 tuns. In the Lake Superior region there are numerous unmistakable evidences of the copper mines having been worked by an unknown race of people, but of whom no trace has been discovered in the form of graves or skeletons. Their implements for mining are found in many of the workings, and these show the ancient miners to have been adepts in tracing the metallic veins. Large forests are now growing over these ancient copper pits.

According to the last American census, it takes 750 paper mills and 2,000 steam engines to supply the book and newspaper publishers with paper at a cost of $27,000,000 per annum.

Horse Barbering.

Nature provides for the calorific protection of the horse's body, on the approach of winter, by causing the growth of a thicker and larger coating of fur. But our modern horse-dealers have discovered that this protection is a mistake, so far as active, working animals are concerned, and was only intended for horses of leisure, that have nothing to do but crunch their fodder and frisk about among the geese and hens of the country barn yard. It is alleged, and apparently with philosophical correctness, that a working horse, covered with Nature's winter greatcoat, will sweat more easily, and is therefore more liable to injury by cold, foundering, &c., than if its hair were shorter, because the heavy coat retains the perspiration moisture for a long time, and prevents proper drying off. Accordingly, the remedy is to clip the hair. This is a queer operation; and under the hands of an expert professor, the animal is "transmogrified" into "a horse of quite another color."

The clipping operation is commenced as soon as the winter hair is fairly grown. With a pair of slender scissors or shears, the barber carefully clips off the horse's covering as closely as the nature of the cutting instrument will allow. But even the nicest shearing would necessarily leave some hairs longer than others, and the skin will present a jagged, uneven appearance. The next process, therefore, is to singe the horse, so as to burn off all stray, protruding hairs, and secure a smooth, uniform surface. For this purpose a shallow oblong lamp is used, with a long nich tube, so as to produce a broad flame that will singe a considerable width of the hair at once. The lamp is filled with alcohol. The operator holds a piece of tin plate in one hand, with which he lifts the points of the hair; the lamp, carried in the other hand, is then carefully brought up to the plate, and the hair evenly burned off. In this way the entire body of the animal is carefully gone over until the hair is all singed down to an even thickness.

After this several blankets are piled upon the horse, and a profuse sweat is produced. He is then thoroughly scraped down with a steel blade, which removes all dirt from the skin, with the loose hairs and singed ends. Thus finished off, the animal presents a sleek and natural sort of appearance.

The whole operation requires three days' time of a good workman, and, at the end of the process, we would hardly know the animal by its color, so great is the change produced. A shiny black horse is changed to mouse color; and in all cases, the outer coat being removed, it is the short undergrowth hair that becomes only visible. The clipping operation, well done, costs $10. The horse thus treated of course requires heavier blanketing when standing in the stable; three thick blankets being usually employed. It is said that these clipped horses enjoy better health in winter, and will do more work, than if the above manipulations were not practiced.

Oxygen Illumination.—If pure oxygen could be obtained cheap for supplying gas jets or oil lamps, lights of fourfold the brilliancy to those which we now enjoy would be obtained for artificial illumination. In Paris oxygen gas is manufactured from manganese by Messrs. Rosseau & Brothers, chemists, for sale in small quantities, and is put up in india-rubber bags. It is employed for burning in lamps for giving a powerful light.

The sword of a swordfish was found sticking in the bottom of the steamship *Golden Age* when she was hauled up recently in Panama for repairs. The sword of bone was thirteen inches long, and it was driven through the copper and both the outer and inner planking. The fish stabbed the wrong customer for once; had it been a whale, all would have been quite right.

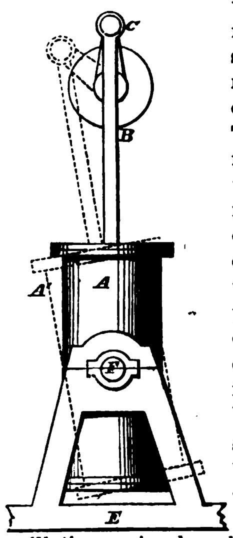
ROMANCE OF THE STEAM ENGINE.

ARTICLE XIX.

WILLIAM MURDOCK.

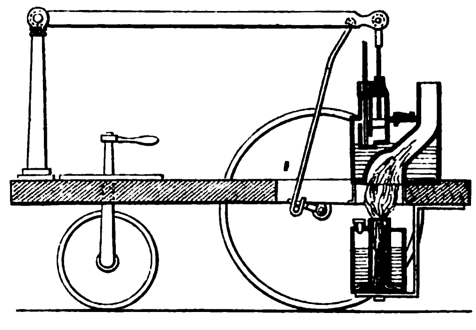
Among the many able mechanics and uncommon men whom James Watt had the faculty to attract to his employ, William Murdock, of Old Cumnock, in Ayrshire (Scotland), stood preëminent. Bred a millwright, and being an enthusiast in mechanics, when he heard that the manufacture of new and wonderful steam engines was undertaken by Bolton & Watt, he went to England, asked for a situation, and stated what he could and what he wished to do. He was at once employed at Soho in superintending the construction and erection of the engines, and was soon afterward sent to Cornwall, as the agent of the company, to superintend the erection and operation of the engines, and collect the revenue. For a number of years he had great difficulties to overcome, but he was ultimately successful, and gave great satisfaction to the mining interests as well as to his own employers. He directed the application of the new engines to drain the Cornish mines, and in order to adapt the engine to work the pumps and to establish a proper system for relieving the mines of great quantities of water, great skill in practical mechanics and much original genius were requisite. Murdock was found to be the "right man in the right place." Scarcely had all the most difficult obstacles for applying the engines been overcome, and numbers of the engines in most successful operation, to the delight and benefit of the proprietors, than they sought to deprive Bolton & Watt of the benefit of the agreement upon which they had entered with them. At first they approached Murdock with temptations respecting the *third* in the saving of fuel which he was entitled to collect as the revenue of his employers, and this not having the effect of corrupting his honest heart, they next tried menaces, and he was threatened with being thrown down some of the deep mines. The threats had as little effect upon him as the temptation of bribery; his bold nature defied opposition and rather courted danger. He was a man of herculean proportions and wonderful muscular powers, and, on one occasion, being in a room where quite a number of Cornish captains had met on business connected with the engines, they unitedly attempted to bully him into a compliance with their demands, when he quietly bolted the door and made an attack upon them so effectually that he was never afterward molested. The thrashing which he gave them gained him a far higher amount of respect from them than his honesty.

The oscillating steam engine is the invention of Murdock, and this alone is enough to immortalize his memory. In the accompanying figure, A represents the cylinder; B, the piston rod; C, the crank; E, the stand supporting the trunnion, F, which is the pivot on which the cylinder vibrates. The trunnion is hollow and formed like the key of a four-way cock, and it has a communication with both ends of the cylinder to admit and exhaust the steam. The dotted lines indicate the varying positions of the cylinder. The object of an oscillating cylinder is to afford a substitute, in the cylinder itself, for the beam, and thus reduce the engine to fewer parts and render it far more compact and less costly. It is only of recent years that the merits of the oscillating engine have been appreciated in a suitable manner. The largest American steamer—the *Adriatic*—is fitted with oscillating engines, and the paddle wheels of the *Great Eastern* are driven by two pairs, built by Scott Russell. Oscillating steam engines have become quite common. It is 62 years (1799) since the first one was built and put up at Soho.



THE FIRST LOCOMOTIVE.

The accompanying figure represents a small working model of a locomotive built by Murdock in 1784, taken from the specification of Watt's second patent. The boiler was of copper, and the flue passed obliquely through it, the heat being applied by a lamp. The cylinder was scarcely one inch in diameter; the stroke was two inches. The piston rod is shown connected to one end of a vibrating beam, to which is attached a connecting rod that operates the crank of the driving axle. The slide valve is a double cylindrical, and worked directly by the beam, which strikes the shoulders of the valve spindle; the exhaust steam passes through the hollow part of the spindle. A single wheel, in front, was set on a swivel, to guide the carriage on a common road. The



driving wheel was $4\frac{1}{2}$ inches in diameter. Notwithstanding the lilliputian size of this locomotive, it gave the inventor a great deal of trouble, one night, when he was living at Redruth, in Wales. He took it out to the door, lighted the lamp under the boiler, and set it down on the level sidewalk, about a mile long, which led to the village church. Off went the engine at a pretty smart pace, and off went huge William Murdock after it; when lo! he heard, at a short distance ahead, a voice uttering tones of the greatest tribulation, and who should this prove to be but the worthy parson of Redruth, who was on his way to the church. Having met with such a little, spitting, fiery, rushing creature, bearing down upon him, he came to the conclusion that it was certainly an imp of the infernal regions come to make a visible assault upon his fleshy tabernacle. The scene so amused Murdock that he could not help bursting into laughter, in which he was joined by the good-natured parson, who felt greatly relieved when he came to understand that he had met with an engine instead of the devil.

We cannot permit this opportunity to pass without relating that it is to William Murdock we are indebted for the first application of gas to the lighting of houses and cities. He was not the discoverer of illuminating gas, but he was the original inventor of its application to useful practical purposes. This was at Soho, in 1793, when he lighted up the works with it, upon an extensive scale, during a public illumination. From that night its use extended, and he soon afterward was engaged to apply it to several factories in Manchester and other places.

It is not a little remarkable that the world is indebted to two men who were born within thirty miles of one another for two of the most wonderful, useful, and universal inventions of modern times, viz., the improved steam engine and gas lighting. During the latter years of his life, Murdock was allowed a salary of about $5,000 annually by the Soho company, to enjoy in quiet retirement. He died in 1839, at the advanced age of 85 years. His remains were laid in Handsworth Church, near those of Bolton and Watt, whom he had served so long and so well. There is a fine portrait of him in the Hall of the Royal Society of Edinburgh, of which he was a fellow, and the celebrated Chantrey executed a bust of him in marble, which serves to perpetuate the remembrance of his manly and intelligent features.

BLANCHING OF FLOWERS.—It is well known that light is as necessary to plants as a due supply of air and moisture. The effects of its absence are often singular. We know that plants grown in darkness do not exhibit their usual healthy green color, light being required for the development of chlorophyll. Advantage is taken of this circumstance in the blanching of salads and vegetables, and the same process is now being applied to flowers. It appears that in Paris there is a great demand for white lilacs for ladies' bouquets in winter; and as the common white lilacs do not force well, the purple *Lilas de Morly* is used. The flowers of this variety, when made to expand at a high temperature in total darkness, are of a pure white; those of the Persian lilac will not whiten.

Cost of the National Hen Coop.

The Washington correspondent of the Nashville *Patriot* thus happily hits off the way in which affairs are managed in the Federal Capital:—

The way the Government gets its work done is curious. As an illustration, you and your family meet in convention of the whole, and adopt a resolution authorizing the construction of a hen coop in your back yard. You at once appoint me superintendent of the work, putting a thousand or two of dollars in bank for me to check on. I get you to appoint my brother-in-law chief engineer. I appoint two of my brothers assistant superintendents, and my brother-in-law oppoints two of his brothers assistant engineers—all at your expense. We buy us each a fast horse and buggy, and ride around town, drink hot cocktails and play billiards, until the bank deposit gives out, when we make a printed report of seventy-three pages, furnishing you a complete topographical survey of your back yard, and a vast amount of statistical information with regard to the number of hens you are likely to have for the next forty years. We wind up the report with the announcement that the site of the hen-coop has been selected, and a call for another appropriation to prosecute the work, which we assure you will be done with "vigor." You place another thousand or two in bank, and we employ two hundred hands at three dollars a day to transport seventy-five cents' worth of lumber (which costs you under our management about ten times that many dollars) to the place of operations, which requires about three months. In the meantime we drive around and go on vigorously with the liquor and the billiards. We then come up with another report, and a demand for another appropriation. With this we get the walls of the structure up, and with one or two more appropriations, and a great many more cock-tails and billiards, we get the thing covered in, and at the end of twelve months, which we very appropriately style our "fiscal year," we put you in formal possession of a ten-thousand-dollar hen-coop than any negro carpenter would have been glad to knock up some Saturday afternoon for a suit of your old clothes.

Steam Passenger Cars.

A number of steam cars of a peculiar character have been built by Messrs. Grice & Long, of Philadelphia. The editor of the Philadelphia *Inquirer* lately made a trip in one of them between Philadelphia and Trenton, N. J., and describes its construction and objects as follows:—

The cars are intended to take the place of the heavy locomotive and train, where the travel is not adequate to the expense of running them, and where it is desirable to establish lines running in quick succession, stopping at any point on the road where a passenger may desire to enter or leave, and thus afford accommodations to a large number who would not otherwise ride. To enable this to be done, however, a cheap and easily managed power, and one not liable to require repairing often (which is so great an item in locomotives) must be had, and this, it seems to us, Messrs. Grice & Long have found.

The car we rode in was built for a Southern road, and is 37 feet long; it has seats for 36 passengers; also, a baggage room 6 feet long, together with a saloon and mail room. The machinery is on the platform in front of the car, in a remarkably small space, and acts on the drivers by means of gearing, which runs so smoothly and noiselessly that no one would suspect the mode of applying the power. Coal is used for fuel, which is also on the platform in bunkers, and within arm's length of the engineer. The water is held in a tank under the baggage room, and coal and water are carried for 25 miles. The speed attained was at the rate of 28 miles per hour. The running time to Bristol was 45 minutes; to Trenton, 80 minutes, including stops. Time from Trenton to Kensington depot (30 miles), 68 minutes. The entire weight of car, with fuel and water for 25 miles, is only 11 tuns. The economy of this arrangement is such that an engineer and conductor are only required to manage it; the conductor, when necessary, acting as brakesman; but a powerful brake is at the engineer's hand, to be operated the moment of shutting off steam, and the distance in which it can be stopped when running at full speed is very short. The reduced wear of the rail, compared with the lurching engine, is also an item of great importance; while the consumption of fuel will not exceed 7 lbs. of coal per mile run.

The Truth and Nothing but the Truth.

From the *Gospel Visitor*, published at Columbiana, Ohio, we extract the following gospel truth:—

One of the most interesting and useful publications which come to our sanctum is the SCIENTIFIC AMERICAN, a weekly publication, devoted to popular science, new inventions, and the whole range of mechanic and manufacturing arts. The SCIENTIFIC AMERICAN has been published for fifteen years by the well known patent solicitors, Messrs. Munn & Co., No. 37 Park-row, New York; and has yearly increased in interest and circulation, until it has attained, we understand, nearly 30,000 subscribers, which is the best of evidence that the publication is appreciated by the reading public. To those of our readers who may not be familiar with the character of the paper, we will state some of the subjects of which it treats. Its illustrated descriptions of all the most important improvements in steam and agricultural machinery will commend it to the engineer and farmer, while the new household inventions and shop tools which are illustrated by engravings and described in its columns, with the practical receipts contained in every number, render the work desirable to housekeepers, and almost indispensable to every mechanic or smith who has a shop for manufacturing new work or repairing old.

THE earliest submarine cables laid between France and England contained several conducting wires covered with a thick serving of hemp, and over all this, thick iron wires as a protective sheath. These cables have all been singularly fortunate. Light cables, laid in shallow seas, have all been unsuccessful.

Correspondence

Watch Escapements.

MESSRS. EDITORS :—I have the pleasure of acknowledging the receipt of your letter, informing me that my Letters Patent for an improvement in watches had been ordered to issue. As watchmaking in this country is fast becoming an important branch of industry, I trust that a few remarks on that part of a watch termed the "escapement," may be interesting to your readers.

The escapement in watches, clocks, &c., is a mechanical contrivance arranged in connection with the last wheel of the train, commonly termed the escapement wheel, which wheel, by means of other parts of the escapement, in connection with the balance, is made to stop at certain short and regular intervals of time, and it is this intermittent action of the escapement that causes that slight sharp sound so distinctly heard in the beating of a watch. Of all the minute and delicate parts composing the machinery of a watch, there are none so esential as the escapement. It is indeed the vital part, and from its pulsatory movement, I can think of nothing more illustrative of its vital powers than to compare it to the human heart—as is the action of the heart in a well regulated human body, so is the action of the escapement in the properly constructed and well regulated watch. It is doubtless this vital importance of the escapement that has given rise to the endless variety which have been constructed by skillful artizans within the last two hundred years, a complete description of which would require a full volume of your paper. I shall therefore only refer, as briefly as possible, to two kinds now in use, viz., the chronometer and lever escapements, years of practical experience having demonstrated that these two escapements are superior to all others for durability, strength, and accurate performance. It is not merely gratifying, but really surprising, to witness the state of perfection to which these two escapements have been brought by the hands of skillful artizans of the present day. Nevertheless, when taken separately there are yet remaining slight objections to both of them, each having some qualities superior and some inferior to the other. The chronometer, on account of its direct impulse, acts with less friction, and consequently imparts more power ; for these reasons it has proved itself superior to the lever for marine purposes, and in all places where it can remain in one position ; but in a watch where, of necessity, it must run in various positions, and be subjected to violent external motion, the chronometer, notwithstanding its superior principles of action, has proved inferior to the lever for the pocket use. This condition of inferiority and superiority, when placed in different circumstances, I will endeavor to explain as I understand it, and if I am wrong in the premises, I desire to be set right by any one who has greater knowledge and experience in such matters than myself.

I hold that in order to produce accurate time in the pocket-watch, there is one indispensable requisite, viz., a very large vibratory motion in the balance. The mean extent of vibration should never be less than 500°, about 1⅖ revolutions. This large arc of vibration is necessary in order to nullify the errors which unavoidably arise in a greater or a less degree, from the imperfect irons in the balance and its pivots ; the action of a compensation balance under different temperatures being such as to throw it more or less out of equilibrium, it is evident that if these little inequalities are made to move through an arc of 500° or 550° at every vibration of the balance, their effects on the time of a watch, when placed in different positions, will be comparatively small to what they would if the balance moved only in a small arc of vibrations. It would also be much less affected by violent external motion, such as it would receive from the wearer by riding in the cars, on horseback, &c. With the lever escapement it is perfectly safe to give the balance an average vibration amounting to 550° ; but with the chronometer, it is not safe to allow the mean vibration to exceed 450°, for the reason that violent external motion would cause the balance to pass so far as to lift the detent the second time, thus causing the escape wheel to pass the distance of two teeth at one vibration of the balance, the effect of which would be an acceleration of time at a very rapid rate.

In view of these facts, I have undertaken to combine the chronometer and lever escapements, in such a manner as to retain the advantages of the direct impulse embraced in the chronometer, and the conditions of safety and impulse in both directions, as embraced in the lever, at the same time rejecting the objectionable features of both. If my escapement possess qualities superior to any now in use, they will show themselves in due time. It is my intention to prove all things, and hold fast to that which is good.

GEORGE P. REED.

Roxbury, Mass., April 6, 1861.

[We have carried one of Mr. Reed's watches, which are manufactured by E. Howard & Co. of Boston, for about a year, and, though we have not subjected the observation of its rate of running to that delicate and rigid measurement which is practiced with chronometers, from such observation as we have made, we have not been able to perceive any change in its rate, whatever. It is, at all events, a most admirable timekeeper, and it is as finely finished and beautiful a watch as any gentleman would wish to carry.—EDS.

A Proposition.

MESSRS. EDITORS :—Will you give me permission, through the medium of your widely circulated paper, to lay before its numerous readers, a proposition in reference to my steam plow. If so, I will proceed by stating that, in consequence of the very unexpected disappointment I have just met with in some of my financial matters I had previously consummated in New Orleans, I have been compelled to order my manufacturers (Messrs. Hunsworth, Eakens & Co., of the Peoples' Works, Philadelphia) to suspend the work upon my machinery, now in process of construction, until I could make some other arrangements.

In view of this, therefore, I will propose to any enterprising party or parties, who will advance to me $10,000, wherewith to proceed to the final completion of my said machinery, to give a full and equal *half interest* in my invention in steam cultivation, including the steam plow, ditching machine, mowing attachment, and all subsequent improvements I may make upon the same to the full extent of the patent North and South.

And furthermore, I hold myself in readiness to secure such party in the investment above named, by guaranteeing that my machinery now building will perform in a practical and successful manner, and should it fail to do so, I will obligate myself to pay back the amount so invested on the 1st day of January, 1862, with lawful interest from date. This obligation I will make secure by executing a mortgage on $27,000 worth of real estate I possess in Jefferson and Polk counties in this State, consisting of my Pine Island plantation, situated on the line of the Texas and New Orleans Railroad, containing 1,355 acres valued at $15,000, and over 3,000 acres yet unsold in my Xemenes League, situated in Polk county, 6⅔ miles north of Sour Lake, valued at $4 per acre, or $12,000. The necessary official documents pertaining to this property, showing value, title, &c., will be presented to any party desiring to inspect them.

In connection with the above, allow me further to remark that, there is no project in which the State of Texas is more directly interested than the one which proposes to place in the hands of the farmers and planters a practical, cheap and simple means, through which the extensively applicable power of steam can be made to tear up the unyielding soil of her boundless prairies, and to do all the other drudgery of the farm or plantation to which this power may be applied ; and there is no State, in either section of the country, that can and will so largely patronize a project of this kind, as Texas.

The State of Texas, feeling the great necessity for internal improvements within her borders, has, for the purpose of stimulating all such enterprises to active measure, enacted a law which gives to railroad companies, to steamboats built within the State, and run upon her waters, &c., a certain quantity of her vacant lands. Now, I am well assured that the State cannot feel any greater degree of interest in any scheme, than in that of the successful introduction of steam cultivation. I have the assurance, therefore, that if my invention proves to answer the purpose for which it is designed, in a successful and practical manner, there will not be a single voice in our Legislature against the passage of a bill donating to this enterprise a certain number of acres of land for each and every steam plow it shall cause to be built and set at work within the State, to a limited number. As to the probability of the success of my invention, I have to refer the reader to the illustration and description of the same contained in No. X. of the present volume of the SCIENTIFIC AMERICAN.

I start for Philadelphia in the course of a few days, and desire that all communications to me be addressed care Merchants' Hotel, Fourth-street, Philadelphia.

I take pleasure in referring to my manufacturers before named, and who, I doubt not, will cheerfully answer any inquiries that may be made of them in reference to my machinery.

C. W. SALADEE.

Pine Island, Jefferson county, Texas, March 22, 1861.

A Suggestion in Regard to Planes.

MESSRS. EDITORS :—In all planes that I have seen, the part behind the iron has formed a very considerable portion. If this be unnecessary or useless, there has always been an immense waste of labor and material in their manufacture, and a great saving may be made in the future. If, during any portion of the stroke, the forward part of the plane be held against the board, the uneven portions will be reduced, and the board brought down to a general level ; meanwhile, no effect can be produced by the hinder part, for it is always at a distance from the board, equal to the thickness of the shaving. But if, at any time, the hinder part be pressed down, thereby raising the fore part clear of the board, the following results will ensue :—

The plane will touch the board but at two points—directly in front of the iron, and at the extreme hinder end. As the plane moves along, the hinder part will be slightly raised up and down by the inequalities of the surface of the board ; but the bit will only be inclined at a greater or less angle without being raised or lowed, so as to modify the thickness of the shaving, and is free to follow all the inequalities in the surface, taking off a shaving of even thickness, and reducing equally the thickness of the board, leaving it of the same contour.

The only part of the stroke during which it can be at all plausibly urged that the hinder part is of use, is the last part ; because when the fore part reaches the end of the board, the end of it which lies on the board, forming and maintaining the level, constantly diminishes till the bit is at the end. And it may be said it would be difficult to preserve the level when the iron is nearly at the end ; but then the hinder end offers no means of doing this, as has been proved.

The unavoidable inference would seem to me to be, that the hinder part of a plane is of no use, and, if so, let us not discard an IMPROVEMENT.

Philadelphia, Pa., March 23, 1861.

Complimentary Testimonials from Patentees.

MESSRS. EDITORS :—On the 26th of January, you wrote me that my papers would be forwarded to Washington that day. On the 22d of February I received your note stating that my patent had been ordered to issue. Your promptness is worthy of commendation, and I am pleased to see that you are receiving the reward of public confidence which the faithful performance of duty always insures. I shall take pleasure in recommending your paper and your firm whenever there is a favorable opportunity.

GEORGE S. TIFFANY.

Palmyra, Mich., March 27, 1861.

MESSRS. EDITORS :—I am in receipt of my Letters Patent, and splendid documents they are. Allow me to again express my sincere thanks to you for the efficient manner in which you have attended to my business. As to the drawings, they are perfect. A person of ordinary ability would only need to look at them to understand the invention completely. It is my opinion that inventors who do not employ your firm, are not very careful of their interests.

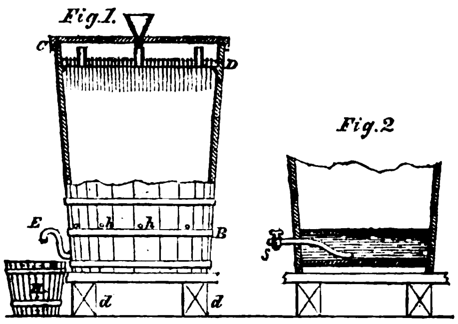
SILAS M. GOFF.

Addison, Vt., April 7, 1861.

Making Vinegar—Quick Process.

In the manufacture of vinegar upon a large scale for sale, the German or quick process may always be successfully employed where whiskey can be obtained at a low price. The common old process of making vinegar from cider was by fermentation, using a mother liquor, like yeast, to induce the proper acetous action. This process is long and troublesome, sometimes requiring months to complete. In the old vinegar establishments, great rows of casks were exposed in favorable situations to the genial influence of the sun, each with a bottle, stuck neck downwards, in its bunghole; and thus, for weeks and months, they would stand exposed until the fermenting process was finished. By the quick process, good vinegar can be manufactured in twenty-four hours.

Alcohol is converted into vinegar or acetic acid by combining with four equivalents of oxygen. An arrangement, therefore, by which alcohol is so exposed as to combine rapidly with the oxygen of the atmosphere, constitutes the quick process, which will be fully explained by the accompanying Figs. 1 and 2, which are sectional views of a small apparatus. The first figure represents a vat made of oak staves; it is



about 6 feet high and 3½ in diameter. It has a wooden cover, C, and is provided with a funnel on the top for supplying the whiskey. A broad wooden hoop at D is secured around in the inside, at about six inches from the top. A second cover rests on this; it is perforated with a great number of small holes one-sixth of an inch in diameter, and about two inches apart. A little piece of cotton wick is inserted in each hole, and is tied with a knot, as shown, to prevent it from being drawn down. Several large holes, about 1½ inches in diameter and 1½ feet apart, are also made in the secondary cover, and fitted air-tight with glass tubes 4 inches long; three of these are shown. About 15 inches from the bottom 10 holes, *h h*, are bored at equal distances around, and made to slope upward. Through these the air enters into the vat. A false bottom, B, perforated with small holes, is also provided a few inches from the true bottom, as shown in Fig. 2, so as to afford a small chamber for the vinegar. The whole interior of the vat between the second cover, D, and the false bottom is filled with beechwood shavings to within an inch of the under surface of D. These shavings, when new, should be first scalded with hot water, and then steeped for a few hours in vinegar. The small siphon tube, E, Fig. 1, is for drawing off the vinegar into the tub, H. The other, faucet, S, Fig. 2, is for carrying off dregs that may accumulate on the bottom; the blocks, *d d*, support the vat above the floor.

To commence operations when the apparatus is new, hot strong vinegar is first poured through the funnel and allowed to percolate downward for two days; the object of this is to induce what is called *eremacausis* in the shavings before fresh alcoholic liquor is poured in. A charge is made up of 60 gallons of strong whiskey and 37 gallons of beer, all heated to 80° Fah., and fed into the funnel. In percolating through the beechwood shavings, it is spread over a very extended surface in very thin streams; here it comes in contact with the air passing through the holes, *h h*, and it then combines chemically with it. The work of acidification proceeds very slowly at first; but when the apparatus is in use for a few days, the action becomes more rapid. The above standard liquor may now be diluted with 60 gallons of soft water to every 25 gallons of the whiskey and beer mixture. The liquor is not fully converted into vinegar by once passing through the vat; it is allowed to percolate through several of such vats in succession in a manufactory. One vat, however, will answer on a small scale by passing the liquor repeatedly through it. It may be lifted with buckets from the tub, H, and poured through the funnel on the top, or it may be pumped up from the tub. The house or room where the manufacture of vinegar is carried on by this process should be kept at a temperature of about 70° Fah.

With 10 vats of the size illustrated, they can be superintended by one man; and when in full operation, 150 gallons of superior vinegar can be manufactured per diem. The vinegar thus made is very pure and clear; and if whiskey alone is used (the most meritorious use to which it can be applied), the article is of a very superior character to that which is the product of beer mixtures. The same process can be carried out on a small scale with common casks set upon end. Whiskey containing fusil oil, such as that distilled from raw corn and potatoes, is not so suitable for making vinegar by this mode, as any essential oil in it arrests the acetifying action; the least trace of wood vinegar among the whiskey also prevents the conversion of the ardent spirits into common vinegar. All such oil, however, may be removed by passing the whiskey through lime.

From the clearness of vinegar thus obtained, it resembles distilled acetic acid; but to make it more marketable, so as to give it the white-wine vinegar quality, one pound of cream of tartar and two pounds of sugar should be added to every 50 gallons.

During the time the liquor is percolating through the vat the temperature of the latter should be about 108° Fah., caused by the rapid oxydation of the alcohol. A thermometer will indicate when the chemical action is going on favorably.

If a very strong vinegar is required, the weak acetic liquor obtained, after having passed through the vat once, is mixed with an equal quantity of whiskey and put through again.

When a sufficient quantity of air is not supplied to the inside of the vat through the holes, *h k*, aldehyde is formed by only two equivalents of oxygen instead of four uniting with the alcohol. A great loss will thereby be experienced, as the aldehyde is very volatile, and will escape up through the glass tubes and the funnel. The remedy for this is more air openings into the cider vat.

Vinegar can be made from all kinds of malt liquors, the juice of most fruits, molasses, beet root juice, &c. All substances containing sugar are capable of being employed to make alcohol and vinegar. Old and sour beer has been, and is still used to a considerable extent in the manufacture of vinegar; but it should never be used for such a purpose, as all beer-vinegar is of a wretched quality, and very liable to lose its acidity and become vapid. We have it from a manufacturer of vinegar that distilled malt liquors or low wines, are best for making vinegar by the quick process.

When various kinds of wood, such as beech, birch and oak, are submitted to distillation in close iron retorts, a considerable quantity of acetic acid passes over in the form of vapor with other products. By subsequent processes of purification and distillation, a very strong and clear acid, called wood vinegar, is obtained. It is principally employed in the manufacture of the acetate of iron for dyers and calico printworks. As alcohol has been obtained in some of the products of coal distillation, the time may not be far distant when vinegar may be extensively manufactured from the product of our petroleum wells, and what is now considered the refuse of our coal oil works.

Danger of Fire from Steam Pipes.—When the plan of warming buildings by steam was first introduced, it was believed to diminish the risk from fire so much that our insurance companies adopted the system of making a discount of 10 per cent from premiums on the insurance of buildings thus warmed. But so many of these buildings have been burned as to cause the adoption of a resolution, at a recent meeting of all the insurance companies of this city, to discontinue this discount. Experience has shown that the safest of all modes of warming is by means of open grates or fireplaces.

To Make Wire Strong.—In a communication from A. Hitchcock, of Chicago, Ill., he states that by cold-rolling wire so as to flatten it one-fourth and one-third of its diameter its strength is increased from ten to twenty per cent. He suggests that flat rolled wire be used for making the next Atlantic Telegraph cable, as such wire is peculiarly adapted for plaiting—a form of cable which would have great elasticity.

Tar Paper for Roofing.—Tar paper, which is used somewhat extensively in cement roofing, by being laid down as a base for the cement, has hitherto been made of old ropes and cloth containing tar. This paper is thus prepared from any kind of paper pulp:—Take 11 gallons of common tar and mix it with 16 gallons of paper size made by dissolving resin in an alkaline solution, and boil them for three hours. Next take 110 lbs. of flour and mix it with 33 gallons of boiling water; add the tar and resin solution, and boil for half an hour, stirring the composition carefully, which may then be used to saturate the paper pulp, at the rate of 27 gallons to the 220 lbs. of pulp. A patent has been taken out for this method of making such paper by Eugeno Hedou, of Paris, France. The composition of tar and resin which he employs is excellent for saturating wooden posts for fences, to render them more durable.

Gas Meters.—The dry gas meter is superseding the wet meter in many places, because it is certain in its action, and does not freeze in cold weather. It is an American invention made by James Bogardus, of New York, who secured a patent in 1831. It was subsequently stolen and patented in England just about the time its inventor arrived in London to secure it. A company in the British capital bought the patent for £12,000, but the inventor has never received a single cent for his invention, although several companies have made large sums of money in the manufacture and sale of these meters. Our attention has been directed to this topic by the recent report of Mr. Cresson, engineer, Philadelphia, Pa., who states that several hundred meters have been added to the gas-works of that city during the past year.

Expenses of the City Government of Paris.—In a report recently made by the Prefect of the Seine to the Municipal Council of Paris, the total expenses of the city government for the year 1861 are estimated at $34,000,000. Of this, $22,000,000 are set down as "ordinary," the balance being extraordinary and special. The principal items of the ordinary expenses are: municipal debt, $2,400,000; sums to be paid to government, $500,000; prefecture, $280,000; levying octroi and other taxes, $1,380,000; National Guard and Guard of Paris, $580,000; charitable establishments, $1,800,000; primary instruction, $460,000; paving of streets, $2,380,000; promenades and plantations, $400,000; fêtes and public ceremonies, $170,000.

The report of the Atlantic Telegraph Company says, the cable recovered and brought home by Captain Kell had been stripped and overhauled, every portion of the core having been carefully examined. It was satisfactory to find that there was not the slightest symptom of deterioration or decay in any part of the gutta-percha. It had further been subjected to a severe electrical test, and a comparison between its present state of insulation and the records of original tests of the most perfect portions of the cable when it first left the gutta-percha works, three years ago, showed that an actual improvement had taken place in its condition since it was laid down.

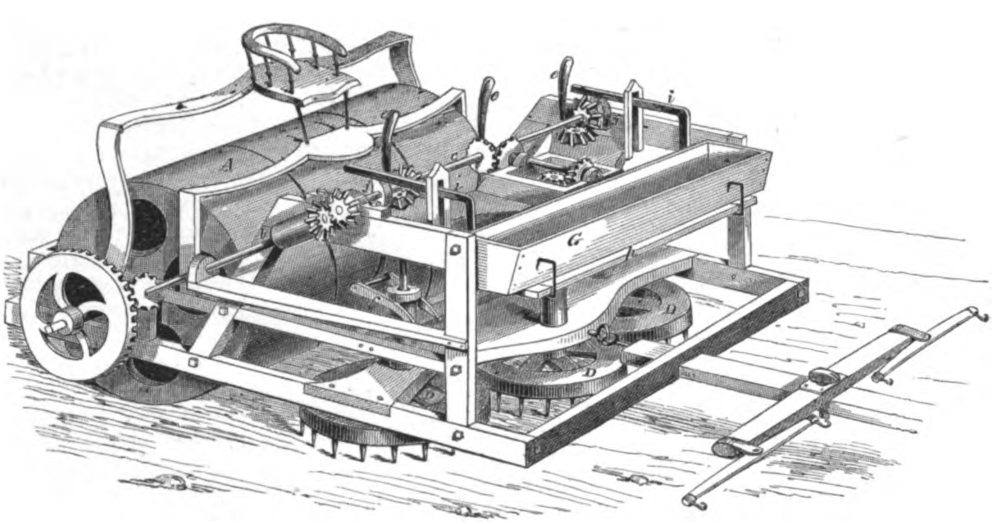
The Atlantic Telegraph Company.—The report of the Atlantic Telegraph Company, to be presented on the 18th ult., recommends that the company should be still kept formally in existence, so as to preserve its original privileges, consisting of agreements with the governments of England and the United States. The directors feel confident that the course of improvement in ocean telegraphy will result in the success of a line from Ireland to Newfoundland.

In the report of the engineer of the London Fire Department for 1860, there were reported quite a number of fires caused by spontaneous ignition. They are classified as follows:—Asphalt sheathing, 1; colored fireworks, 1; wet hemp, 1; manure, 1; wet matting, 2; hay, 3; lamblack, 5; oily sawdust, 5; oily rags, 5; wet rags, 7.

The cost of carrying a bale of cotton, of 500 lbs., from Memphis, Tenn., to Boston, Mass., by the inland route, is $4.50. This is less than to send it to New Orleans, reload in a ship, and send it by sea; and the saving in time is about 30 days. One rail car holds 30 bales of close-packed cotton.

Improved Seeding Machine.

With the opening of Spring, our farmers are endeavoring to learn what machines or implements will aid them most in that operation on which all of our lives depend—the seeding of the fields—and to assist them in their selection, we purpose to illustrate some of the recent inventions in this department, beginning with the combined seeder, harrow and roller invented by Mr. Horace Crofoot, formerly of Tawboro, N. C. This machine is arranged to sow the seed, harrow it in very thoroughly, and press the soil around it at a single operation; the driver riding at ease in his seat, and conducting the operation without fatigue. The arrangement of the parts is clearly shown in the annexed engraving.



CROFOOT'S IMPROVED SEEDING MACHINE.

The roller, A, is made in three sections running loosely upon a shaft, so that their vertical play will allow them to conform to the inequalities of the ground. The power for turning the revolving harrows, and for shaking the seed through the screen, is derived from the shaft of the roller; the loose shaft being caused to rotate by fastening a plate on one of the outer ends of the roller, the plate having a square opening fitting upon a square portion of the shaft. Through the interposition of the inclined shaft, *b*, with the beveled gears upon its end, rotation is given to the horizontal shaft, *c*, which, by means of beveled gears, imparts motion to the revolving harrows, D D D. The shafts of these harrows are surrounded by loose sleeves, which allow them a certain horizontal play, and either of them may be raised from the ground to pass over any obstruction by means of the bent levers, *e e e*, which have forks upon their ends embracing the shafts, as shown at *f*. The seed is placed in the box, G, through which it falls freely upon the screen, *h*, and to this screen a vibrating motion is imparted by means of the bent levers, *i i*, which are operated by the cams, *j j*.

The adjacent edges of the harrows move in opposite directions, and by their rotary motion they pulverize the soil very thoroughly, securing a perfect tilth.

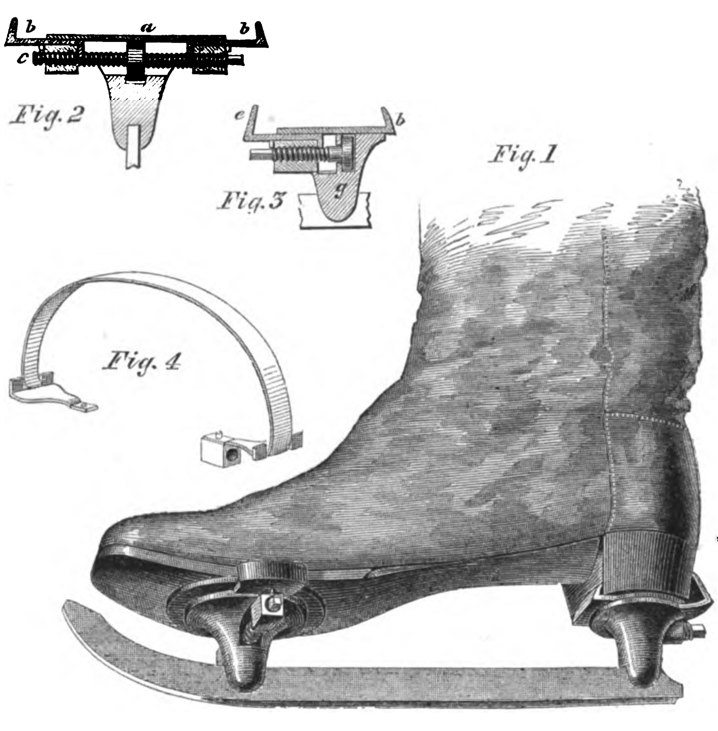
The patent for this invention was granted, through the Scientific American Patent Agency, on Dec. 11, 1860. One-half interest has been assigned to N. M. Terrell, and further information in relation to the matter may be obtained by addressing him at Tawboro, N. C., or Horace Crofoot, Glen's Falls, N. Y.

Glass Gages for Oil Lamps.—In filling a metal lamp, the oil is liable to be spilled by running over the top, because it is so difficult to judge of the exact rise of the fluid by looking downward into the small opening. A remedy could easily be provided for this evil in the use of a small glass gage, fitted into a recess in the side of the lamp, so as to indicate the exact hight of the oil. Metal lamps are not liable to be broken like those made of glass, but the latter are preferred by many who would otherwise choose the former, for the simple reason that, in filling them, they can witness the rise of the fluid, always preventing its overflow.

House Raising in Chicago.—The following on house raising, from the Chicago *Tribune*, affords an illustration of the elevating tendencies of that city:—The Tremont House, and about an acre of houses thereon, commenced rising to grade this morning. There are 5,000 screws under the house, and a gang of 500 men employed, giving each man the supervision of 10 screws. The power was applied at 10 o'clock in the forenoon, and at 11 o'clock the immense weight of the building had been raised three inches; it has yet five feet nine inches to rise. As a proof of the immense power of the screws, it may be stated that when the building commenced rising, a portion of the foundation, which is a stone wall six feet in depth, cemented with an unsually tough cement, and resting upon white oak planks, and those in turn upon the clay, was torn off as easily as if it had been of straw. This part of the foundation had not been disconnected from the main building. The rear part of the hotel, 180 by 100 feet, has been cut off, and is now being torn down to make room for the new kitchen and dining apartments.

Improved Mode of Fastening Skates.

Of all the numerous modes of fastening skates which have been invented, we have not seen one requiring less material than the one here illustrated, which was invented by P. J. Clark, of West Meriden, Conn. Besides the runner and its two conical supports, there is scarcely any material at all used, as will be seen by a glance at the engravings.



CLARK'S MODE OF FASTENING SKATES.

A clamp, the jaws of which are drawn together by a screw, grasps the heel, and another of similar construction grasps the sole at the ball of the foot. The construction of the latter is shown in Fig. 2. Below the circular plate of brass, *a*, on which the sole of the boot rests, slide transversely in a direction across the foot the two bent jaws, *b b*, which are drawn together or carried apart by the right and left screw, *c*. The threads of this screw work through projections rigidly secured to the lower sides of the jaws, *b b*, the screw being held in place by a smooth portion at its middle fitting into a projection on the lower side of plate, *a*. It has a square end to fit a key by which it may be turned either to bring the jaws, *b b*, together to grasp the sole in fastening the skate to the foot, or to carry them asunder when it is desired to remove the skate.

The heel clamp is shown in Fig. 3. In this, only one jaw, *e*, is movable, the forward one, *f*, being secured rigidly to the conical support, *g*.

If the sole of the boot or shoe is not sufficiently firm to permit this mode of fastening, a strap, Fig. 4, may be secured at its ends by clamps, similar to those represented by *b b*, and tightened over the foot by turning the screw, *c*, thus dispensing with the use of buckles, and avoiding the pain which is apt to be caused by the pressing of these hard pieces of metal against the foot. A strap may also be passed over the instep, and tightened by drawing the ends together by means of a screw and key.

The advantages of this fastening are, that by it the skate can be put on or taken off very quickly, with thick mittens on the hands; there are no buckles to hurt the feet, and the skate is light and simple.

The patent for this invention was granted, through the Scientific American Patent Agency, on Feb. 5, 1861; and further information in relation to it may be obtained by addressing S. S. Clark, to whom the patent has been assigned, at West Meriden, Conn.

Manganese Disinfector.—Chemistry is essentially a science of progress and utility. Every experiment made in a laboratory has utility for its object, or a truth to confirm. Latterly, sanitary matters have been much discussed; and as the human family have a tendency to congregate together into large bodies, it is well that the chemist's thoughts should be directed toward the best means of utilizing the sewerage of populous places. It is a noble calling to cure diseases, but to prevent them is nobler still; and we cannot hold in too high esteem those men who, by their inventions, save us from plague and pestilence. Scheele, the discoverer of chlorine, was the first man who gave to his fellow creatures a real preventive of contagion. To him all honor is due. Several combinations of chlorine, under the title of chloride of zinc, chloride of lime, have been very usefully applied as disinfectants; of course, improvements have taken place in these things since Scheele's time; and that which we have more particularly to notice now is Condy's manganese disinfector, which possesses all the good qualities attributed to chlorine compounds, and, in many respects, is far superior to them. Unfortunately, a great number of accidents—even deaths—have occurred from the chloride disinfectors now in use; it would, therefore, be better for society if the manganese disinfectant were generally introduced, which is said to be free from any possibility of mistake, being perfectly innoxious, and an excellent disinfecting and deodorizing agent.—*Septimus Piesse.*

It is stated by the Chicago *Tribune* that there are 4,300,000 bushels of grain stored up in that city at the present moment. Allowing 60 bushels to a load, it would take 71,666 teams to draw it; and if these were placed in line, it would extend a distance of 365 miles. It would take 287 steamers, each carrying 15,000 bushels, to transport it to the East.

The "Great Eastern."—At a recent meeting of the stockholders of the *Great Eastern* steamship, the directors stated that the loss by the trip to America was about $1,500.

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NEW YORK, SATURDAY, APRIL 20, 1861.

FLAX AND COTTON.

The flax question is now engaging considerable public attention. This is owing, in a very great measure, to the present state of affairs in those States which furnish the great supplies of cotton. Several articles have lately been published in the Boston papers in which the culture of flax is recommended to our farmers as a profitable crop, and assertions have been made that it can be so treated as to be rendered a cheap substitute for cotton. To render it fit for spinning on cotton machinery, it is proposed to *cottonize* it, by cutting it into short lengths, then treating it chemically, so as to split it up into fine fibers like wool. About ten years ago, Chevalier Claussen discovered a mode of cottonizing flax chemically, and for about a year or two afterward much was said and much published in England about the probability of this discovery rendering flax a cheap substitute for cotton. All these anticipations were doomed to be extinguished, as the process was found too expensive, and the flax-cotton proved unsuitable for spinning, so as to compete with its rival.

Perhaps no man has devoted more attention to this subject in our country than Stephen M. Allen, Esq., of Massachusetts, who appears to be a firm believer that flax can be rendered a substitute for cotton in the manufacture of cheap fabrics. In the month of February, last year, he delivered an address before the Massachusetts Legislative Agricultural Society, in which he stated that his experiments had been successful in cottonizing flax, and that machinery for this purpose was then being constructed for several mills in New England and the West. He also stated that the flax fiber thus produced was capable of being spun and woven either on cotton or woolen machinery, and that it was suitable for mixing with cotton and wool in small or large proportions, and that a more beautiful and stronger fabric was thus obtained. Specimens of mixed woolen and cotton goods, containing from seventy-five to forty per cent of flax fibrilla were exhibited on that occasion, and pronounced beautiful. Mr. Allen also declared before the Rhode Island Society for the Encouragement of Industry, that flax-cotton could be produced in large quantities "in every Northern State, and that it will spin and weave on ordinary cotton machinery, make a better article of cloth, and cost less than cotton." Such statements as the foregoing are being revived at the present time; they should not be despised, but they should be received with great caution. If flax-cotton can be furnished for lower prices than common cotton, and if it will answer a similar purpose equally well, it has only to be brought to the market for sale, when it will be sure to find plenty of purchasers.

A correspondent writing to us from Springfield, Mass., on flax-cotton, takes a practical view of the subject. He says:—"As the strength of fabrics composed of flax is due almost entirely to the great length of each fiber, what is the advantage of subjecting it to a very expensive process to cottonize it by shortening the fiber, thereby reducing its strength? It is true flax-cotton may be spun on common cotton machinery, but long flax fiber can be spun on flax machinery for two-thirds the cost of spinning cotton. It is therefore absurd to reduce flax to the cotton state." He also asserts that flax cotton costs fifty per cent more than common cotton, and that bulk for bulk it is twenty-eight per cent heavier. These statements are based upon experimental knowledge and deserve attention.

If some new discoveries were made whereby fine flax could be prepared as cheaply as cotton for spinning, then it would be preferred for most purposes as as a substitute, because linen fabrics are far more beautiful than those of cotton. Flax, however, requires to undergo several operations—chemical and mechanical—to fit it for spinning, while cotton only requires ginning, the former therefore cannot stand in competition with cotton, so far as relates to cost. The history of cotton affords an instructive lesson on this head. Before the discovery of the Whitney gin, the expense of cleaning common cotton was so great that it was dearer than fine flax. In those days flax was universally cultivated by European and American farmers, both for domestic clothing and for sale. Every farm in New England had its patch of flax, and almost every house its weaving loom, and throughout the whole of Christendom, at that period, cotton was but little used.

The wand of the magician inventor has changed the face of the country and revolutionized the manufacturing art. The fields of waving flax have nearly all disappeared from our hills and dales, and the loom is no more heard in every household weaving its flaxen web for family clothing. Cotton has taken the place of fine flax for most purposes, simply because it is produced at much less cost. But while we make these undeniable statements respecting cotton, we at the same time believe, that with more science and skill, flax may be extensively and profitably cultivated by our farmers. This part of the subject, however, we must leave for another occasion.

SHIPS' COMPASSES—DANGEROUS ATTRACTION—ENGINES AND IRON HULLS.

Since iron has commenced to enter so largely into the construction of ships, the errors of the compass have become very frequent and dangerous. Any useful information on this subject has, therefore, a special claim upon maritime nations, and upon none more than ourselves. A very interesting paper on this topic was lately read before the Convention of Naval Architects, in London, by F. I. C. Evans, R.N., superintendent of the compass department in the Admiralty. He stated that in sailing vessels, the north pole of the needle was almost invariably drawn towards the ship's head, but the action, in all cases, was very limited in power. In steamships with wooden hulls, the machinery oftentimes disturbs the needle, and the magnetic force varies in direction, according to the arrangement of the engines and boilers; therefore great care should always be observed in fitting up machinery so as to arrange it in such a manner that the least possible attraction will be exerted to disturb the true action of the needle.

In most all iron vessels the errors produced in the compass by local attraction are very uncertain and dangerous, and more so than is commonly suspected by the builder, owner or navigator. In constructing an iron steamer, the hull very frequently becomes a large magnet divided into two portions, similar to a magnetic bar, having a north and a south pole. This is caused by the repeated hammering necessary in riveting the plates. When this is the case, the poles of the iron hull attract and repel the poles of the delicately-poised compass needle and render it unreliable. It has been found that different kinds of iron used in shipbuilding possess different magnetic qualities. The softer the iron, the more subject is it to great magnetic changes, and therefore the more likely to lead to errors in the compass and to increased dangers in navigation.

It has also been noticed that iron ships are in more danger from local attraction immediately after being launched than after they have made one or two voyages. Owners of iron steamers should, therefore, be very careful not to send them to sea very soon after they are launched, but first trim them carefully, and be sure to have the compasses perfectly adjusted before a voyage is undertaken. An iron ship should be thoroughly tested with the compass when the hull is completed, and when being equipped and its engines put in, its head should always be turned in a contrary direction from that which it occupied when the hull was in process of construction. As iron steamers which have their engines put in before being launched cannot comply with these arrangements, it would be better not to fit up machinery in any case before launching. After the engines are fitted up in working order in a steamer, they should be kept constantly moving for several days at the dock, before a trip is undertaken, even when all the parts are in working trim. This suggestion is made in order that the magnetism acquired by the hull through the riveting operations may be "shaken out." The long vibrations of the engines will tend to destroy the induced magnetism in the mass of iron which results from the hammering of the plates, as the magnetism induced by the latter is due to long-continued and short vibrations.

"The Wealth of Nations."

Since commencing our series of articles on wealth, we are frequently asked what is the best treatise on the subject, and we devote one short article to a general reply to the question.

Until the middle of the last century all governments seem to have been under the delusion, which is still not entirely rooted out, that the wealth of a country was to be increased by some law or other device, for "keeping money in the country." In 1766, Adam Smith, after holding the professorships of logic and of moral philosophy at Glasgow, and traveling over the continent of Europe with the Duke of Buccleugh, retired to his native town of Kirkaldy, in Scotland, where he spent ten years in producing that immortal work, which is slowly but steadily changing the legislation of the whole civilized world. It was said a few years since, that the cavity was still to be seen in the plastering, worn by the great thinker's head as he leaned back rapt in his profound meditations. The main drift of Smith's "Inquiry into the Nature and Causes of the Wealth of Nations," is to show that the wealth of a people is not obtained by getting it out of the rest of the world, but is produced by the people's own industry, and accumulated by their individual economy. The views of Adam Smith have since been arranged and illustrated by other writers. The text book used in teaching this science for many years in most of our colleges has been Say's "Political Economy," a methodical and exhaustive treatise on the subject by an able Frenchman. This has been superseded to some extent, within a few years, by the work of Professor Bowen, of Cambridge, perhaps the most learned work on the science that has ever been written. Professor Bowen argues in favor of protective duties on imports, but not on the exploded ground of "keeping money in the country." There have been writers on political science, as there have on all other sciences, who did not understand what they were talking about; the most distinguished of these was Dr. Chalmers, whose work is a confused mass of nonsense. The treatise which we think will be found most acceptable to the general reader is that of Dr. Wayland, ex-President of Brown University. It is embraced in a small volume, and is marked by the comprehensiveness and wonderful transparency characteristic of the writings of this great man.

The Lawrence Model Lodging House.

The late Abbot Lawrence, of Massachusetts, left $50,000 to be appropriated to the erection of model lodging houses, so that the poor might have a convenient and comfortable home at a moderate rent, and to show capitalists that they can get fair interest for their money by building such structures. His executors, after much deliberation, have adopted the following plan, which is worthy of imitation by tenement builders in all our cities:—

Each will be be nearly rectangular, 41 feet wide by 63 feet long, four stories high, with French roof; built of brick, with freestone dressings. The building will be so located on the lot as to admit of drive ways upon all sides, thereby giving an abundance of light and air to all the tenements. There will be four tenements upon each of the five floors, arranged with four rooms for each tenement, with closets, such as water closet, store closet, coal and wood closet and clothes presses. Each tenement is entirely separated from the other tenements by brick partition walls. The entrance hall or street passage is in the center longitudinally, and runs quite through the building, with a rotunda in the center, 16 feet in diameter, in which are placed upon either side of the hall passage a flight of cast iron stairs. The hall passage, as well as the walls of the rotunda, are built of brick, and the floors are built with brick throughout, rendering the entrances from bottom to top nearly fireproof. In the basement will be arranged a store cellar for each tenement, and a public bath room. All the rooms will be amply lighted and ventilated.

Our Editorial Correspondence.

WASHINGTON, April 5, 1861.

Whoever visits Washington in these days is pretty sure to be set down as an office seeker. The hotels are well thronged, and the rivalry for a share in the distribution of the spoils of office appears to be sharp, and ofttimes acrimonious. I called yesterday mornng, to pay my respects to the President, and I found such an eager crowd clambering about his wearied and jaded Excellency that I beat a retreat instantly, without accomplishing the object of my call. D'Alembert, a French writer, once declared "that the industry of men was so far exhausted in canvassing for places, that none was left to fulfill the duties of them." The truth of this remark is well veriñed by the state of things here. The pressure is so great that patent hinges and patent locks are almost unavailing against the patriotic crowd, who are *more* than willing to enter the service of Uncle Sam. Radical and sweeping changes in the public bureaus, the sudden removal of old, and the installment of new, officers, necessarily confuse business, and one might as well seek to compose the winds as to undertake the prosecution of legitimate business in some of the Departments, without being jostled about considerably. Expectants for office are not the only ones who are trembling upon the verge of solicitude; the fact is equally true of those who are now holding office. In imagination, if not in reality, they see the official guillotine standing at the door, and the political handwriting "*Mene mene tekel upharsen*," appears on the wall. An instance of this came under my notice. I was conversing with a gentleman long connected with one of the departments; he expressed solicitude respecting his position, and I had not left him but a few moments before I heard that the ax of the headsman had done its work in his case. This state of things creates confusion, and it will be some time before the official machine can be regulated to a steady motion. In reference to the Patent Office, in which the readers of the SCIENTIFIC AMERICAN feel such a deep interest, such influences are at work more or less, though much less, I think, than in many other bureaus; still, there are many who are seeking to get into this office. Its mysteries attract the curiosity of the curious, and the pressure to pry into them is therefore considerable; and there is a painful anxiety on the part of those who are deeply interested in its successful management, to know what the policy of the office is to be.

Mr. Holloway, the new Commissioner, is in the active discharge of his duties, and all his movements are watched with a degree of solicitude which, in all my experience with the Office, I have never before seen. The political change in the government is radical—it naturally looks to its friends to rally to its support. They do rally,

"In hosts they come, in legions march away."

And in this critical juncture of public affairs an unusual scrutiny is exercised in making removals and appointments.

The Patent Office ought, in some degree at least, to constitute an honorable exception to an indiscriminate proscriptive policy, and be as free from political influence as possible; its operation may be compared to a delicate piece of machinery that performs well all its functions under the guidance of skillful hands. A clumsy boor comes along and throws chunks of iron into its delicate mechanism, and speedily all its parts are thrown into disorder. To tumble every man out of the Patent Office for mere opinion's sake would show a reckless disregard of the objects for which it was founded, and demoralize its character; yet it would be equally injurious not to depurate the Office of all such officers as are dangerous to its vital being. Of this class there are a few who are generally unpopular and objectionable. Mr. Holloway, thus far, is liked very much. He seems to have entered upon the duties of the Office with a full appreciation of their magnitude and importance; but what he will, or will not do, are now matters of mere speculation. He is said to be a good listener, a careful thinker, willing to be advised, slow to promise, but firm to act whenever his judgment is convinced. One thing I feel warranted in saying, viz., that he means to be the inventor's friend, and will endeavor to maintain the policy of ex-Commissioners Mason and Holt.

Mr. Holloway comes from the thriving, populous town of Richmond, Ind., which numbers among its citizens many ingenious mechanics and inventors. He has done much to promote the mechanical, manufacturing and agricultural interests of that place, and is now President of the Board of Agriculture of that State. As a member of the Thirty-fourth Congress, he was chairman of the Committee on Agriculture, and rendered efficient service to that important interest, and has given liberal support to the interest of the Patent Office and the mechanic's art. He enters upon his duties under favorable auspices. The business before the Patent Office is large, and under the favoring influences of the Patent Law Amendment Act, the number of applications is gradually increasng, thus securing a revenue sufficient for an energetic administration of the duties; and if the policy of the Office is made to conform to the progressive spirit of the times—if it shall meet the inventor in a liberal manner, and adjusts his claim upon that basis —then there will be no trouble. There are, however, powerful and subtle influences in the Office which will be exerted against any such policy; they were sufficiently potent during the recent administration to bring a deserved odium upon it, and it remains to be seen how far Mr. Holloway will tolerate the spirit of crotchety technicalities to bear rule in the Office, and against which Judge Mason and Mr. Holt had to contend with great earnestness.

I am inclined to the opinion that a majority of the present Examiners will be retained for the present, at least. Some changes have already taken place, and some appointments have been made; two or three Assistant Examiners have been removed and one Examiner-in-Chief (Mr. A. B. Little), who has been connected with the Office since the days of Edmund Burke. He was one of the most able and accomplished men in the Office, and his removal is generally regretted. He was connected with the Appeal Board, and under the new law the President appointed Messrs. Hodges, Harding and Theaker. It is understood that Mr. Harding will not accept the appointment, and the greatest anxiety is felt on the part of solicitors here as to who shall fill this vacancy in the Appeal Board. The necessities of the Office require an experienced person, and if the President fails to realize this important fact, the business of the Board will, for a time, at least, go on very slowly.

Mr. Hodges and Mr. Theaker are here, but have not yet commenced their duties, and cases are rapidly accumulating for the action of the Board.

James M. Blanchard of Indiana, Clifford Arick of Ohio, and D. S. Stewart are appointed Assistant and Junior Assistant Examiners; and it is reported that Professor Hedrick, of New York, has been appointed a Chief Examiner.

Ex-Commissioner Thomas' Revisory Board still continues to exercise its functions, the practical effect of which is to obstruct the business in the Office, as has been frequently alleged in the SCIENTIFIC AMERICAN. It costs the patent fund at the rate of $5,000 a year to maintain this useless appendage. It is thought that, when Commissioner Holloway comes to fully understand its nature and operation, he will abolish it. I have consulted with several solicitors here, and they all agreed that the Board was a hindrance to the business of the Office. In my next letter I will give an account of the examining process which applicants for situations in the Patent Office have to undergo. O

STEAM ON CITY RAILROADS IN CALIFORNIA.—A San Francisco correspondent says:—"The first locomotive of the Market Street Railroad Company, in this city, was part locomotive and part passenger car. It looks very well, and, apparently, works very well, but it lacks power. From some cause those since built are all locomotive. The company's charter calls for horses, but so far they have used steam, and the community appear to be pleased with it. But two accidents have occurred of any account, and their cars have run since the 4th of July."

A TEN THOUSAND DOLLAR SPECULATION.—We invite the attention of any of our readers who may wish to invest $10,000 in a speculation to the proposition of Colonel Saladee on another page. It will be seen that he offers landed security for the repayment of the money in case the speculation should not succeed. Who will give the inventor a lift?

THE DISCOMFORTS OF RAILROAD TRAVELING.—While we may justly congratulate ourselve on the great improvements in the means of locomotion that have been made within the memory of the youngest of our readers, we certainly cannot as yet regard the system as complete and perfect. Rarely can we make a day's journey on any of our railroads (the ordinary mode of traveling) without being painfully conscious of inconveniences and discomforts which are anything but complimentary to the genius of our inventors or to the enterprise of our railroad companies. Our dresses and our persons are begrimed with dirt and cinders, until we feel almost as filthy as Hottentots, and look as though we had been engaged with the charcoal peddler or the chimney sweep. Not only must all ideas of cleanliness be abandoned, not only must we expect our hands, faces, hair, noses, ears and dresses to be filled with this vile compound, but we are put in actual pain by the cinders which are almost sure to find their way into our eyes, creating inflammation, and endangering the loss of sight, and by the dust, which, not satisfied with defiling us externally, finds its way into our lungs at every inspiration, to the detriment and perhaps fatal injury of these vital organs. We are not only made uncomfortable generally, but our health and future happiness are actually seriously endangered. The condition of our traveling accommodations, in this respect, is anything but creditable to our ingenuity or our enterprise. Can it be remedied? Could the dust and smoke which now torment the traveler be completely avoided? At present, the chief remedy is to close all the avenues through which they can enter the cars; but this is attended by another inconvenience of scarcely less magnitude.

Praise and Blame.

Who was praised for the successful trips made by the Baron Renfrew over the different railroads in our country?

The conductor.

Who deserved the praise?

The engineer.

Who was applauded by the newspaper reporters when President Lincoln traveled from Springfield to New York?

The conductor.

Who should have been?

The engineer.

Who had all the credit of the safe transportation of the Seventh Regiment, when they visited Richmond?

The conductor.

Who should have had it?

The engineer.

Who is often the most to blame, inasmnch as he started the train out of time?

The conductor.

Who is invariably censured if his engine breaks down?

The engineer.

Who is sometimes the true culprit?

The machinist who built it.

Who is sure to be blamed by the reporters, and never praised?

The engineer. —*American Engineer.*

CARBONIC OXYD AND HYDROGEN.—In a paper published in the *Annales de Chimie* by MM. St. Claire Deville and H. Debray, it is stated that, in several experiments to obtain hydrogen gas by the decomposition of water passed into retorts filled with coke and heated to a high temperature, the following products were obtained:—

Hydrogen	52·5
Carbonic acid	5·0
Carbonic oxyd	42·5
	100.0

THE new naval signals of Mr. W. Ward, an American inventor, have been adopted by the British Admiralty, and are now in use in the Channel Fleet of England.

THERE are 1,000 lives and $7,500,000 worth of property lost by shipwrecks annually on the coasts of Great Britain.

THE total number of immigrants coming to the United States for the past seventeen years has been 4,386,441.

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 Wednesday evening, April 3, 1861—J. P. Vedder in the chair.

WATER WHEEL.

I. D. Seely, of Western New York, exhibited a model of a water wheel recently invented and patented by himself, which he termed a "cylinder wheel," combining radial buckets and scroll discharge. In inventing this wheel, he attempted to overcome four difficulties, one or more of which he had found to exist in every other wheel that he had known, and the result was that he had secured in this wheel the following advantages:—

1. Ability to run under water or with back-water.
2. Great reduction in the cost, as compared with the turbine wheel.
3. Adaptability to small operations, such as churning.
4. Saving the centrifugal force of the water.

The wheel is intended to be made of cast iron. The inventor had only tested practically one made of wood, 18 inches in diameter. He had used a turbine wheel that claimed to use 78 per cent of the water, which carried a 2-foot cross-cut circular saw under 15 feet head of water. By substituting his own wheel, he had added a 14-inch slitting saw, and could run them both.

EXPLOSIVE KEROSENE OIL.

C. A. Seely referred to an account of a recent explosion of a kerosene lamp. An explanation of the cause had been suggested, namely, the addition of cheap alcohol. That might be so in this particular instance, but alcohol is no cheaper than kerosene. The more probable cause was this: from petroleum a variety of oils are distilled, differing in volatility; some volatilizing at 600°, and others at zero. He had at his laboratory oil which would boil at 100°; and out of that another could be separated which would boil at 60°. The old genuine coal oil was safe enough, but the mixtures now added made the oils volatile at a low temperature, like burning fluid. These mixtures were added because the manufacturers had at present no other use for them. There would be more explosions unless this adulteration was stopped.

Mr. Dibben believed that this explosive kerosene was mixed with alcohol. He had seen kerosene, so called, that was burned in a lamp without a chimney.

Mr. Stetson suggested a test of the explosive quality of oil. If it would burn in an open dish or on clothing, it was dangerous.

The Chairman stated that, within 12 or 18 months, petroleum had entered very largely into the supply of kerosene.

Mr. Wadsworth said that oil standing at 40° or 41° by Baumé's spirit test was not explosive. The mixture of petroleum made a whiter and more handsome oil, but it was dangerous. Petroleum sometimes ranged as high as 47°, and was therefore explosive. If the oil could be lighted with a match, like alcohol, it was explosive.

The Chairman said that camphene was not of itself explosive, only when mixed with alcohol.

Mr. Seely—Explosion is produced by rapid burning. If you could burn a stick of wood in an instant, it would make a report like a 64-pounder. The reason why burning fluid explodes is, it volatilizes and mixes with air. Heat sperm oil sufficiently, and it will explode.

STEEL PLATED SHIPS.

Mr. Dibben—We have heard full descriptions of the wonderful structures *La Gloire* and *Warrior*, lately built by the French and English. But I desire to call your attention to the fact that these are but imitations of the ship or battery of the late Robert L. Stevens; and, although our press has ridiculed the latter by naming it *Stevens' Folly*, *The Nondescript*, &c., yet, from a limited knowledge of this nondescript, I believe that it would be more than a match for either of the former. As early as 1838, Mr. Stevens submitted to United States government plans for a ship similar to the present structure, to be used for the defense of New York harbor, to be shot proof against the heaviest naval guns then in use (64-lb. shot); but shortly after this the United States navy adopted 10-inch guns, capable of throwing round shot of 120 lbs. Again, Mr. Stevens, after a long series of experiments, proposed to meet this increased efficiency of the gun by an increased resistance, and in 1854, the keel of the present ship was laid, which is about 400 feet long and 45 feet beam, with a displacement of about 6,000 tuns at 20 feet immersion, to be propelled by two screws of 20 feet diameter and 25 feet pitch, driven by eight engines, 50-inch bore and 3 feet 6 inches stroke, designed to make 100 revolutions per minute. With boilers capable of keeping steam at from 50 lbs. to 60 lbs., this would give an effect of from 8,000 to 10,000 horse-power. This, with a model of great beauty, will give her a speed that would enable her to run down any ship that floats at this day. The battery, which, in fact, is the only part that is above the water, occupies only a section of about 60 or 70 feet in length amidships, and rises about 20 feet above the water line, containing two working decks, beside an upper deck designed to be bombproof. The sides are protected by combined plates of iron 8 inches thick, with the space between them and the ship's sides (about two feet) to be filled in by alternate layers of wood and rubber. I would note here that Mr. Stevens found the best wrought iron plates 7 inches solid thickness could be shivered and broken by a 120-lb. shot at short range. The fracture of one of these plates that I remember seeing, presented the appearance of cast iron, rather than fine wrought iron. This ship carries no mast, and is not designed for cruising or foreign service; nor do I believe any of her transatlantic imitations are fit for such service, for the reason that, when furnished with armament and stores, they would have but limited capacity for coal. The ship I have attempted to describe has so far progressed that she may be completed and made ready for service in from three to four months.

Mr. Bartlett said that the credit of introducing and proving the practicability of iron clad ships was fully awarded to Mr. Stevens by the London *Quarterly Review*. The English experiments seemed to show that almost any number of thin plates riveted together could be pierced, but that a solid plate 4½ inches thick was almost shotproof. He thought that the 8-inch plates experimented upon by Gen. Totten were proof against any missile ever yet discharged, when the plates were backed by solid masonry.

Mr. Stetson believed that the idea of iron plated ships originated in America. Mr. Stevens tried thick iron, and afterward chose a series of thin iron plates. Gen. Totten used thick iron for earthwork; the English had applied the same thick iron to ships. But Whitworth's projectile had punctured the thick iron plates in England, and it was a question whether a single plate could be made tough enough. A thick mass of iron could not be forged so as to produce the same effect on the interior as near the surface with the present forge hammers. There was no way of rendering the interior as strong as the surface.

Capt. Bartlett believed that a vessel could be built to float in the Bay of New York that no shot would penetrate, but yet it would not be invulnerable. It was well known that granite reefs were removed several feet under water by a sufficient quantity of powder. A single shell would be sufficient to destroy a bomb-proof vessel if it could be exploded under the ship. When Mr. Stevens first appeared at Washington with his plans for an iron-clad vessel, Commodore Stockton boasted that he would be able to bore it with his improved cannon. It had been settled that an iron plate, eight inches thick, would resist any shot at present used. Fortifications could be built strong enough to break any shot for a given time; but any fortification could be taken at last by shot and shell from a land battery. It was merely a work of time. So iron plates, being battered for a length of time, would become brittle and give way. Iron-clad ships were not practicable for cruising—only for defense. Capt. B. exhibited some of Gen. James' projectiles, of which he spoke last week. The shot was covered with canvas, underneath which was a tin casing, and underneath the tin casing was a quantity of lead. The lead was run into the hollow part of the shot, and through several longitudinal openings to the tin casing on the outside. The first effect of the explosion is to expand the lead, and thus destroy the windage, the same as the Minié ball. As soon as the shot comes out of the cannon, the tin casing is thrown off. The shot goes out on a half-turn from the rifling of the gun; then as soon as the tin and lead are stripped off there are rifling grooves in the shot that come into play. The largest of the shot exhibited weighed 81½ lbs.; it was carried by an ordinary 42-pounder with a charge of 10½ lbs. of powder, at 5° elevation, a distance of 2,221 yards, and went through 52 inches of solid oak. A small plunger inside contains a percussion cap, which causes an explosion the instant the shot strikes an object; even a sand-bank will cause an explosion before the shot enters three inches. The shot then splits longitudinally.

The President (Prof. Mason) inquired whether percussion shell had been used in the navy before Gen. James' invention.

Capt. Bartlett—I think not.

Mr. Stetson believed there was a better projectile than this of Gen. James', to which too great prominence had been given by the United States Government. The explosion of the shell in striking iron-cased vessels would diminish the effect. The shot should be kept solid.

Mr. Babcock said there was no doubt of the originality of this style of projectile of Gen. James', but he was not the first to make explosive shot. That was done 20 years ago by Norton.

Capt. Bartlett mentioned some experiments in that direction, on a small scale, 21 years ago, in which he was concerned. In his judgment there was most unquestioned novelty in Gen. James' invention; the windage was never got rid of before.

Mr. Babcock claimed that the Hotchkiss shot possessed all the advantages of Gen. James'. He stated that he saw, and measured the target through which this 81-pound shot had penetrated; it was three thicknesses of timber of one foot each, making 36 instead of 52 inches. The shot might have struck the braces behind, which would make up the additional thickness. With the exception of this one shot-hole, none of the shot penetrated more than 18 inches.

NEW SUBJECTS.

The same subject will be continued. The following additional subjects were proposed:—

"Ice—its Formation and Resolution," by Professor Mason.

"Have there been any Fires Caused by Steam Pipes?" by Mr. Johnson.

"A Railroad in Broadway," by Mr. Seely.

"Material for Fire-Proof Crucibles and Brick," by Mr. Churchill.

On motion, the Association adjourned till Thursday evening, April 11, at 7½ o'clock.

The French Mode of Grafting.—The French are practising a new method of grafting, a knowledge of which may prove valuable to American horticulturists, inasmuch as it can be performed at any season of the year when the sound, matured buds can be had, whether the sap is in a flowing state or not. It is performed by removing a small piece of bark and wood, leaving a smooth and flat surface, to which a similar piece containing the bud which is to form the future tree is fitted, which is sealed over immediately with collodion. This forms a strong, impervious cuticle, which secures a free circulation of the sap on the approach of warm weather, and a perfect union of the parts.

Hours of Railroad Conductors.—The Philadelphia *United States Gazette* states, that the conductors on the street railroads of that city work during sixteen hours per day. The conductors of cars on the railroads in all our cities, we believe, are subjected to the same oppressive hours of toil and watchfulness. In conversation, a few days since, with a conductor on one of the Brooklyn railroad lines, he spoke in accents of grief in regard to the long hours of labor to which he was subjected, and "what is worse still," he said, "the uncertainty and irregularity of our hours—and we have no Sabbath."

The railroads of the United States, with their rolling stock and equipments, have cost just about one thousand millions of dollars. The national debt of England is four thousand millions of dollars.

Recent American Inventions.

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

LOCK.

This invention is a valuable improvement in what are known as combination or permutation locks. The invention consists in the employment of two sets of toothed disks which gear together when the lock is in operation, but may be separated to change the combination on which the lock is set by turning an eccentric shaft on which one set of disks are journaled. The key is applied to the outer disks of the set by means of pins projecting from the faces of the disks, while each disk of the first set acts independently on the corresponding disk of the second set. Each disk of the second set is provided with a radial slot, which slots must be all brought to a correct position in respect to the bolt, to enable the latter to be withdrawn. By disconnecting two sets of disks, while the bolt is withdrawn—then changing the position of the first set, and afterward setting them again in gear, and then throwing the bolt and rotating the disks, so as to shift the radial slots—it is evident that the bolt is secured against withdrawal, except by adjusting the disks to the combination of positions last adopted. This ingenious device has been brought into extensive use, but cannot be readily explained without drawings. L. F. Munger, of Rochester, N. Y., is the inventor of this device.

CHILD'S CARRIAGE.

The object of this invention is to combine, by a very simple arrangement, three different children's vehicles in one, so that any of them may be used, and answer equally as well as if made separately as heretofore—and the whole furnished at nearly as small a cost as the separate devices now made. Children require different kinds of vehicles according to their age. Infants are drawn and shoved along in "carriages" and "perambulators" as they are technically termed, while older children propel themselves along in "velocipedes." By combining these three devices in one, a vehicle is obtained which may be used for several children of a family, and one which may be adapted to the growth of a child, that is to say, changed from a carriage to a perambulator, and from a perambulator to a velocipede. This invention consists in applying to a frame which is mounted on three wheels, two behind and one in front (the latter being a caster wheel), a suspended platform, rear or back handles, and a suitable body or seat provided, when necessary, with levers and connecting rods, to effect the desired object. Benjamin P. Crandall and J. A. Conover, both of New York city, are the inventors of this ingenious device.

ENAMELING MACHINE.

The object of this invention is to obtain a machine which will greatly aid and expedite the manual process of enameling frames, such as picture and mirror frames, preparatory to gilding them, and one which may be used for enameling circular, oval and all other shaped frames, except those containing angles. This invention was patented by John Sperry and C. W. Sherwood, both of New York city.

IMPROVEMENT IN BOOTS AND SHOES.

This invention consists in an improved mode of preparing the sole and upper for sewing, whereby the seam is brought entirely on the outside of the shoe or boot in the sewing operation, but if the shoe or boot be turned, the seam will be brought on the inside thereof. The especial object of this mode of preparing the sole and upper is to afford greater convenience for sewing them together by a sewing machine, than is afforded by the common arrangement of the parts. Luther Holden and Stoughton P. Holden, both of Woburn, Mass., are the inventors of this device.

IMPROVEMENT IN SETTING-UP STANDING RIGGING.

This invention relates to the use of metal blocks with sheaves, in place of the dead-eyes commonly used in the standing rigging of ships and other vessels. It consists in a certain construction of such blocks, with provision for securing the ends of the lanyards, and for securing them to the shrouds. Barton Ricketson, of New Bedford, Mass., is the patentee of this apparatus.

GARDEN SEEDS GRATIS.—We have received from Messrs. J. W. Briggs & Son, of Macedon, Wayne Co., N. Y., a sample of the choice garden seeds which they offer to send free to any one, on the receipt of a three cent stamp, to pay the postage. Thanks, gentlemen.

ISSUED FROM THE UNITED STATES PATENT OFFICE

FOR THE WEEK ENDING APRIL 2, 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.

856.—J. H. Atwater, of Providence, R. I., for an Improvement in Portable Copying Presses :

I claim a book with a wedge-shaped back, substantially as described for the purpose specified.

And in combination with a book, having a wedge-shaped back, I claim a cylinder or roller provided with an apron to envelope the book, substantially as specified.

I claim interspersing leaves of thicker paper between portions of the copying paper in the copying book, substantially as described, so as to make the book more firm, and to prevent the leaves from being wrinkled.

857.—Francis B. Blanchard, of Brooklyn, N. Y., for an Improvement in Steam Boilers :

I claim the combination in the manner substantially as shown and described of the water heater and steam heater with each other and with the boiler, air-pump and chimney, all as set forth.

858.—J. O. Blythe, of Germantown, Pa., for an Improved Door Spring :

I claim the peculiar construction of the arm, b, as seen in Fig. I, No. 1, at the point marked g, in combination with other parts of the machine to effect the purposes set forth, as stated.

859.—R. Boeklen and W. Staehlen, of Brooklyn, N. Y., for an Improvement in Smoking Tubes:

We claim, first, a smoking tube provided with a valve or valves, operating substantially as and for the purpose set forth.

Second, The smoking tube formed with an enlarged interior chamber A, as shown and described, in combination with a valve, C, for the purpose set forth.

860.—A. H. Boyd, of Rockville, Mass., for an Improvement in Sewing Machines :

I claim, first, The employment of the cam wheel, G, the eye pointed crossing arms, H H, a foot piece, N, and a needle, arranged and operating in the manner set forth, for the purpose of making the embroidery stitch represented.

Second, The employment of the bar, K, the ratchet wheel, D, the cam wheel, G, and the arms, H H, arranged in the manner represented, whereby the arms are made to cross under the foot piece as often as it rises, substantially as set forth.

861.—J. Brainerd, of Cleveland, Ohio, E. F. Olds of Lyons, Mich., and A. W. Olds, of Green Oak, Mich., for an Improvement in Harrow Frames :

We claim the radial arms, A, secured betweeu the plates, B and C, by the bolts, A′, in combination with a central pin or standard, D, socket or pipe, E, projection, J, box, H, and draw-bar, F, the several parts being constructed and arranged substantially as and for the purpose set forth.

862.—J. H. Breckinridge, of Meriden, Conn., for an Improved Cap for Oil Cans :

I claim as an improved article of manufacture, a sheet metal can cap having a portion of its exterior surface raised and formed into a groove of the form shown and described, for the purposes set forth.

863.—J. E. Briggs, of Watertown, N. Y., for an Improvement in Brakes for Carriages :

I claim the combination with a draught pole, E, which is allowed to have an endwise movement between the hounds C C. of the brake bar, G, levers, H H, rods, K K, transverse bar, J, and the stop rod, L, all arranged and operating substantially as and for the purposes set forth.

[The nature of my invention consists in combining with a draught pole or the thills of a vehicle, constructed so that they will have a longitudinal movement, certain levers and connecting rods which are operated upon by the said longitudinal movement of the draught pole, and which operate upon a transverse brake bar suitably arranged in front of the forward wheels, so as to apply the rubber blocks on the ends of this bar to the peripheries of the wheels, and to release these rubbers from the wheels.]

864.—Ezra Buss, of Yellow Springs, Ohio, for an Improved Clothes-dryer :

I claim the arrangement of the arms, C C, upon a spindle, B, which turns freely in a suitable support, A, in combination with a tightening and loosening screw, d, or its equivalent, for placing and securing the arms in any desired relative position, independently of the movement of the spindle in the support, substantially as and for the purpose specified.

865.—A. Christian, of New York City, for an Improved Rocking Horse :

I claim the platform, A, ratchet wheel, E, with its pawl, e, and the slotted plate, F, when the same shall be used in combination in the manner and for the purpose set forth and specified.

866.—J. T. Clegg, (assignor to himself and H. Coulter), of Philadelphia, Pa., for an Improvement in Lamps :

I claim, first, An open cap, so constructed that one side will impinge the flame, while upon the opposite side a space is left between the wick tube of the lamp, and the side of the cap, for the purpose of creating a draft, and thus supplying the requisite quantity of oxygen to the flame at the point of combustion, substantially as set forth.

Second, The combination of a sliding regulating tube (with or without flues) with an open cap, substantially in the manner and for the purpose specified.

867.—H. E. Copely, of Waterbury, Conn., for an Improvement in Photographic Medals:

I claim a solid metallic ornamented plate or frame produced by dies with one or more cavities upon either face of said plate or frame, and with a raised rim surrounding each of said cavities, but this I only claim when said cavities are filled with pictures, substantially as described.

I also claim securing a picture to the face of a medal, metallic button or other similar article by means of a projecting rim formed upon the surface of said article by means of dies, which rim surrounds the picure, and is pressed down upon the edge thereof, substantially as described.

868.—B. P. Crandall and J. A. Conover, of New York City, for an Improvement in Children's Carriages :

We claim, first, The frame, A, mounted on the wheels, B B C, as shown with the suspended platform, G, seat or body, F, and rear or back handles, H, attached, all being arranged and used in connection with pole, 1, or strap, E, substantially as and for the purpose set forth.

Second, In combination with the frame, A, platform, G, and seat or body, F, the hand levers, J J, connecting rods, K K, and foot lever, D, applied to the caster wheel, C, as and for the purpose set forth.

Third, The bending of the front ends, b, of the connecting rods, K K, as described to admit of the wheels, B B, and hand levers, J J, working in.

Fourth, Extending the shaft, above the traverse bar, b, of the frame, and having any suitable figure or index D, connected therewith, above the traverse bar, with strap, E, connected to the index, substantially as and for the purpose set forth.

869.—J. A. Cramer, of Brooklyn, N. Y., for an Improvement in the Boxes of Carriage Hubs:

I claim the conical or wedge-shaped nut, B, Figs. 1 and 2, on the end of the box, A, for the double purpose of wedging and clamping the hub on the said box, substantially in the manner and for the purposes described.

870.—Benjamin Crawford, of Pittsburg, Pa., for an Improved Arrangement of Feed Water Heating Pipes of Steam Engines :

I claim the arrangement in the flues, J J, of a boiler of the transverse pipes or chambers D D, and series of zig-zag pipes, E E, in combination with supply pipes, A B C, which are arranged to run from the doctor or pump along the top of the boilers, and the induction pipes, I I, which are arranged along and to run from the flues, J J, under the arch or tile of the furnace to the interior of the boiler, substantially as set forth.

871.—Jonah Crites, of Orrville, Ohio, for an Improvement in Horse Rakes:

I claim the arrangement of the crank axle, F, provided with the grooved pulleys, G G, and with the arm, L, the drums, H H, upon the drivers, the bands, a a, the levers, d and e, the connecting bars, J and K, with the rake shaft, E, provided with wheel, I, the several parts being arranged and constructed so as to operate jointly for the purpose specified.

872.—T. B. DeForest, of Birmingham, Conn., for an Improvement in Skirts :

I claim, first, Forming an open space. or open spaces, to accommodate the feet in walking, substantially as set forth.

Second, Making the skirt to open in front or behind, wholly or partially, by continuing the bottom hoop up to the waist band or other desired point and connecting thereto the ends of the other hoops, as described.

Third, Making the lower portion of the skirt detachable or removable from the rest at or near the termination of the open space, substantially as and for the purposes described.

Fourth, Forming the lower hoop or hoops into a spring, by bending up to operate, as and for the purpose described.

873.—S. S. Dice, of Stark county, Ohio, for an Improvement in Cross-cut Sawing Machines :

I claim the pulley at end of saw, in combination with the saw in cross-cut sawing machines.

874.—A. H. Downer, of New York City, for an Improvement in Hemmer and Finger Shield for Hand-sewing :

I claim, first, The arrangemeut of the snails upon the side of the finger next the work instead of on the top by which it is made to clear other work when the shield is used for other purposes besides that of hemming.

Second, Connecting the hem folder or snail to the shield or piece of metal upon which it is supported upon the finger, in the manner described, so that it may readily be removed or changed, without changing the main plate, as set forth.

875.—William Ellard, of Woburn, Mass., for an Improvement in Machines for Finishing Leather :

I claim the specified arrangement and application of the bars, d e, or the T-lever, E, the cam, L, the roller, I, and the retainer or rail, K, with respect to each other and the glossing tool carrier, D, the bed, B, and the crank wheel, G, the whole being to operate substantially as specified.

876.—C. R. Ely, of Shelden, Vt., for an Improvement in the Process of Reducing Iron Castings and Preparing Cast Iron Patterns :

I claim, first, The use of hot dilute sulphuric acid for the purpose of removing wax or other like composition or coating from the surface of any cast iron pattern when it becomes desirable to cleanse or reduce the same, substantially as described.

Second, The use of hot dilute sulphuric acid for the purpose of removing rust or scale from the surface of cast iron patterns, substantially as shown.

Third, The use of hot dilute sulphuric acid for the purpose of preparing an improved surface upon cast iron patterns for the reception of wax or other composition preparatory to their being used to mold from.

877.—P. G. Gardiner, of New York City, for an Improvement in Carriage Springs :

I claim, first, The construction of a carriage or other spring, substantially as described, by combining with an upper elastic blade of a convex form, outwardly an ogee-shaped underblade, in the manner and for the purposes set forth.

Second, In combination with a spring made of two blades connected at their ends, as shown and described, I claim making the underblade of such length in relation to the upper as that the two blades shall be prevented from coming in contact at their centers, whatever the superincumbent weight or load may be.

878.—R. W. George, of Richmond, Maine, for an Improved Washing Machine :

I claim an improved washing machine, consisting of a vibratory presser frame, D, rotary dasher, C, made with a flat, m, yielding slatted apron, G, sectoral guards, L L, and yielding partitions or side boards, M M, combined and arranged substantially in manner and so as to operate as specified.

879.—S. P. Gilbert, of Racine, Wis., for an Improvement in Hollow Augers :

I claim the combination with the bit, D, and hollow auger, G, of the rotary case, C, substantially as and for the purposes shown and described.

880.—O. W. Goslee, of Glastenbury, Conn., for an Improvement in Cultivators :

I claim the arrangement of the frame, a f, arms, i, handles, b, braces, c, plates, g, clevis, d, axle, e, and cultivator teeth, 1 2 3, the whole being constructed in the manner and for the purpose described.

881.—E. Goulard, of New York City, for an Improved Apparatus for Buoying Vessels :

I claim the construction of the vessel, with recesses or boxes, B, at the sides, as and for the purposes shown and described.

I also claim the arrangement with the said boxes of the compressible balloons, A, air pump, F, air tubes, F, windlass, C, chains, e, and conduits, D, in the manner and for the purposes shown and described.

[The object of this invention is to enable the captain or master of a vessel to diminish her draught of water at a moment's notice, in order to enable her to pass over a bar, or over a sunken rock or other spot where the depth of the water, under ordinary circumstances, would be insufficient to carry the vessel safely across; or to enable the captain or master of a vessel to keep her afloat and to save himself, his crew and cargo in case the vessel should spring a leak, or be damaged by a collision, or become waterlogged from some other cause.]

882.—John Haynes, of Pembroke, Maine, for an Improvement in Machinery of Operating Fog Bells :

I claim the combination of the pendulum device, D E F, wheel, H, and bell, L, with the hull, A, substantially as and for the purposes set forth.

883.—Frederick Heidrich, of Philadelphia, Pa., for an Improvement in Lamps :

I claim the employment of a fluid-tight chamber over the wick pinion in combination with the wick tube, substantially in the manner and for the purpose described.

884.—R. W. Hunt and M. Kennedy, of Galesburgh, Ill., for an Improvement in Water Elevators :

We claim the arrangement of the self-opening valve, F, with the bucket, E, and lifting rope, G, when combided with the rod, J, ring, d, spout, I, projections, f, plates, e, and drops, g, as and for the purposes shown and described.

[This invention consists in the employment or use of a chain and counterpoised valvular bucket, in connection with a hinged spout and a bucket-sustaining and bucket-liberating device, whereby water may be elevated with facility for domestic purposes, and a very simple device obtained for the desired purpose.]

885.—S. Hutchings and J. D. Leach, of Penobscot, Maine, for an Improved Washing Machine:

I claim the curved connection between the flat bottom of the washbox and the inner surface of the inclined board, n, at the forward end of said box, when such a shape is given to the actuating faces of the swinging feet, g g, as will enable them to produce the described compressing and rubbing effect upon the clothing which may be operated upon within our said machine, and when the several parts of said machine are arranged in the manner set forth.

886.—Samuel Ide, of East Shelby, N. Y., for an Improvement in Beehives:

I claim having the hive constructed with an inner wall composed of straw, or other equally porous material, when the said straw or porous wall is separated from the outer case so as to leave an air space, and used in connection with ventilating apertures, all substantially as shown and described for the purposes set forth.

[The object of this invention is to render beehives more suitable than those hitherto constructed for the wintering of bees, so that the same may be kept through severe cold weather without having their number diminished, as is generally the case, in consequence of the ordinary hives being poorly ventilated and not constructed sufficiently warm.]

887.—T. Jacobs and N. J. Wilkinson, of St. Louis, Mo., for an Improvement in Apparatuses for Purifying Water:

We claim arranging the corrugated plate or collector, D, in connection with the feed pipe and within the boiler, as described, for the purpose of cleansing the feed water before it mingles with that in the boiler and after it has passed through the purifier, in the manner described.

888.—Joseph Leeds, of Philadelphia, Pa., for an Improvement in Furnaces for Heating Buildings:

I claim the top plate, A, and side plates, B B, constructed in the form described, the division plates, C D E, the heat radiating flues, K K, opening through the top plate, A, and communicating through the plate, C, with the fresh air chamber, G, as described, the deflecting plate, M, constructed with the openings, 2 2 3, as described, and the fresh air distributing pipe, N; the said parts being arranged in relation to each other, the chambers, F and G, and the flue, L, substantially in the manner described and for the purposes specified.

889.—J. G. Leffingwell, of Newark, N. Y., and G. W. Thompson, of New York City, for an Improvement in Gas Burners:

We claim, first, A gas burner, A, having in combination a tip, a, flexible diaphragm, C, and valve, D, arranged in the manner and for the purposes set forth.

Second, The ring, b, with its inclined sides and hooked edge, as described, for the purpose of securing the diaphragm.

890.—Josiah Long (assignor to J. G. Wolf), of Morristown, Ind., for an Improved Wagon Brake:

I claim, first, The employment of the screw coupling, e, and screw adjustment, g, for the purpose of enabling the breaks of the hind and fore wheels, to be used either separately or combined, substantially as set forth.

Second, I claim the arrangement of levers, p p, screw coupling rod, e, screw adjustment, g, connecting rods, f f, lever, i, doubletree, E, and levers, d d d d, for the purpose set forth and described.

891.—David Lyman, of Middlefield, Conn., for an Improved Mode of Attaching a Clothes'-wringer to a Tub:

I claim the employment, in wringing machines, of adjustable hinges at the point, represented by E F G, between the main frame, B, and a clamping lever or frame, C C, the latter being operated by the screw, D, or equivalent mechanical device or devices, at or near the top of the machine, all substantially in the manner described and for the purpose set forth.

892.—G. H. Magersuppe, of New York City, for an Improvement in Lanterns:

I claim the portable lantern described, capable of being readily folded into the shape and size of a pocket book, in the manner and for the purpose substantially as set forth.

893.—G. H. Mallory, of New York City, for an Improvement in Sewing Machines:

I claim placing the dog, C, upon the needle stock, B, for the purpose described, in combination with the pressure plate, p, and feed lever, l, substantially as specified.

I also claim the looper, D, when placed above the cloth table or plate, 5, in combination with a vertical needle, b, piercing the cloth upward from below, with the looper head, S, shaft, u, crank, V, rod, u2, lever, W, and cam, X, for communicating a rotary reciprocating motion to said looper, as specified.

894.—Edward Maynard, of Washington, D. C., for an Improvement in Cartridge Loaders:

I claim, first, The lateral or through aperture which communicates with the termination of the longitudinal cartridge cavity in said loader, and which may serve the respective purposes set forth.

Second, I also claim giving such a shape to the knob-head of my improved cartridge loader that a screwdriver, or some other useful article, may be jointed thereto and partially concealed therein, substantially in the manner set forth.

895.—J. R. McDonald, of Fayette, Mo., for an Improvement in Hemp Brakes:

I claim The arrangement of the cap, D, and guard, C, with the boxes, b, and shaft, B, as shown and described for the purpose set forth.

[This invention relates to certain improvements in that class of hemp brakes in which a revolving beater is employed, and has for its object the preventing of the wrapping of the hemp around the bars of the beater, a contingency hitherto of frequent occurrence, and one which detracts greatly from the efficiency of the brake. The invention also has for its object the keeping of the journals of the beater free from tow and other substances which have hitherto found their way into the journal box and impeded the operation of the machine. The invention has further for its object the regulating of the action of the beater on the hemp as occasion or the nature of the work may require.]

896.—Orlando Miller, of Girard, Pa., for an Improvement in Beehives:

I claim the detachable drone and robber trap, constructed and arranged in the manner and for the purpose substantially as specified.

897.—C. G. Page, of Washington, D. C., assignor to G. C. Robinson, of New York City, for an Improved Refrigerator:

I claim the circulating flue, i, constructed substantially as described, in combination with an ice box open on its sides, as set forth.

I also claim, in combination with said flue, i, the flue, x, in the cover of the chest, as set forth.

898.—A. E. Parks, of Brooklyn, N. Y., for an Improvement in Electro-magnetic Telegraph:

I claim, first, The recording of a telegraphic alphabet of dots and dashes by means of two pencils or styles, one of them being operated by positive and one by negative electricity.

Second, The use of an alphabet composed, substantially as described, of dots and dashes recorded at pleasure in either of two positions on the paper.

Third, The type constructed, substantially as described, of several conducting pieces insulated from each other.

Fourth, The use of the port rule, constructed substantially as described, with the wires, p1 p2 n1 n2 g1 g2 l' and l2, inserted therein.

899.—J. A. Parlett and Jeremiah Thompson, of Elmira, N. Y., for an Improvement in Plows:

We claim the arrangement of moldboard, B, landside, D, coupling bar, C, shoe or sole, H, point, E, beam, A, anchorate drawback, F, clevis, d, and handles, G, the whole being constructed in the manner and for the purpose described.

900.—A. M. Perkins, of Springfield, Mass., for an Improvement in Pumps:

I claim, first, The construction of a valve, as described, composed of a cylinder fitting into a corresponding groove in a suitable seat, the operation of opening and closing being performed by the rising of the cylinder out of, and the falling of the same into the groove, as aforesaid, when constructed and operated substantially as described.

Second, The combination of a movable valve seat with the valve chests and covers, b b, when situated under the cylinder, substantially in the manner set forth.

901.—Wm. Randall, of Uxbridge, Canada, for an Improvement in Excavators:

I claim the cylinder form box, b, and the revolving shovels, c c, as combined, for the purpose specified.

902.—D. W. S. Rawson, of Galena, Ill., for an Improvement in Varnishing Photographs on Paper:

I claim the employment of wax in the method of varnishing photographic pictures, as described.

[The object of this invention is to obtain a perfectly smooth and highly glazed surface on photographic pictures taken on paper or other flexible fabric, and to this end it consists in sticking or sealing the picture, by means of the varnish or enamel employed to finish it, to the face of a plate of glass or other smooth inflexible surface, and removing it when dry, when it retains a surface of corresponding smoothness.]

903.—J. H. Rible, of Dayton, Ohio, for an Improvement in Mowing Machines:

I claim the arrangement of the eccentric journal boxes in which the ends of the crankshaft have their bearings, in combination with the draft pole or tongue of the machine, and with the braces, H and I, which support the cutting mechanism, substantially in the manner and for the purposes set forth.

904.—Barton Ricketson, of New Bedford, Mass., for an Improved Apparatus for Setting Up Ships' Rigging:

I claim the employment, in combination with sheave blocks applied to take the place of dead eyes in standing rigging, of beckets, e e', formed upon plates, d d', arranged to oscillate upon the sheave pin, c, substantially as and for the purpose specified.

905.—A. J. Russell, of New York City, for an Improved Adhesive Material:

I claim, as an improved article of manufacture, the dry adhesive sealing material made as shown and described.

[The nature of this invention consists in a new article of manufacture formed of suitable paper or such like material, saturated or coated with an adhesive substance, and then dried; thus providing a new adhesive sealing material of great convenience for sealing papers, wrappers, packages, &c.]

906.—R. S. Sanborn, of Sycamore, Ill., for an Improved Coffee Steeper:

I claim, first, The combination of the cup, A, and perforated tube, T, substantially in the manner described.

Second, The combination of the tubular handle, R, with the cup, A, and tube, T, substantially as set forth.

907.—C. F. Schmidt, of Williamsburgh, N. Y., for an Improvement in Muzzles for Dogs and Other Animals:

I claim the described muzzle for dogs or similar animals, constructed in the manner and for the purpose set forth.

908.—J. C. Schooley, of Cincinnati, Ohio, for an Improved Bathing Apparatus:

I claim the arrangement of tub, C, shower bath, H, seat, e f g, and upright case, A, constructed substantially as and for the purposes set forth.

909.—John Sperry and C. W. Sherwood, of New York City, for an Improvement in Machines for Enameling Picture Frames:

We claim, first, The employment or use on a vertical rotating shaft, C, of a basin or enamel receiver, D', with or without lamp, E, and the frame, I, to be enameled, arranged substantially as and for the purpose specified.

Second, The scraper, J, formed of two plates, g h, connected together by a bolt, J, and arranged to operate as and for the purpose set forth.

Third, The lever, H, in combination with the pin, e, of shaft, C, and the pin, f, of the sliding or adjustable basin or receiver, D', or other suitable clutch, arranged to operate substantially as and for the purpose specified.

910.—Joseph Tiberi, of St. Louis, Mo., for an Improvement in Fire Grates:

I claim the arrangement of the said damper in the throat of the chimney, in the manner described, for the purpose specified.

911.—A. R. Turner, of Malden, Mass., for an Apparatus for Trimming Wicks:

I claim the organized apparatus described, for trimming the wicks of lamps, the same consisting substantially of the knife, g, attached to a travelling carriage, which is made to move back and forth in a horizontal plane, while the wick is firmly held by any suitable holding device during the cutting operation, as set forth.

912.—L. D. Valetton, of New York City, for an Improvement in Machines for Making Fringe:

I claim, first, The forked reciprocating carrier, B, for feeding the gimpure to the hook, g, at the proper time and in the required quantity, substantially as described.

Second, The hooked spindle, G, having a rotating motion for twisting the fringe, a vibrating movement to compensate for the shortening of the strand, and a reciprocating motion for discharging the strand and receiving another, substantially as specified.

Third, I claim, in machines for making fringe, the employment of the intermittently rotating spool frame, O, for twisting the wire around the strand, substantially as set forth.

Fourth, The employment of the rods, m m, or equivalent device, having a vibrating motion, in combination with the intermittently rotating spool frame, O, substantially as and for the purposes set forth.

Fifth, The combination of the reciprocating carrier, B, the rotating and reciprocating hook, g, and the revolving spool frame, O, or their equivalents, operating together substantially in the manner and for the purpose set forth.

913.—Wm. F. Veber, of Bowling Green, Ohio, for an Improvement in Cultivators:

I claim the arrangement of frame, A, handles, B B, slotted standard, C, shares, C', wedges, i, rods, D D D k, and slotted cross beams, c d g, the whole being constructed in the manner and for the purposes shown and explained.

[The subject of this invention is a cultivator of great simplicity and efficiency of construction, and so made that it may be readily changed to suit the varying requirements of crops at all the various stages of their growth.]

914.—W. S. Watson, of Madison, Ind., for an Improvement in Brick Machines:

I claim the combination of a pressing block, intermittently reciprocating press box formed with one or more pressing chambers, independently reciprocating plunger or plungers, and table or lifter or tables or lifters, having at intervals not only a raising and lowering action across or through the press box, but also an intermittently reciprocating motion in concert with the press box, substantially as and for the purpose or purposes set forth.

915.—H. S. White, of Newport, R. I., for an Improvement in Newspaper Files:

I claim a newspaper file composed of two strips, one of which is furnished with points or pins that pass into the holes or recesses in the other, and having slots formed in their ends, around and through which a cord or cords are wound and held by friction, for holding the slats to each other and to the paper between them, as set forth.

And I also claim fastening the slats together at their centers by means of the cord which fastens one or both of the ends of the file, as set forth and shown.

916.—S. H. Whitmore, of Cincinnati, Ohio, for an Improvement in Steam Engines:

I claim, first, The combination of two hollow-throated oscillating valves with each other, when operated by a link motion substantially as described.

Second, The application of a governor to a link, when used in combination with hollow-throated oscillating valves, for the purpose of effecting a variable cut-off, substantially as described.

Third, The V-shaped opening in the valve and valve seat of a hollow-throated oscillating valve, for the purpose of admitting steam before the valve is opened throughout its entire length, substantially as described.

917.—J. R. Whittemore, of Chicopee Falls, Mass., for an Improved Vegetable Cutter:

I claim the combination of the rotary cutters, f, and bed piece, D, and the knives, k, substantially as and for the purpose specified.

918.—J. G. Whittier, of Attica, Ind., for an Improved Boot Crimp:

I claim, first, The construction of the crimping jaws with rigid backs, flexible faces and interposed springs, substantially as and for the purposes set forth.

Second, The combination of the rod, K, set nut, L, and toggle movement, M N O, for compressing the jaws together with any desired force and readily releasing them, as explained.

[This invention is an important improvement in machines for the purpose named. The invention consists, first, in a new construction of flexible crimping jaws for pressing the boot fronts into shape upon the "form;" and, second, in a novel device for setting the jaws to any required distance asunder, and adapted to be readily and quickly released at will for withdrawing the form.]

919.—Martin Wilcox, of Middlebury, Ohio, for an Improved Steam Pump:

I claim the arrangement of the chamber, A, float, F, pipe, N, and valve, E, in combination with the valves, M and J, with the pipes, H, constructed and operating in the manner and for the purpose substantially as described.

I also claim the chamber, T, with the partitions, O O, and valve, I, in combination with the pipes, B B', valve, D, condenser, C, and pipe, G, constructed in the manner and for the purpose substantially as set forth.

920.—Stephen Wilcox, Jr., of Westerly, R. I., for an Improvement in Hot Air Engines:

I claim, first, The employment, in a hot air or gas engine, of a plunger, C, in combination with an annular piston, B, arranged and operating within the cylinder, A, substantially as and for the purposes set forth.

Second, The employment of the tight case, D, around a plunger, C, serving as the working piston of two single-acting hot air engines, in combination with the employment of one or more lugs, c, and piston rods, G, arranged substantially as represented, for the purpose of diminishing the liability of leakage of air from the interior of the engine.

921.—C. M. Wilkins, of West Andover, Ohio, for an Improved Cheese Vat Operator:

I claim the hinged rockers, J J, in combination with the hinged lever, L, operating as and for the purpose specified.

922.—Turner Williams, of Providence, R. I., for an Improvement in Means for Avoiding Dead Centers in Cranks:

I claim the use of a spring combined with a rod for directing its force, or the equivalent therefor, arranged relatively with the crank substantially as described, to effect the purpose set forth.

923.—Levi Dodge (assignor to himself and David Blake), of Cohoes, N. Y., for an Improved Shear for the Manufacture of Axes:

I claim the employment of the circular shears and dies for cutting saids steels and swadging their scarfs ready for welding, in the manner set forth.

924.—T. J. Freeman (assignor to himself and E. T. Freeman), of Heyworth, Ill., for an Improved Machine for Cutting Standing Corn Stalks:

I claim, first, The roller, B, in connection with the reciprocating knife, J, arranged for joint operation as and for the purpose set forth.

Second, The combination of the roller, B, and reciprocating knife, J, with the toothed plunger bar, Q, and frame, K, all being placed within a frame, A, as and for the purpose specified.

Third, The peculiar arrangement of the bars, G H, with the plate, j, and pin, k, essentially as shown, whereby the pitman, F, may be readily connected to the traverse piece, I, and readily disconnected therefrom for the purpose of rendering the knife operative or inoperative, as required.

[This invention consists in the use of a roller placed in a suitable frame, and used in connection with a reciprocating yielding knife, a frame for bending over the corn, and a reciprocating toothed plunger, the parts being constructed and arranged so that the desired work may be expeditiously and perfectly performed.]

925.—Luther Holden and S. B. Holden, of Woburn, Mass., assignors to themselves and J. C. Seely, of East Cambridge, Mass., for an Improvement in the Manufacture of Boots and Shoes:

We claim so preparing the sole and upper for sewing that the parts to be sewed together are brought to the condition substantially as illustrated by Figs. 1, 2, and 6, and described, that is to say, projecting from the central or principal portion of the sole, at right angles or nearly so to the face thereof, in such manner as to bring both faces of the seam on the outside of the work while the sewing is being performed.

926.—H. H. Huntley (assignor to Chamberlain & Co. and William Craven), of Cincinnati, Ohio, for an Improvement in Cooking Stoves:

I claim, first, The described central, longitudinal fire box, C, provided with cool air passages, F F', which enter the lower part of said box from opposite sides at or about its mid length, in the manner and for the objects stated.

Second, I claim a cook stove with the following elements:—an oven, A, extending from side to side of the stove, a long, narrow, longitudinal fire box, C, suspended centrally in the top of said oven, cool air passages, F F', which enter at or near the mid width of the stove sides, pass over the oven at its middle portion, and enter the lower portion of the fire box at or about its mid length, and the four corner diving flues; the whole being arranged as and for the purposes set forth.

927.—Henry Kipling (assignor to J. B. Behrmann), of New York City, for an Improvement in Bracelets:

I claim, as an improved article of manufacture, a bracelet composed of a single piece of wire arranged spirally with a central strengthening wire, C, covering, A, and tips, D, all as shown and described.

928.—R. J. Mann., of Brooklyn, N. Y., assignor to L. A. Osborn, of Newark, N. J., and I. J. Vincent, of said Brooklyn, for an Improved Method of Manufacturing Skeleton Skirts:

I claim the method of forming hoop skirts by applying the hoops and tapes, or their equivalents, to each other while they are supported in the relative positions which they are to occupy in the finished skirt, substantially as set forth.

929.—W. McCord, of Sing Sing, N. Y., assignor to himself, C. F. Cox, of said Sing Sing, and Robert Woodward, of New Egypt, N. J., for an Improvement in Fire-arms:

I claim, first, The combination and arrangement of the cams, H H', on the upright shaft, I, parallel bars, b, on the lower part of the reciprocating block or plate, F, sliding plates, M N, having spaces formed in their enlarged ends, and rammers, P', attached and inclined cartridge chamber slots or channels, Q, formed in the transverse block, D; the said cams, H H', giving the necessary reciprocating movements to the said block or plate, F, and sliding plates or rammers, at the proper intervals of time in relation to each other, substantially in the manner and for the purpose fully set forth.

Second, I claim forming the lower part of the hopper, R, as represented and described, with a knife-edged partition between the entrances to the cartridge slots or channels, Q, for the purpose of preventing the detachable cartridge chambers, F2, choking up the entrances to said slots or channels as they descend into the same, as set forth.

Third, I claim the peculiar tangential and eccentric form of the portions of the cams, T, immediately next the more abrupt portions from which the ends of the spring hammers, S, are tripped, in combination with said spring hammers operating in the manner and for the purpose described.

930.—James Nevison, of Morgan, Ohio, assignor to himself and A. D. Wood, of Buffalo, N. Y., for an Improvement in Stave Machines:

I claim the levers, o and p, and spring, in combination with the cords, n and n, connected with the saw frame, for the purpose of operating the feed words, as described.

931.—H. B. Peck, of Wolcott, N. Y., assignor to L. T. Snedaker, of Clyde, N. Y., for an Improved Method of Arranging Fly Wheels:

I claim the employment of a comparatively light fly wheel, F, made to produce the required effect by running it at a higher rate of speed than that of any part of the working train or machinery, in combination with an adjustable rolling pressure brake, H J K L, or its equivalent, for varying the machinery, substantially as and for the purpose specified.

932.—G. N. Seidler (assignor to Rawson Read), of Hartford, Conn., for an Improved Portable Folding Bed:

I claim the combination of the box or framework, a and f, racks, m and o, supports, h h', having the padded springs, x c, arranged substantially in the manner and for the purpose described.

933.—Gustavus Zchech and Jacob Kiefer, of Indianapolis, Ind., for an Improvement in Shingle Machines:

We claim the guide, v, working on the pin, t t, when used for the purpose set forth.

934.—J. C. Tiffany, of New York City, and G. G. Heermance, of Hudson, N. Y., for an Improvement in the Means of Promoting Combustion in the Furnaces of Steam Boilers:

We claim the heated chamber, f, through which air passes, combined with the pipe, e, within said chamber, supplying a regulated amount of steam or vapor which combines with the air in said heated chamber and passes off to the fire through a suitable opening or openings, as and for the purposes specified.

We also claim the construction of the chamber, f, represented in Fig. 3, with the lugs and spikes, for the purposes and as set forth.

RE-ISSUES.

58.—Leonard Campbell and T. W. Brown, of Columbus, Miss, assignees of said Campbell, for an Improvement in Cotton Gins. Patented May 22, 1855:

I claim, first, Ginning the cotton, stretching and straightening its fiber, and combing the same, at one continuous operation, by means of a combination of the gin saws, a, brush cylinders, E F, and stationary brush bar, I, substantially in the manner described.

Second, The use of a stationary brush bar, in combination with the brush cylinder, E, substantially in the manner and for the purpose described.

Third, The employment of a combined mote and cotton discharge board, constructed of two planes placed at certain angles or in certain relative positions to each other, substantially as and for the purposes set forth.

Fourth, The employment of a wind and guard plate, G', in combination with the brush, F, that takes the cotton from the gin saws, substantially as and for the purposes set forth.

Fifth, The combination of the gin saw, the brushes, the brush bar, the division wind board, the perforated concave, the wind and guard plate, and the combined mote and cotton separating board, substantially as and for the purposes set forth.

59.—Francis Draper, of East Cambridge, Mass., for an Improvement in Fountain Inkstands. Patented Jan. 7, 1851:

I claim, first, Extending the tube of the dipping cup, made adjustable up and down by screw or otherwise, down to the bottom of the reservoir, and so fitting or packing the lower end of said tube and bottom of the reservoir, or either, as to establish a cut-off at pleasure between the dipping cup and reservoir at the bottom of the latter, substantially as specified

Second, In combination with the piston or cut-off for closing the tube at the end of the stroke, substantially as shown and described, I claim the formation in the bottom of the reservoir of a cup or recess, as set forth.

Third, The combination with the reservoir and adjustable dipping-cup or tube, of an inner or intermedite cylinder for operation together essentially as specified.

60.—C. F. J. Colburn, of Newark, N. J., for an Improved Evaporator for Hot Air Pipes. Patented Jan. 22, 1861:

I claim, first, The arrangement of the reflector, C, in combination with the evaporating vessel, A, and hot air pipe, B, as described, for the purpose of facilitating the evaporation and to prevent the dust rising into the apartment.

Second, Making the evaporating vessel, A, or a portion of the same, of unglazed earthern ware, or some other porous material, substantially as and for the purpose specified.

Third, Constructing the vessel, A, of two parts, a and b, the part, a to be made of porous material, and the part, b, to contain a lamp wick or its equivalent, substantially as and for the purpose set forth.

[A full description of this invention will be found in No. 7, Vol. IV. (new series), of the Scientific American.]

61.—Jonathan Smith, of Tiffin, Ohio, for an Improvement in Seed Drills. Patented Jan. 4, 1860:

I claim, first, Producing a direct downward pressure on the grain by the ratchet washer, when its lateral agitation by the corrugated plates is suspended, to insure a continuous flow of grain, substantially in the manner described.

Second, The thin metal corrugated wheels, D, and ratchet washers, E, conforming therewith in lateral surface, in combination with shaft, A, collars, F, and concave hopper bottom, B, the operation being as set forth.

62.—L. F. Munger, of Rochester, N. Y. (formerly of Le Roy, N. Y.), for an Improvement in Locks. Patented July 14, 1857:

I claim, first, A series of wheels, W, revolving on a common center and provided with teeth or indentations at their peripheries, for changing their position relatively with other wheels, V, or their equivalents, when each of the wheels, W, aforesaid has a pin projecting from its side or sides, so placed as to interlock with similar pins in the wheel or wheels next adjoining it, to operate substantially as and for the purpose set forth.

Second, The combination of the wheels, W, with the wheels, V, or their equivalents, when the latter are arranged or placed on an adjustable axis or shaft, specifically as shown, for the purpose of connecting and disconnecting the wheels, W, and the wheels, V, or their equivalents, as specified.

63.—A. W. Morse (assignee of J. H. Maydole and A. W. Morse), of Eaton, N. Y., for an Improvement in Grass Harvesters. Patented Feb. 6, 1855:

I claim, first, Combining with the finger bar of said grass harvester an adjustable arm or lever, c, provided with a roller or other means of passing easily over the ground, for the purpose of sustaining the finger bar at any required distance from the ground, or allowing it to rest upon the ground at pleasure, for the purpose set forth.

Second, The arrangement of the aforesaid arm or lever, c, in near proximity with the driver's seat, for the purpose of operating the finger bar, in the manner substantially as described.

Third, The combination of the brace bar, K, with the frame of the said improved grass harvester, when the said bar is arranged in such a manner as to form a lateral support to the operating arm or lever, c, substantially as described.

Fourth, The adjustable wheel, a, which serves as a fulcrum for raising the cutting apparatus, in combination with the inner shoe, substantially as set forth, and for the purposes specified.

DESIGN.

N. S. Vedder (assignor to Ingraham & Phillips). of Troy, N. Y., for a Design for a Cooking Stove.

Note.—The title of Henry Jenkins' patent, re-issued March 5, is "Improvement in the Process of Manufacturing Wire Grating," instead of "Improvement in Machinery for Weaving Wire Grating," as published on page 190 of the current volume.

New Pamphlets in German.—We have just issued a revised edition of our pamphlet of *Instructions to Inventors*, containing a digest of the fees required under the new Patent Law, &c., printed in the German language, which persons can have gratis upon application to this office. Address MUNN & CO.,
No. 37 Park-row, New York.

Notes & Queries

J. H., of Ill.—By treating coal oil with caustic alkali, then washing it with warm water, you will remove nearly all its unpleasant odor. India-rubber does not dissolve well in rape seed oil, but it will do so in coal oil. The assignment of a patent deed can be recorded at any time after it is obtained, but a suit cannot be brought by the assignee until it is entered on record at the Patent Office. It has been held in Massachusetts that the assignment of a patent is valid without being recorded; it is certainly not invalid by not being recorded within 90 days after it is made. The statute in this respect is merely directory. Matches are dipped into molten brimstone, then dried before they are tipped with the igniting composition. Emery paper is the best to use for rubbing friction matches upon.

D. D. W., Jr., of Fla.—Decker & McRae, of Reidsville, Pa., are the inventors of the stave jointing and dressing machine illustrated on page 305, Vol. II. (new series) of the Scientific American. E. & B. Holmes, of Buffalo, N. Y., manufacture the kind described on page 332, same volume, and the stave jointer illustrated on page 216 of the current volume was invented by Bowker & Bensel, of this city.

B. C., Jr., of Mass.—The heat given off by air as it is compressed, is again absorbed as the air expands. Engines working by compressed air get very cold.

F. H. A., of Mass.—We do not know what becomes of all the scrap tin. Cart loads of it may be sometimes seen thrown down in vacant lots throughout this city.

L. P. S., of Conn.—You can make a very good cement for the outside of buildings by using pure clay dried thoroughly, reduced to powder, and mixed with boiled linseed oil until it attains the proper consistency. It may be colored with any of the common pigments used for painting. The cement which is employed to coat the fronts of brick buildings, so as to make them resemble brown sandstone, is composed of dried sand, containing about twenty per cent of litharge and five per cent of plaster-of-Paris, mixed together and slightly moistened with boiled linseed oil. The buildings are prepared to receive it with two, and sometimes three coats of boiled linseed oil. It appears almost dry when put on; it soon becomes hard and is very durable.

C. P. H., of Ill.—Paint is liable to flake off when the clapboards contain considerable resin or if they are wet when the paint is put on. But if the surface be dry and the paint made up with good linseed oil, and put on first in a thin primary coat, it will not scale off. If resin or varnish is mixed with the paint it will scale off.

J. P. J., of Minn.—The floss of the milk weed is too short in the fiber and too weak to be employed for spinning and weaving into thread or cloth.

J. J. L., of Ky.—Canvas prepared with boiled linseed oil and laid upon a roof makes a good water-tight protection; but we think you will find it more expensive and less durable than shingles. Coal tar mixed with asphalt in equal parts, and applied hot to a roof covered with canvas, does very well if covered on the top with a thick coat of sand and air-slacked lime.

P. McK., of S. C.—There is no work published that contains the information which you wish respecting river steamers; but there is an English publication that can be obtained on propellers and ocean steamers.

M. J. O., of Mass.—Pale varnish, containing a very minute quantity of fine Paris white, applied to glass makes it appear like ground glass.

O. W. S. H., of Ill.—We do not know the fireproof paint to which you refer by the name of "Anta." Dry clay, ground to fine powder and mixed with linseed oil, makes a moderately good fireproof paint. Strictly speaking, however, there is no such thing as a perfect fireproof paint known to us.

T. J., of Ga.—A solution of size (common glue) applied to wood, then allowed to dry, will form a good base to prevent the varnish entering the pores, but we do not see what injury the varnish can do in filling up the pores.

S. C., of Ohio.—The best substance known to us to apply to wooden slides, to prevent them from shrinking and swelling, is good linseed oil.

Money Received

At the Scientific American Office on account of Patent Office business, for the week ending Saturday, April 6, 1861:—

I. P., Jr., of N. Y., $30; H. A. H., of Mass., $25; J. B. S., of N. Y., $15; F. H., of Mass., $100; S. R. W., of Conn., $10; J. A. De B., of N. Y., $32; C. H., of N. H., $20; B. T. W., of Wis., $15; W. & H., of Ohio, $25; Van W. & M., of N. J., $25; S. R. W., of N. Y., $45; H. B., of N. J., $15; T. & G., of Mich., $10; S. J. M., of Ohio, $15; T. D., of Iowa, $10; M. C. B., of N. H., $50; F. F. M., of N. Y., $100; N. A. P., of Tenn., $60; E. J. Y. P., of N. Y., $20; E. D., of N. Y., $25; H. C. D., of Mich., $25; J. G., of Miss., $30; J. H., of N. J., $10: H. W., of ——, $25; S. & A., of Ohio, $15; A. B., of N. J., $25; N. M., of Ohio, $20; I. J. F., of Mass., $25; M. C., of Iowa, $10; J. S. Y., of N. Y., $15; W. W. R., of Wis., $25; A. A., of Ill., $10; S. J. H., of N. Y., $15; D. K., of Mich., $10; A. M. H., of Cal., $20; A. M. H., of Conn., $15; C. J. E. T., of R. I., $25; O. F. W. D., of Pa., $15; L. M. S., of N. Y., $20; M. T. G., of Ill., $10; C. H. D., of Vt., $15; J. J. M., of N. Y., $28; W. S., of Mich., $40; J. O. F., of Mass., $20; T. & E., of Pa., $25; P. B., of N. Y., $25; P. D. B., of Mich., $10; D. P., of Iowa, $10; J. McA. G., of Mass., $15; J. McD., of N. Y., $25; H. P., of N. Y., $25; C. B., of N. Y., $25; A. J. S., of Ill., $15; J. N. W., of Pa., $25; W. S. K., of Conn., $40; H. P., of N. Y., $40; W. N. B., of Iowa, $40; I. H. W., of N. J., $10; F. & S., of N. Y., $15; W. Q., of Pa., 15; J. B. L., of N. Y., $10; J. L., of Mass., $25; H. Y., of N. Y., $15; G. H., Jr., of Conn., $10; M. & C., of Pa., $25; C. & B., of Mass., $10; G. K., of N. Y., $40; C. F. C., of Mass., $20; J. C. S., of Mass., $40; E. G., of N. Y., $25; P. P. W., of N. Y., $25; F. G. J., of L. I., $100; C. G. D., of N. Y., $22; M. A. D., of Mich., $10; P. T., of N. Y., $25; S. R. W., of L. I., $45; J. W. S., of N. J., $10; J. T., of Conn., $25; J. B. L., of N. Y. $12.

Specifications, drawings and models belonging to parties with the following initials have been forwarded to the Patent Office during the week ending March 30, 1861:—

[The patents on these cases, when issued, will be granted for seventeen years under the new Patent Law.]

C. G. D., of Mich.; J. R. R., of Mass.; W. W. R., of Wis.; J. R., of Pa.; C. H., of N. H.; G. W. R., of N. Y.; N. A. B., of N. Y.; G. H., Jr., of Conn.; T. D., of Iowa; H. C. H., of Ill.; G. W. R., of Ill.; M. & C., of Pa.; S. R. D., of L. I.; P. D. B., of Mich.; J. N. W., of Pa.; I. J. F., of Mass.; W. D. B., of Mass.; H. S., Jr., of N. Y.; P. T., of N. Y.; C. & B., of Mass.; M. T. G., of Ill.; C. J. E. T., of R. I.; D. K., of Mich.; A. B., of N. J.; S. R. W., of N. Y. (2 cases); D. P., of Iowa; H. A. H., of Mass.; S. R. W., of Conn.; W. & H., of Ohio; J. McD., of N. Y.; J. A. De B., of N. Y.; H. B., of Conn.; T. & G., of Mich.; J. L., of Mass.; H. P., of N. Y.; J. T., of Conn.; J. B. L., of N. Y.

TO OUR READERS.

Models are required to accompany applications for Patents under the new law, the same as formerly, except on Design Patents, when two good drawings are all that is required to accompany the petition, specification and oath, except the government fee.

Binding.—We are prepared to bind volumes, in handsome covers, with illuminated sides, and to furnish covers for other binders. Price for binding, 50 cents. Price for covers, by mail, 50 cents; by express or delivered at the office, 40 cents.

New Books and Periodicals Received.

Blackwood's Magazine. Published by Leonard Scott & Co., Gold-street, this city.

The number for this month of this veteran periodical contains two interesting scientific articles; one on iron-clad ships of war, and the other on the physical geography of the sea. The other articles are excellent.

The Atlantic Monthly. Published by Ticknor & Felds, Boston.

The April number has the conclusion of the "Professor's Story." It is very inferior to the other series of articles by Holmes.

CHANGE IN THE PATENT LAWS.

NEW ARRANGEMENTS—PATENTS GRANTED FOR SEVENTEEN YEARS.

The new Patent Laws, recently enacted by Congress, are now in full force, and promise to be of great benefit to all parties who are concerned in new inventions.

The duration of patents granted under the new act is prolonged to seventeen years, and the government fee required on filing an application for a patent is reduced from $30 down to $15. Other changes in the fees are also made as follows:—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Re-issue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing Disclaimer	$10
On filing application for Design, three and a half years	$10
On filing application for Design, seven years	$15
On filing application for Design, fourteen years	$30

The law abolishes discrimination in fees required of foreigners, except in reference to such countries as discriminate against citizens of the United States—thus allowing English, French, Belgian, Austrian, Russian, Spanish, and all other foreigners except the Canadians, to enjoy all the privileges of our patent system (except in cases of designs) on the above terms.

During the last sixteen years, the business of procuring Patents for new inventions in the United States and all foreign countries has been conducted by Messrs. MUNN & CO., in connection with the publication of the SCIENTIFIC AMERICAN; and as an evidence of the confidence reposed in our Agency by the Inventors throughout the country, we would state that we have acted as agents for more than FIFTEEN THOUSAND Inventors! In fact, the publishers of this paper have become identified with the whole brotherhood of Inventors and Patentees, at home and abroad. Thousands of Inventors for whom we have taken out Patents have addressed to us most flattering testimonials for the services we have rendered them, and the wealth which has inured to the Inventors whose Patents were secured through this Office, and afterward illustrated in the SCIENTIFIC AMERICAN, would amount to many millions of dollars! We would state that we never had a more efficient corps of Draughtsmen and Specification Writers than are employed at present in our extensive Offices, and we are prepared to attend to Patent business of all kinds in the quickest time, and on the most liberal terms.

The Examination of Inventions.

Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and submit it to us, with a full description, for advice. The points of novelty are carefully examined, and a reply written corresponding with the facts, free of charge. Address MUNN & CO., No. 37 Park-row, New York.

Preliminary Examinations at the Patent Office.

The advice we render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there, but is an opinion based upon what knowledge we may acquire of a similar invention from the records in our Home Office. But for a fee of $5, accompanied with a model or drawing and description, we have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a Patent, &c., made up and mailed to the Inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through our Branch Office, corner of F and Seventh-streets, Washington, by experienced and competent persons. Over 1,500 of these examinations were made last year through this Office, and as a measure of prudence and economy, we usually advise Inventors to have a preliminary examination made. Address MUNN & CO., No. 3 Park row, New York.

Caveats.

Persons desiring to file a Caveat can have the papers prepared in the shortest time by sending a sketch and description of the invention. The government fee for a Caveat, under the new law, is $10. A pamphlet of advice regarding applications for Patents and Caveats furnished gratis on application by mail. Address MUNN & CO., No. 37 Park-row New York.

How to Make an Application for a Patent.

Every applicant for a Patent must furnish a model of his invention, if susceptible of one; or if the invention is a chemical production, he must furnish samples of the ingredients of which his composition is composed, for the Patent Office. These should be securely packed, the Inventor's name marked on them, and sent, with the government fee, by express. The express charge should be prepaid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by draft on New York, payable to the order of Munn & Co. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but if not convenient to do so, there is but little risk in sending bank bills by mail, having the letter registered by the postmaster. Address MUNN & CO., No. 37 Park-row, New York.

Rejected Applications.

We are prepared to undertake the investigation and prosecution of rejected cases, on reasonable terms. The close proximity of our Washington Agency to the Patent Office affords us rare opportunities for the examination and comparison of references, models, drawings, documents, &c. Our success in the prosecution of rejected cases has been very great. The principal portion of our charge is generally left dependent upon the final result.

All persons having rejected cases which they desire to have prosecuted are invited to correspond with us on the subject, giving a brief history of their case, inclosing the official letters, &c.

Foreign Patents.

We are very extensively engaged in the preparation and securing of Patents in the various European countries. For the transaction of this business, we have offices at Nos. 66 Chancery-lane, London; 29 Boulevard St. Martin, Paris; and 26 Rue des Eperonniers, Brussels. We think we can safely say that THREE-FOURTHS of all the European Patents secured to American citizens are procured through our Agency.

Inventors will do well to bear in mind that the English law does not limit the issue of Patents to Inventors. Any one can take out a Patent there.

Circulars of information concerning the proper course to be pursued in obtaining Patents in foreign countries through our Agency, the requirements of different Patent Offices, &c., may be had gratis upon application at our principal office, No. 37 Park-row, New York, or either of our Branch Offices.

Interferences.

We offer our services to examine witnesses in cases of interference, to prepare arguments, and appear before the Commissioner of Patents or in the United States Court, as counsel in conducting interferences or appeals.

For further information, send for a copy of "*Hints to Inventors.*" Furnished free. Address MUNN & CO., No. 37 Park-row, New York.

The Validity of Patents.

Persons who are about purchasing Patent property, or Patentees who are about erecting extensive works for manufacturing under their Patents, should have their claims examined carefully by competent attorneys, to see if they are not likely to infringe some existing Patent, before making large investments. Written opinions on the validity of Patents, after careful examination into the facts, can be had for a reasonable remuneration. The price for such services is always settled upon in advance, after knowing the nature of the invention and being informed of the points on which an opinion is solicited. For further particulars, address MUNN & CO., No. 37 Park-row, New York.

Extension of Patents.

Valuable Patents are annually expiring which might be extended and bring fortunes to the households of many a poor Inventor or his family. We have had much experience in procuring the extension of Patents; and, as an evidence of our success in this department, we would state that, in all our immense practice, we have lost but *two* cases, and these were unsuccessful from causes entirely beyond our control.

It is important that extension cases should be managed by attorneys of the utmost skill to insure success. All documents connected with extensions require to be carefully drawn up, as any discrepancy or untruth exhibited in the papers is very liable to defeat the application.

Of all business connected with Patents, it is most important that extensions should be intrusted only to those who have had long experience, and understand the kind of evidence to be furnished the Patent Office, and the manner of presenting it. The heirs of a deceased Patentee may apply for an extension. Parties should arrange for an application for an extension at least six months before the expiration of the Patent.

For further information as to terms and mode of procedure in obtaining an extension, address MUNN & CO., No. 37 Park-row, New York.

Assignments of Patents.

The assignment of Patents, and agreements between Patentees and manufacturers, carefully prepared and placed upon the records at the Patent Office. Address MUNN & CO., at the Scientific American Patent Agency, No. 37 Park-row, New York.

It would require many columns to detail all the ways in which the Inventor or Patentee may be served at our offices. We cordially invite all who have anything to do with Patent property or inventions to call at our extensive offices, No. 37 Park-row, New York, where any questions regarding the rights of Patentees, will be cheerfully answered.

Communications and remittances by mail, and models by express (prepaid), should be addressed to MUNN & CO., No. 37 Park-row, New York.

Zur Beachtung für deutsche Erfinder.

Die Unterzeichneten haben eine Anleitung, die Erfindern das Verhalten angibt, um sich ihre Patente zu sichern, h: ausgegeben, und verabfolgen solche gratis an dieselben.

Erfinder, welche nicht mit der englischen Sprache bekannt sind, können ihre Mittheilungen in der deutschen Sprache machen. Skizzen von Erfindungen mit kurzen, deutlich geschriebenen Beschreibungen beliebe man zu addressiren an

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nebst den Regeln und der Geschäftsordnung der Patent-Office und Anleitungen für Erfinder, um sich Patente zu sichern, in den Ver. St. sowohl als in Europa. Ferner Auszüge aus den Patent-Gesetzen fremder Länder und darauf bezügliche Rathschläge; ebenfalls nützliche Winke für Erfinder und solche welche patentiren wollen.

Preis 20 Cts., per Post 25 Cts.

Coal Oil Explosions.

In distilling petroleum and coal oil, some of the vapors pass over at a very low temperature. The lightest of them is so volatile that it requires to be condensed with a very cold mixture of ice and salt; and we have been informed that it will boil at 20° Fah. We have noticed that several varieties of mineral oil, of a very low specific gravity, have lately become somewhat common. They are sparkling and clear, and free from unpleasant smell; but they are just as dangerous as the old "explosive fluids." We have examined one specimen of this oil, so volatile that its boiling point was only 90° Fah. Explosions in lamps are caused by hydro-carbon fluids vaporizing at a low temperature, and mixing with about eight volumes of atmospheric air. As the light oils of this class vaporize at the temperature of our summer months, those who burn them should be careful to keep their lamps tight, their oil cans in a cool cellar or refrigerator, and be very careful never to spill the fluid in close proximity to a light or fire, under penalty of an explosion. When any hydro-carbon vapor, such as that of mineral oil or alcohol, or when any common coal or resin gas, becomes saturated with oxygen, it is then in a condition to produce instantaneous combustion when ignited. This will explain the cause of such explosions.

Ship Building.—The invention of this art is attributed to the Egyptians; the first ship (probably a galley) being brought from Egypt to Greece by Danaus, 1485 B. C. The first double-decked ship was built by the Pyrians, 786 B. C. The first double-decked one built in England was of 1,000 tuns burthen, by order of Henry VII., A. D. 1509; it was called the *Great Harry*. Before this time, 24-gun ships were the largest in any navy, and these had no port holes, the guns being on the upper decks only. Port holes and other improvements were invented by Descharges, a French builder at Brest, about 1500. Ship building was first treated as a science by Paul Hoste, a French mathematician, in 1696. A 74-gun ship was put upon the stocks at Van Dieman's Land to be sheathed with india-rubber in 1829, but never completed. For beautiful models and fast sailing, the shipping of the United States, especially the packet ships and steamers sailing from New York, are not equalled by any in the world.

Stamping Glass.—The art of stamping glass has been successfully practiced for several years by Mr. Moore, of London, and the process is thus described in the *Mechanics' Magazine*:—A sheet of glass is placed in a suitable furnace, and submitted to heat until it becomes somewhat soft. It is then taken out, placed between two cast iron plates, one of which has an impression on it in alto, and the other in relievo. These two plates are then pressed together by a lever, and the glass compressed between them as in a mold. When pressed, the sheet is transferred to another furnace, where it is softened and flattened, with the exception of the raised figures; it is then placed in an annealing furnace, and after this it is ready for use. This raised figured glass is employed for ornamental purposes.

Curing Rancid Butter.—A correspondent of the *Rural Register* gives the following recipe for curing rancid butter:—For 100 lbs. rancid butter, take 2 lbs. fine white powdered sugar, 2 ounces saltpeter finely pulverized, and as much fine dairy salt as you wish to add to the butter to make it to your taste. The butter has to be thoroughly washed in cold water before working in the above ingredients. The amount used should be in proportion to the strongness of the butter.

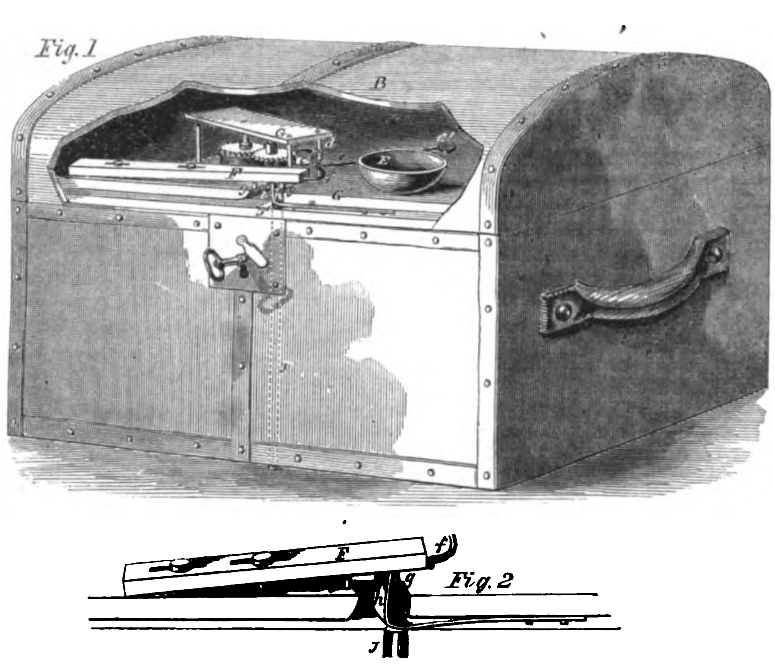
Improved Trunk Alarm.

It is probable that more valuables have been stolen from trunks than from any other receptacles, this kind of robbing being so common that it is generally considered a proof of folly to leave anything of value in a trunk. But it is sometimes difficult to avoid this, and therefore any invention which tends to make the stealing from trunks more difficult must be of general interest, and prove valuable to the inventor.

The accompanying engravings illustrate an invention for the application of an alarm clock to a trunk in such a manner that the alarm will be sounded whenever the trunk is either opened or raised from the floor; the apparatus being secured within the lid in a very compact manner. Fig. 1 represents the trunk, with the lid broken away to show the alarm clock and its connections. To sound the alarm, the bell, E, is struck by the hammer, e', which is connected by its rod, e, to the rockshaft, b, this shaft receiving a rocking motion through the verge, c, from a clock spring wound in the usual manner within a barrel or drum. The whole of this invention is embraced in the devices by which the works of the alarm are kept at rest until the trunk is raised or the lid is opened, and are then immediately sounded. To this end, an arm, *f*, is secured to the rockshaft, *b*, and the end of this arm is brought against the end of the sliding bar, F, which is held in place by the spring, *h*, Figs. 1 and 2, this spring having a tendency to press downward, but being forced up in the position shown by the rod, J, which passes down through the bottom of the trunk, and rests with its lower end upon the carpet or floor. It will be seen that if the trunk is raised from the floor the spring, *h*, being no longer forced upward by the rod, J, will bend downward, thus releasing its hold upon the pin, *g*, of the rod, F, when this rod will be pushed backward out of the way by the arm, *f*, and thus the rockshaft will be left free to vibrate and ring the alarm. Raising the lid also relieves the spring, *h*, in the same manner.

The trunk is prepared for being left by slipping the rod, F, forward till the pin, *g'*, catches into the hole, *i*, and winding up the spring with an ordinary clock key; the pin, *g'*, holding the rod, F, against the arm, *f*, and thus preventing the clock from running. But the closing of the trunk lifts the rod, F, so as to bring the pin, *g'*, out of the hole, *i*, into the position shown in the engravings, ready to sound an alarm in the manner explained.

The patent for this invention was granted, through the Scientific American Patent Agency, on March 19, 1861; and further information in relation to it may be obtained by addressing the inventor, C. W. Taylor, at Pittsburg, Pa.



TAYLOR'S IMPROVED TRUNK ALARM.

The first prize and the royal medal of the Royal Institution of British Architects, for the year 1861, has been awarded to J. B. Lesuer, architect, of Paris, who is a corresponding member. No distinction is made by this institution between natives and foreigners.

Writing Inks.—The following recipes for making good black inks are taken from the London *Chemical News*. The first is an ink much used in France, and said to be one of the best in use:—1st. Aleppo galls, in coarse powder, 8 ounces; logwood chips, 4 do.; sulphate of iron, 4 do.; powdered gum arabic, 3 do.; sulphate of copper, 1 do.; crystallized sugar, 1 do. Boil the galls and logwood together in 12 lbs. of water for an hour, or until the water has been evaporated; strain the decoction through a hair sieve, and add the other ingredients; stir until the whole, especially the gum, be dissolved, and then leave at rest for 24 hours, when the ink is to be poured off into glass bottles and carefully corked. 2d. Triturate in a mortar 36 grains of gallic acid with 3½ ounces of strong decoction of logwood; put it into an 8-ounce bottle, together with 1 ounce of strong ammonia. Next dissolve 1 ounce of sulphate of iron in half an ounce of distilled water by the aid of heat; mix the solutions together by a few minutes' agitation, when a good ink will be formed, perfectly clear, which will keep good any length of time without depositing, thickening or growing moldy, which latter quality is a great desideratum, as ink undergoing that change becomes worthless. It will not do to mix with ordinary ink, nor must greasy paper be used for writing on with it.

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