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Contents:

(Illustrations are indicated by an asterisk.)

EXTENSION OF PATENTS—FOR WHOSE BENEFIT THEY ARE GRANTED.

There seems to be an impression among inventors that since the law of March 4, 1861, went into force the previous law, in respect to extending patents for seven years, was abrogated. This is not so in regard to cases which were patented under the old law. Any patent which was granted prior to March 4, 1861. may be extended for seven years on proper application to the Patent Office, provided the patentee has not already been amply remunerated for his invention and proves to the satisfaction of the Commissioner that he has used proper diligence in attempting to realize gains from his patent. The patentees of 1851 should lose no time in making out a statement of their profits and losses in consequence of their patents, and in seeing counsel in regard to an extension, if they wish the term of these expiring patents continued for another seven years.

It is often the case that the extended term of a patent produces to the patentee a ten-fold profit over the amount realized during the first fourteen years of its existence. The assignees of a patent cannot obtain this extension: it must be done at the instance of the inventor—or, if deceased, his heirs may apply for the extension, but in either case ninety days' notice of their intention should be given—for whose sole benefit it is granted.

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FINE TOOLS.

It is a trite saying that "a bad workman quarrels with his tools;" but a corollary ought to be added to this effect: "a good workman quarrels with bad tools." Watch-makers, engravers, mathematical instrument-makers, die-sinkers, model-makers, mechanical dentists, machinists, in fact all metal-workers, have occasion to use the best tools. They cannot always find time to make them, and as a consequence are obliged to resort to stores; this is all very natural and proper.

The intelligent American workman must have remarked the almost universal prevalence of foreign brands on fine tools and instruments of all kinds. Stubb's screw plates are the best in market. A bolt screwed in one of them *fits* the hole made by the tap, which is more than can be said of other brands. The threads are fine and well-proportioned; instead of being a shallow groove on the bolt it is clean and well defined. This is as it should be. The rimmers of this same brand are perfect tools. They are five-sided; in this form they are less likely to stick or jam, for one edge that cuts is always backed up by two other edges, so there are no two cutting opposite each other. They are so finely tempered that the sharp ends of the small sizes scratch glass, and they work in tough, unannealed steel without injury. Wherever we go we see the same articles inquired for. They have become standard, and men buy them because they know they will do good service.

Why do we not make our fine tools? Darling and Schwartz, of Bangor, Maine, make a steel scale which is both a straight edge and a rule, and is divided into very minute fractional parts of an inch. This tool cannot be excelled. J. R. Browne and Sharp, of Providence, R. I., make steel scales, wire gages, steel squares, and vernier callipers of excellent workmanship and material. Some few other firms make twist drills, of late, but beyond these there are few who manufacture fine machinists' or metal-workers' tools. The saws that jewellers use must return an immense profit. They are at present sold for five cents each, and it is manifest, from the burrs on the side of the blades, that the teeth are cut on hundreds of them at once. Indeed a planer bed or a milling machine might be stowed full of these things from end to end, so that they could be sold by the makers for a slight advance on the price of the raw material. Those used at present are of Swiss or French make.

Look at the countless array of tools wanted by mechanics. Small taps, screw plates, tap wrenches, rimmers, small hammers, screw-drivers, drills, and drill bows, or their equivalent, saws, mandrels of standard sizes, etc., etc. There is no need to specify the whole paraphanalia of the machinists' or metal-workers' bench. They ought to be made at home instead of being imported. These hints are for the benefit of whom it may concern. We should like to see American mechanics using American tools, and we are sure that any one having sufficient capital and patience enough to wait until he, or they, could make a market for their goods, would reap an ample fortune. Respecting the ability of our workmen to compete with foreign production there is no question. When we can make drills for musket cones, or watch pinions, that will drill 150 feet in steel, without being ground or tempered, we can make anything else of equal excellence that we choose to turn our hands to.

LOCATION OF STEAM GAGES AND INDICATORS

A correspondent informs us that he has two steam boilers connected by a pipe which is furnished with a stop valve for closing the communication between the boilers. He recently had the valve closed and found that the pressure in one boiler was 50 pounds to the square inch and in the other 20. On opening the valve the pressure immediately rose to 65 pounds. It would be interesting to have further par ticulars in regard to this experiment, but with our present light we are inclined to attribute the surprising result to the location of the gage in such position that it was acted upon by the current of steam in its passage from the high pressure boiler to the lower.

The action of currents of steam, though familiar to engineers in other situations, seems to have been strangely overlooked in its effect upon gages and indicators. Clark, in his most able work on the locomotive, states that repeated observations showed the pressure to be greater in the steam chest than in the boiler, and he remarks that from the carefulness with which the observation was made and the perfection of the instruments, it is as difficult to doubt the statement as it is to believe it. There may be difficulty in doubting the statement, but to believe it is simply impossible. Steam will not flow from a vessel of lower pressure into a vessel of higher pressure. There must have been some error in the observation, and a very probable cause of this was the location of the gage in such position that it received the impact of the swiftly moving current of steam which rushes from the boiler into the steam chest.

Currents of steam may operate not only to raise the mercury in a gage, but also to lower it so as to indicate no pressure whatever, even in engines working steam at a pressure of 30 or 40 pounds to the inch. This effect is produced by inserting the gage pipe at right angles to the current of steam, when the steam is drawn out of the pipe by the friction of the passing current, and we may even have the indication of a partial vacuum. This matter is worthy of attention on the part of the builders and runners of steam engines.

LIGHT WANTED.

Most of the Examiners in the several departments of the Patent Office keep their work well up, so that but a reasonable delay occurs between the filing of an application for a patent and the official decision. But there is one class of cases which is sadly neglected, and which, in behalf of inventors, we ask the Commissioner to have corrected. We refer to the class designated "Photics," *i. e.*, the room in which coal-oil and other lamps are attended to. Not a day passes but what one or more applicants for a patent in this line writes to us or calls at our office to inquire when his application for a patent, made months before, will be acted upon. A gentleman at the West, whose application for a lamp was filed in the Patent Office May 4, 1864, writes under date of October 31, as follows:—"I should like to know about my lamp application. The delay has been a serious injury to me. I should like to know at once what has been done in the matter. I have a matter to patent far more important than anything I have yet sent you, which I shall put in other hands unless I can learn something definite about my present application. It has been longer than I ever waited before for a decision after making an application."

This extract is a sample of letters of complaint we are constantly receiving from inventors who have cases pending in the "Photic" department. Will Commissioner Holloway see that the great coal-oil *consuming* interest is attended to?

WAR A STIMULANT TO INVENTION.

The impregnable fleets of ironclads which protect the waters of these United States might never have been but for the presence of war. Secure in its pacific policy the Government would have watched the progress of more belligerent nations toward building armored ships, without making a similar provision. Even after the war actually commenced it was hard to convince some officials that iron-clad ships were useful, and not until positive evidence was given of their necessity did Government set to work at them in earnest.

The case has been the same with breech-loading small arms. When the war is nearly ended these weapons are adopted on a large scale. From armored ships, and small arms in general, down to the most minute equipment of the soldier, this war has proved a spur to invention, and the result is well shown in the efficiency of our armies and the comfort of the men in the field.

It is not a comparative superiority over other nations that we enjoy in this respect, but a positive one. Neither is it necessary to condemn the Armstrong gun, already condemned in its own country, and vaunt the powers of the Parrott rifle, to prove our assertions. The Ericsson wrought-iron gun and the Rodman 1000-pounder can speak for themselves, but they would not have spoken for many years to come had not the war stimulated the inventors and projectors of these pieces of ordnance to put them to the test of actual duty.

Our country enters on a new era, with new systems in all of its several departments. The science of war itself has been changed, and tactics once thought necessary to the proper handling of troops in action are supplanted by less intricate ones. The professional soldier has learned something from the volunteer officer, and what the latter lacked in training has been supplied by his fertile invention, and a mind quick to comprehend situations and to make the most of them.

The arts languish when the torch of war blazes. Lured by its brilliancy men forsake peaceful callings and seek the imminent deadly breach. But the inventor makes men of iron and brass in their stead, whose muscles are tireless, and whose skill is unsurpassed. Where one man falls in the field forty rise up in the factory in the shape of useful machinery. But for this fact there could be no war, for our armies would go naked, hungry and athirst.

War is always the stimulant of invention, and the nation which has the clearest-headed men, and the most energetic, is the one that will win against all obstacles. Though the hills be levelled to the earth, and the forests be left smoldering piles, good shall come out of it. For where the wilderness made the earth desolate, villages shall smile, and mills hum where savages lurked. The fables of the Arabian nights are idle tales, but the deeds which modern ingenuity achieves are not less less wonderful, while they advance the interests of mankind.

MAKING SIRUP FROM CORN.

"A German chemist has discovered a process of making sirup from Indian corn—not the stalks but the grain. He gets between three and four gallons from a bushel, and it is worth $1 50 per gallon. A company has been formed to erect an establishment at once, and put the process in practical operation. All the stock is taken, two of our leading sugar dealers having subscribed $50,000 each, and others who are anxious to invest in the enterprise are unable to get a chance." Such is the story which is now being told by men of the highest respectability in this community.

Perhaps all this relates to something new, and perhaps not. If the German chemist spoken of has discovered a cheap process of making cane sugar from corn, he has made one of the greatest chemical discoveries of the age, but if he is merely changing starch into grape sugar he is accomplishing nothing more than has been done ever since the origin of the art of making fermented liquors from grain.

All of our grains contain a large proportion of starch, that in Indian corn being from 64 to 80 per cent. Starch can be converted into grape sugar by several methods. The cheapest and most common is by sprouting the grain. The sprout comes out of the end of the grain and turning back grows along its side. It is found that as the sprout grows, the starch opposite to it in the grain is changed into grape sugar. This process is employed in malting. In malting diastase is produced, and this substance has the property of changing starch to grape sugar. One pound of diastase will convert 1,000 pounds of starch into sugar.

Another method of converting starch into grape sugar is to steep it in dilute sulphuric acid, in the proportion of 10 parts of acid to 1,000 of water and 500 of starch. In this way there is no difficulty in obtaining pure grape sugar from pure starch. This is practised as a commercial industry in France and Germany, the sugar being used principally for adulterating cane sugar.

Grape sugar is that which is found on raisins. It is far less sweet than cane sugar; the proportion of its sweetening property being stated at about one-third.

Grape sugar can be made from cotton and linen fiber, and from wood, as well as from starch, by the same process of steeping in nitric or sulphuric acid. Last winter Prof. Seely, of this city, made quite a quantity from waste paper and saw-dust.

Cotton, linen, and wood fiber, starch, gum, and grape sugar are composed of the same elements, carbon, oxygen, and hydrogen, combined in the same proportions with a minute quantity of water, and hence it is not strange that they should be convertible into each other.

PURIFYING GAS BY OXIDE OF IRON.

When bituminous coal is placed in a close retort so as to be shielded from contact with the air, and its temperature is raised to a bright cherry red, it is decomposed, and its elements re-combine to form a great number of new substances. Among these are light and heavy carburetted hydrogen, and a number of volatile hydro-carbons, which mingled mechanically together constitute illuminating gas. There are also a number of hydro-carbons which by being cooled are condensed in the form of tar. Besides these, three gases are formed which will not condense in cooling, and which are so offensive and deleterious that if they could not be removed they would render coal gas unfit for use in our dwellings; these are ammonia, carbonic acid, and sulphuretted hydrogen. Fortunately ammonia has so strong affinity for water hat it is only necessary to expose the gas to a large surface of water to have all of the ammonia absorbed. Both of the other two impurities are eliminated by passing the gas through several thin beds of lime.

This is the plan in general use in this country, but in England a different method of extracting the sulphuretted hydrogen has been invented, and is rapidly extending. This consists in substituting for lime the hydrated oxide of iron.

Le Gaz says when sulphuretted hydrogen is brought in contact with hydrated oxide of iron both compounds are decomposed. The oxygen leaves the iron to combine with the hydrogen, and the sulphur combines with the iron, forming sulphide of iron. Consequently oxide of iron is an efficient medium for purifying illuminating gas of sulphuretted hydrogen. But the cost of oxide of iron would have precluded its use for this purpose were it not for the fact that by exposure of the sulphide of iron to the action of the atmosphere it is again converted into oxide of iron—the oxygen of the atmosphere displacing the sulphur. This action is sometimes so rapid as to heat the iron red hot.

It is only necessary, therefore, to expose the iron to the action of the atmosphere for it to become ready for use a second time; and thus it may be employed 30 or 40 times. The sulphur displaced remains mechanically mingled with the mass, increasing its weight by repeated use finally to the extent of 30 or 40 per cent.

The oxide of iron is employed in the form of coarse powder mingled with saw-dust, and is spread in beds 12 to 18 inches in thickness, in purifiers similar to those in which dry lime is employed. The gas must finally be passed through one thin layer of lime to take out the carbonic acid.

SECOND TRIAL OF THE 1,000-POUNDER.

A correspondent at Fort Hamilton sends us a full description of the first trial of the 20-inch gun, substantially the same as that already published, adding, however, the statement that at the last fire with 100 pounds of powder and 1,080-pound shot, and 25° elevation, the time of flight was 24 seconds, and the range between 3½ and 4 miles. He then says:—On the 27th the trial was continued. One charge was fired with 100 pounds of powder and 1,080-pound shot, elevation 0°, recoil 6 feet 10 inches; second, 125 pounds of powder and 1,080-pounds shot, elevation 0°, recoil 7 feet 5 inches; both shot fell about 600 or 800 yards distant; the first richocheted eight times, the second only five, owing to the rougher surface of the water. But one difficulty appeared; this had been anticipated ; the common friction primer was not sufficient to drive a flame through so long a channel of metal; the flame was chilled before it reached the powder. This caused a delay the first day, the vent having to be filled with fine powder to effect the discharge. This was obviated on the second day by a simple contrivance; the top of the vent was drilled out and tapped to receive a plug, over which were fitted two semi-cylinders which contained the friction primer with a small magazine filled with powder attached to it, over all was slipped a metallic ring to keep it together; this effected the desired result.

This gun is not to be fired again until some preparations are made to try the effect of the shot on a vessel which will be anchored at point blank range.

NEW BOOKS AND PUBLICATIONS.

THE AMERICAN CONFLICT. By Horace Greeley. J. G. Derby, General Agent, 5 Spruce street, New York.

When peace shall be restored to this now distracted country, when the great questions at issue are put to rest forever, there will be many who will wish to know the cause, the course, and the complete history of the events which are now transpiring. Truly, as has been often said during this struggle, we are making history; but even the lover of his country, not counting the half-hearted or the indifferent, is busy buying and selling, and knows nothing of what is transpiring in war except as he reads the daily journals, or sees eager crowds jostling each other at the bulletin boards.

It is to his countrymen that Horace Greeley addresses himself, though the work is dedicated to John Bright; and the great demand for the book proves the interest taken in it. In the usual preface, which Mr. Greeley, with a touch of humor, styles "Preliminary Egotism," the scope of the work is shadowed forth. The author says therein: "What I have aimed to do is so to arrange the material facts, and so to embody the more essential documents, or parts of documents, illustrating these facts, that the attentive intelligent reader may learn from this work, not only what were the leading incidents of our civil war, but its causes, incitements, and the inevitable sequences whereby ideas proved the germ of events."

Much more is also added, but this must suffice. From the first volume sent us we find that the performance is equal to the promise, thus far, and although the illustrations are not the best, still there is a fund of information upon the great rebellion which is invaluable. O. D. Case & Co., of Hartford, Conn., Publishers.

THE ROCKS IN WHICH PETROLEUM IS FOUND.

For the Scientific American.

MESSRS. EDITORS:—In Vol. III. (New Series), page 270, you published an article by me on the geological distribution of petroleum in the United States. Inasmuch as the most crude and erroneous notions and opinions still prevail, and are inculcated upon this subject, leading to vain expenditures of time and money, and vexatious looking for similarity in geological strata, where none can possibly exist, I wish in the present communication to enlarge upon this subject, and show how fully the geological science of our country has been sustained by the oily developments of the last five years.

The lowest geological horizon, or stratum, in which petroleum is found of commercial importance, is in Canada, at Enniskillen, near Lake St. Clair. The oil is in the corniferous limestone, which is largely composed of fragments of corals, with sea shells cemented together. The cavities of these corals and sea shells are often filled with liquid bitumen, which distills from them, as can be seen in the walls of the Second Presbyterian Church, in Chicago. This limestone in the United States is in its maximum about 350 or 400 feet thick. Immediately overlying the limestone is the marcellus shale, which is so highly charged with bitumen as to lead to great expenditures of time and money in vainly looking for coal in it. It is about 50 feet thick in Canada. These two rock formations, then, which in Canada are not over 150 feet in thickness, are the reservoirs, holding rock oil, however and whenever formed, in that country.

Ascending in the geological scale, and passing over into New York, the next stratum of rock yielding bitumen, oil and gas, is there known as the Hamilton Group, about 1,000 feet thick. The oil springs of Western New York, along the banks of its numerous lakes, are mainly in this group of rocks. They have as yet yielded oil only in small quantities for medicinal purposes. But they afford ample scope and verge for exploration.

Above this group succeed black shales, known as the Gennessee Slate, 300 feet thick. The wells of Mecca, Ohio, and others of that region are most probably in this rock. Above the Gennessee Slate comes in the Portage Group of slates and sandstones, 1,700 feet thick. The deeper weels of Oil Creek, Pa., will reach the sandstones of this group.

Still above lie the rocks of the Chemung Group, which are mainly composed of thin-bedded slates and limestones. In its maximum it is 3,200 feet thick, but in Western New York and Pennsylvania it is much thinner, being only about 1,000 feet thick. Much of the oil of Oil Creek is from this group; 400 and 500 feet of it are seen in the cliffs and hills of Oil Creek, the Alleghany River and its tributaries above, and in Venango County.

Measured in the maximum development of all the rocks enumerated we find between the oil of Canada and Venango County, Pa., 6,000 to 7,000 feet of sedementary rock, all of which bear the appearance of having been deposited in sea water. The entire group of rocks enumerated are known as the Devonian Series in England. The oil springs of Eastern Canada and New Brunswick, along the Gulf of Newfoundland, are in the upper members of this series.

In treating of a subject of so vast importance as the one under discussion, and which is now so largely engrossing the monetary circles of our country, and giving to one State from production and manufacture a sum total of $51,000,000—the growth of the last