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Contents.

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TABLE OF CONTENTS OF

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NEW AMENDMENT OF THE DESIGN PATENT LAW.

An amendment of the patent law relating to design patents has lately passed both houses of Congress and received the approval of the President. The object of the amendment is to correct a defect in the law, which prevented the patentee from collecting damages in cases of infringement.

Under the old law, the Supreme Court held that in the case, for example, of a carpet manufacturer who complained of an infringement of his design or pattern of carpet, the complainant must clearly prove what portion of the damage, or what portion of the profit made by the infringer, was due to the use of the patented design. It was practically impossible to make this showing. Hence the infringer could imitate the patented design without liability, and the law was a nullity.

Under the provisions of the new law, the infringer is obliged to pay the sum of $250 in any event; and if his profits are more than that sum, he is compelled, in addition, to pay all excess of profits above $250 to the patentee. It is believed that the penalty of $250, irrespective of profits, will put a stop to the wholesale system of infringement heretofore carried on by unscrupulous persons.

The following is the text of the new law:

An act to amend the law relating to patents, trade marks, and copyright.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That hereafter, during the term of letters patent for a design, it shall be unlawful for any person other than the owner of said letters patent, without the license of such owner, to apply the design secured by such letters patent, or any colorable imitation thereof, to any article of manufacture for the purpose of sale, or to sell or expose for sale any article of manufacture to which such design or colorable imitation shall, without the license of the owner, have been applied, knowing that the same has been so applied. Any person violating the provisions, or either of them, of this section shall be liable in the amount of two hundred and fifty dollars; and in case the total profit made by him from the manufacture or sale, as aforesaid, of the article or articles to which the design, or colorable imitation thereof, has been applied, exceeds the sum of two hundred and fifty dollars, he shall be further liable for the excess of such profit over and above the sum of two hundred and fifty dollars; and the full amount of such liability may be recovered by the owner of the letters patent, to his own use, in any circuit court of the United States having jurisdiction of the parties, either by action at law or upon a bill in equity for an injunction to restrain such infringement.

SEC. 2. That nothing in this act contained shall prevent, lessen, impeach, or avoid any remedy at law or in equity which any owner of letters patent for a design, aggrieved by the infringement of the same, might have had if this act had not been passed; but such owner shall not twice recover the profit made from the infringement.

Approved, February 4, 1887.

ARE STEEL GUNS REALLY SUPERIOR?

Admiral Porter said recently that there was little hope of building fast war ships as long as the Bureau of Steam Engineering designed the engines, for that, such was the influence of interested persons, it was not free to choose the best devices. Whoever is familiar with the workings of the Ordnance Bureau will admit that this, too, is similarly controlled. Long ago it pronounced in favor of steel guns, and like a judge who records his decision and then asks to hear the evidence, this bureau has been listening unmoved to the most convincing testimony regarding the relative efficiency of cast iron guns.

The importance of this question of steel *vs.* cast iron guns will be appreciated when it is explained that it would take at least five years after the passage of an appropriation before the first steel gun could be turned out, while only a twelvemonth would be required to establish a cast iron gun plant.

It has never been the custom among American mechanicians to blindly follow the lead of others, but rather to work untrammeled by traditions; to carefully note what has already been done, and to strike out anew in whatever direction gives the most promise. Experienced gun makers and artillerists have recently admitted that the steel rifle has not fulfilled the promises made for it. The Krupp guns, of which we hear so much, have never yet been subjected to such high pressures as have been applied to cast iron guns, and experience has shown it would not be safe to put them through such tests. Indeed, the cast iron smooth bore guns which have been converted into rifles by the insertion of wrought iron rifled cylinders have been fired under a pressure fully three times as great as it has been thought advisable to subject steel guns of the same caliber to. An authority says: "Cast iron guns have often been fired hundreds of rounds under pressure of nearly seventeen tons to the square inch of bore, yet there has never been a failure, nor a sign of one. The United States has now a 12¼ in. cast iron rifle constructed on the same plan as the 8 in. converted rifle. This gun was made ten years ago, as an experiment. It has been fired with charges as high as two hundred pounds of hexagonal or quick powder (as compared with powder now considered suitable), and is still serviceable. The United States has another experimental 12 in. rifle, entirely of cast iron. It has been fired more than a hundred rounds with high power charges (265 pounds powder, 800 pound shot), and is still serviceable."

Curiously enough, the experiments with these guns ceased at the very time when there was the most reason for continuing them, to wit, while they were giving evidence of their ability to stand a long series of continuous rounds. The mode of testing a high pressure gun, upon which all authorities agree, is to fire it, round after round, until it bursts or shows weakness. There is authority for the statement that there is not a 12 inch steel gun in Europe which has been fired two hundred rounds, and yet, just as soon as these cast iron guns gave promise of withstanding successfully such a test, a peremptory order came from the Ordnance Bureau to cease firing and stop further experiment.

The failure of steel guns in Europe is frequent, though there is good reason for the belief that we only hear of a tithe of them, the balance being kept secret. Only the other day a big steel gun exploded at the muzzle, on the French trial grounds, and news comes that both in the war ships Collingwood and Ajax a number of steel guns have been condemned.

Because of these facts it is not at all surprising that the majority in the House of Representatives, though willing to appropriate money for guns, are averse to having the outlay controlled by the Ordnance Bureau, which is wedded to the steel gun theory and others not much better sustained.

THE COCAINE HABIT.

A number of cases of confirmed cocaine habit have recently been reported. While some of them lack confirmation, it is certain that several physical and mental wrecks have been caused by the excessive use of this alkaloid. The South American Indians, long famous as coca eaters, seem as a rule not to succumb to its effects. They use the dried leaf, which they chew, previously introducing a small amount of alkali, to set the cocaine free. In civilized countries the alkaloid as a chloride is usually employed, and is administered by hypodermic injection.

The practice of using it habitually in excess is hitherto reported as almost confined to physicians. Its effects upon its victims are very sad. The brain becomes permanently or for a period affected, a species of lunacy being produced. Just as in the case of opium eaters, the moral nature is undermined. One doctor was reported, so recently as to be within the memory of our readers, as having turned on the gas in a drug store where the alkaloid was refused him, with the design of asphyxiating the clerk, in which attempt he nearly succeeded. Another doctor, within a space of some sixteen months, has gone insane from the cocaine habit and has been removed to an asylum, leaving his wife also ill from the effects of the same drug, with which he had experimented on her.

If the cases continue to multiply, there may be room for questioning the utility to man of the discovery of this anæsthetic. It is doubtful if all the services in local anæsthesia rendered by it can compensate for the ill it has already done.

Pyrofuxin—a New Tanning Substance from Coal.

A new extract of coal is being introduced in Germany for industrial purposes, especially for tanning leather and disinfection generally, to which the name "pyrofuxin" is given by the discoverer, Professor Paulus Reinsch, of Erlangen, Bavaria. Unlike the generality of such compounds, this new material is not a derivative of coal tar, or of any of the distillates of coal, but is obtained directly from coal itself. Pit or bituminous coal contains most of it, and is prepared for treatment by being broken into nuts. The crude pyrofuxin is extracted by repeated boilings in a solution of caustic soda. The pyrofuxin enters into solution, and is allowed to stand for a time. It is then poured off, and a carbonic acid gas is passed through it. The resultant liquor has a specific gravity of 1·025 to 1·030, and holds from 10 to 15 grammes of pyrofuxin to the liter. In its purified form the compound is a fine, nontriturable substance, without taste or smell, non-poisonous, and in appearance like catechu. Some Russian coals contain 18 per cent of pyrofuxin. After the extraction of this material the coal remains combustible. It is described as being one of the most powerful and effective antiseptics known to science. On this account it is expected to be most valuable for tanning, as being twenty-eight times quicker in action than bark, and producing a better result at decreased cost.

It will be soon enough to give credence to this alleged leather tanning agent when specimens of good leather are produced.

Weight and Power of Modern Guns.—Table of Armstrong Guns.

Gun.	Caliber.	Weight.	Total Length of Gun.		Length of Bore.		Weight. Charge.	Weight. Projectile.	Muzzle Velocity.	Total Energy.	Energy per Ton Weight of Gun.	Energy per Inch of Shot's Circumference.	Thickness of Wrought Iron Plate the Shot is Capable of Perforating.
in.	in.	tons.	calibers.	in.	calibers.	in.	lb.	lb.	ft. per sec.	ft. tons.	ft. tons.	ft. tons.	in.
4·724	4·724	3·5	24	112·7	22	104·0	12	40	1,680	783	522·0	53·1	7·0
4·724	4·724	2·2	35	165·3	33	156·6	16	40	2,078	1,198	582·4	81·3	9·1
6·0	6·0	4·0	28	166·4	26	156·2	42	80	2,060	2,354	588·5	125·7	11·6
6·0	6·0	4·5	32	192·0	30	180·0	45	100	1,940	2,610	580·0	130·4	12·2
6·0	6·0	5·5	37	222·0	35	210·0	60	100	2,146	3,193	580·5	170·5	13·5
7·0	7·0	7·0	28	196·0	26	182·0	60	120	2,050	3,497	466·3	160·2	13·0
7·0	7·0	8·0	32	224·0	30	210·0	75	145	2,020	4,075	479·4	186·6	14·1
7·0	7·0	9·0	37	259·0	35	245·0	80	145	2,140	4,604	511·5	210·9	14·9
8·0	8·0	11·5	28	222·5	26	208·0	120	180	2,177	5,915	514·3	238·9	15·8
8·0	8·0	12·5	32	256·0	30	240·0	120	200	2,157	6,452	537·6	258·4	16·5
8·0	8·0	14·0	37	296·0	35	280·0	130	210	2,236	7,280	520·0	291·5	17·5
9·2	9·2	19·0	28	257·6	26	238·7	175	320	2,060	9,412	495·3	327·5	18·5
9·2	9·2	21·5	32	287·3	30	287·8	200	380	2,035	10,923	508·0	380·1	20·0
9·2	9·2	24·0	37	340·4	35	322·0	230	380	2,375	14,800	616·6	516·0	23·2
10·0	10·0	25·0	28	274·0	26	254·5	200	450	1,910	11,383	455·3	364·2	19·5
10·0	10·0	27·0	32	320·0	30	300·0	270	470	2,185	15,560	576·3	497·9	22·8
10·0	10·0	30·0	37	370·0	35	350·0	270	500	2,213	16,079	566·0	543·3	23·8
12·0	12·0	43·0	28	331·0	26	307·5	380	700	2,087	21,141	491·6	563·1	24·2
12·0	12·0	46·0	32	384·0	30	360·0	400	800	2,117	24,861	540·4	662·2	26·2
12·0	12·0	51·0	37	444·0	35	420·0	450	850	2,205	28,665	562·0	763·6	28·1
16·25	16·25	93·0	28	455·0	26	422·5	850	1,800	2,108	55,377	595·4	1,088·7	33·5
16·25	16·25	110·0	32	520·0	30	487·5	900	1,800	2,218	61,200	556·4	1,203·2	35·2
16·25	16·25	127·0	37	601·3	35	568·75	900	1,800	2,295	65,745	517·6	1,292·6	36·5
17·0	17·0	100·0	28	468·0	26	442·0	827	2,000	1,932	51,790	517·9	973·1	31·7
17·0	17·0	116·0	32	544·0	30	510·0	1,000	2,000	2,190	66,512	573·3	1,249·7	35·8
17·0	17·0	137·0	37	629·0	35	595·0	1,000	2,000	2,255	70,520	514·7	1,325·0	37·0

Castner's New Method for Producing Sodium.

This new method, heretofore mentioned by us, is now being successfully worked in London, and is thus described in *Engineering:*

Up to the present this novel method of manufacture has been kept rather secret, but now, owing to the success achieved by a plant erected and worked on a commercial scale, we are enabled, through the courtesy of Mr. H. Y. Castner, to lay before our readers an outline sketch of the method of operation which is followed, and which we have seen carried out with success at his works, 65 Belvidere Road, Lambeth. Few persons outside of the chemical profession are aware of the commercial existence of the metal sodium or of its uses, and even among those following that profession but little is known, except that it is used in the manufacture of aluminum, and is very expensive. Much has lately been published in various scientific journals throughout the world upon the subject of alleged new processes, whereby that highly interesting metal—aluminum—might be cheaply produced without sodium, and thus be made to take in the commercial world a place to which its varied valuable properties entitle it. So far nothing has resulted from these numerous so-called discoveries, and at the present time the only process in use whereby aluminum can be produced is that devised by and due to Deville's ingenuity.* This process has been called the sodium process, apparently to distinguish it from others, but seeing that it is the only process which has ever proved practical, it is somewhat of a mystery why it needed to be so distinguished.

The late Dr. Walter Weldon, in a paper read before the Society of Chemical Industry a few years ago, clearly resolved the great question of cheaply producing aluminum, and showed by argument that this end was only to be gained in either of the two following directions, namely, first, by the production of cheap sodium and the employment of Deville's process, and second, by the discovery of a substitute for sodium, which has hitherto given to aluminum its excessive cost in production. After twenty-five years of research by some of the best scientists of the present age, no substance has been found that will replace sodium, and although every known substance has, at various times, been proposed, none has been successful. So discouraging has been the research, that those familiar with the subject have almost abandoned hope of ever seeing aluminum cheaply manufactured by chemical processes, believing also that Weldon's first proposition was an impossibility.

It is not the purpose of this article to enter into a lengthy discussion of Mr. Castner' process of producing sodium, as Mr. James Mactear, F.C.S., is about to prepare a scientific paper on the subject, to be read on March 7 before the Society of Chemical Industry. We shall content ourselves by presenting to our readers a short practical description of the process and its results.

Before doing so it will, however, be advantageous to give a short account of the method by which sodium has hitherto been separated from its compounds, in order that a clearer conception of the features in which the new process differs from the old one may be obtained. At high temperatures carbon has the property of separating sodium from its oxygen compounds, carbon uniting with the oxygen to form carbonic oxide, the sodium being thereby liberated. In the usual process this reaction is brought about by mixing carbonate of soda, lime, and carbon in small wrought iron cylinders, and exposing them to an intense heat, when a part of the sodium comes off as vapor. The lime is added to prevent fusion, for were the mass to melt, the carbon would float on the top, and could no longer attack the soda. The new process differs from the old principally in working with a fused mass of soda compound, this operation having been rendered feasible by the most ingenious device of weighting every particle of carbon with iron, so that the two chemicals—soda and carbon—are kept in perfect admixture, and are continually presenting fresh surfaces to each other as the liquid circulates in the crucible under the action of the heat. By this simple but beautiful plan of weighting the carbon, it is rendered possible to employ a soda compound which is decomposed at a much lower temperature than that hitherto used, and to carry on the process in large and durable vessels, instead of in small cylinders, which have a very short life. Having thus given a short account of the chemical process, we will describe the commercial method of manufacture.

The operations are carried on in large cast steel crucibles, and the charges consist of caustic soda and a finely ground artificial compound of carbon and iron, which is the reducing agent. This compound is made by coking a mixture of fine iron and pitch. The crucibles containing these materials are first heated in a small furnace at a low temperature, the object being to expel the hydrogen from the caustic alkali and bring about quiet fusion. The crucibles are then removed from this furnace, by means of a little truck, and placed upon a movable platform, which is operated by hydraulic power. They are then by this means raised into the large furnace, where the crucible covers are fixed stationary. The edges of the crucible and cover coming together form a tight joint, and from this cover projects a small tube to the outside of the furnace into a narrow rectangular box, known as the condenser. The reduction of the sodium commences soon after the crucible containing the charge is in its place, the vapors and gases passing from the fused mixture through the exit pipe from the cover into the condenser, where the metallic vapors are condensed to metal, while the uncondensed gases escape by a small outlet tube. After the charge is exhausted, the crucible is lowered, and one containing a fresh charge raised in its place; in this manner the process might almost be called continuous.

The actual temperature used in this process to bring about reduction, as measured by experts, has been found to be 850° Cent. By the older method the temperature necessary is about 1,400° Cent. This is practically the great point of economy in this process, as the high price of sodium has hitherto been owing to the excessive heat used in the older process and the consequent destruction of the wrought iron vessels. Sodium at present costs about four shillings per pound to produce, while the materials necessary for this quantity, were nothing wasted, would hardly cost four pence. The difference between these two figures represents the wear and tear to the furnace, the destruction of the wrought iron cylinders, the loss and waste of materials, the excessive labor and care necessary to employ in manufacturing, and fuel. Approximately, the cost of these items in producing one pound of sodium by the older process is as follows:

Two shillings is due to the destruction of wrought iron, etc.

One shilling is due to the loss and waste of materials, of which three times the theoretical quantity must be employed.

Eightpence is due to the labor.

Fourpence is due to the fuel.

Mr. Castner seems justified in his claim to produce sodium at a shilling per pound in large quantities. The steel crucibles which have now been in use some time show but little wear, and indicate indefinite use in future, thus reducing the first item of cost in the older process to a fraction. There is hardly any appreciable loss or waste of materials, and from four pennyworth of caustic soda is ultimately obtained one pound of sodium. The labor is a very small item of expense, and the fuel consumed is less than one-third that used in the older process.

Seventy-five tons of fuel are required by the older method in producing one ton of sodium. From actual results a like amount of fuel will produce over three tons of sodium by Mr. Castner's process. The results from this new process are not obtained by calculations on paper, as the inventor has shown from actual working that his claims are well founded. The process is no longer an experimental one, the furnace now erected having a capacity of 120 pounds of sodium per day, which is probably more than is produced at any works now in existence. The production of sodium at one shilling a pound by this process may be considered an accomplished fact, which ultimately means cheapened aluminum and a solution of the problem that has so long engaged the attention of chemists and metallurgists.

* The Cowles electric smelting process, heretofore described by us, has only produced aluminum alloys as yet, and it is doubtful whether it can be made to do more than this.

Preventive Medicine.

Dr. C. R. Illingworth thus writes in the *Med. Press:*

One of our great aims as physicians is to prevent disease; another is to cut short its course when developed. Our power in these directions finds full scope among that class of disorders now generally recognized as depending upon the reception, growth, and development in the tissues of micro-organic life in one shape or another. By the continual suppression of the growth and development of these forms of cell life, we may, indeed, hope at length to erase the names of the diseases they cause from the category of those "ills that flesh is heir to." The diseases I refer to are scarlet fever, diphtheria, measles, whooping cough, rheumatic fever, chicken-pox, small-pox, syphilis, hydrophobia, yellow fever, *et hoc genus omne.*

The germicide remedy I have found to answer as a specific and prophylactic in such diseases is the biniodide of mercury given in solution of potassic iodide. In all cases of scarlatina or measles occurring in one member of a family, I put the rest upon preventive medicine. Thus, for children I prescribe as follows: Bichloride of mercury solution, ℥ iss; iodide of potassium, ʒ j; ammonio-citrate of iron, ʒ j; sirup, ℥ iss; water to eight ounces. One or two teaspoonfuls to be given three times a day.

The Peace Army of the United States.

The following figures are believed to be approximately accurate, and most interesting and instructive they are:

French army, peace footing	523,283
German army, peace footing	445,417
United States army of pensioners, peace footing	400,000

One of the great evils of a huge standing army is the cost of its support—a constant drain upon the national resources.

It does not seem that in this respect we have so very much the advantage of France or Germany, loaded down as those nations are with military burdens.

The great difference is that, while all or nearly all of the French and German soldiers, supported at the national expense, are available in case of a national emergency, few or none of ours are.

Is this enormous burden a just debt?

The question is best answered by another question. Is it not fair to assume that in 1877, twelve years after the end of the civil war, about all the equitable claims for pensions on account of that war had been put in and allowed?

Yet since 1877, the number of pensioners on our rolls has almost doubled; and the annual cost of maintaining them has nearly trebled.—*N. Y. Sun.*

A Solid Life Insurance Company.

The figures of the last annual report of the New York Life Insurance Company, just issued, present a record of almost unexampled success in the conduct of the business of that old and strong company for the past year. Its income for the year was $19,230,408, it paid policy holders $7,627,230, and it has cash assets amounting to $75,421,453. It goes without the saying that this great company does its insurance business on strictly business principles. It recognizes the policy holder's right to paid-up insurance in case of a discontinuance of payment of premiums, and its policies are notably free from restrictions as to occupation, residence, and travel. The company issues a great variety of policies, thus adapting its contracts to the wants of almost every one having present means from which a small percentage can be spared for the benefit of themselves or those dependent upon them at a future date.

DR. GILES DE LA TOURETTE has recently published a monograph upon normal locomotion and the variations in the gait caused by diseases of the nervous system. He found, from a comparison of a large number of cases, that the average length of pace is, for men, 25 inches; for women, 20 inches. The step with the right foot is somewhat longer than that with the left. The feet are separated laterally in walking about 4½ inches in men and about 5 inches in women.