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Contents.

(Illustrated articles are marked with an asterisk.)

[T]ABLE OF CONTENTS OF

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PATENT LITIGATION AND COMPROMISE.

A saying which has become almost an axiom with patent lawyers is to the effect that there is no money in an accounting. A suit for infringement of patent is prosecuted in the federal courts of equity under a motion for injunction and a claim for an accounting. This motion and claim are brought by the owner of the patent against the alleged infringer. If the court sustains the patent, a permanent injunction is granted and the matter is passed into the hands of a master. Here books are examined, profits are discussed, and the question of how much in the shape of past profits or royalty should be paid by the enjoined party to the owners of the patent is settled.

These proceedings before the master are often of almost interminable length. Account books, perhaps of many years' accumulation, are submitted, every vantage point is contested by the opposing lawyers, and when all is settled there is apt to be little left of the accounting for the benefit of the holders of the patent. Sometimes they receive an award so great as to be uncollectable, when a compromise is in order. The great expense of the proceeding, including master's, experts' and lawyers' fees, makes it something from which the experienced shrink. A conscientious lawyer will generally advise his client to make the best compromise possible rather than to plunge into an accounting of uncertain duration and expense.

The unsatisfactory accounting, which is theoretically the object of a patent suit, is really the outcome of something which is also unsatisfactory in many cases—the injunction awarded the patent suit itself. The latter form of proceeding has become very expensive. Competent lawyers must be retained and the best experts must testify in patent suits. The records are taken down word for word from the witnesses, and the time consumed and, consequently, the *per diem* bills of master, counsel and experts rapidly mount to large proportions.

It is said that at a recent meeting of some of the great electrical interests it was shown that enough money had been spent in lawsuits to pay dividends for several years. Lawsuits are a very unsatisfactory instrumentality for virtually increasing the capitalization of companies. A million of dollars sunk in a suit represents so much additional capital on which interest must be paid. This kind of expenditure cannot legitimately be treated as working expense.

The practical moral would seem to be that owners of patents should avoid too inelastic or abstract a treatment of their rights. There is little glory in maintaining a patent—it is all a matter of business. If, therefore, a certain revenue can be obtained by licensing a presumed infringer, it is often better to do so than to sue with uncertainty of success. It may be safely said that no one knows how limited his patent is until it has been through the courts. By compromising his claims an inventor will usually obtain an acquiescence in a wider interpretation of his patent than he could hope from the action of a court. The various companies who were infringers of the Edison lamp patents were willing, it is said, to pay a royalty of ten cents a lamp and acknowledge the validity of the patent. Probably it would have been wiser to have accepted this payment rather than to have continued the litigation.

THE ALKALI METALS POTASSIUM AND SODIUM.—II.

THEIR ALLOYS AND AMALGAMS.

In continuation, we must supplement our statement of the properties of these metals somewhat. At its melting point, sodium is as liquid, mobile and lustrous as mercury. It instantly tarnishes in damp, but not in dry air. It becomes pasty at about 122° F. At the ice temperature it is still ductile, but below zero Fahrenheit becomes brittle and crystalline. Sodium stands high as a conductor of heat and electricity, being in these respects surpassed only by gold, silver and copper. Hence, in cases where mercury is applied as a mobile liquid conductor, the liquid alloy might be preferable—protected, of course, from damp air, say by inclosure in a space communicating with the air only through a tube containing calcium chloride.

An American chemist, Charles A. Seeley, now deceased, discovered a surprising property of these alkali metals. They dissolve, *as metals* apparently, in liquefied ammonia gas, and on evaporation are left in their original metallic forms. The solutions are transparent and of deep blue color.

As aforesaid, the discoverer of the alkali metals found that mercury containing a little of them would enfilm, or wet (so to speak), iron, steel and platinum. About 1840 an English chemist, Robert Mallet, discovered also that melted metals having no natural affinity for iron dissolve it rapidly when containing a little sodium or potassium. An American chemist, Henry Wurtz, took up these subjects in 1857, and carried them much further. He made very numerous experiments and inventions in this field, and patented some of them. The cost of sodium then ranged in this country from $8 to $10 per pound; and his inventions, patented prematurely, about 1866 or 1867, were, therefore, of no economical value, and have long been public property. Now that it is proved, however, by Castner's work, that if a market exists for sodium it can be produced at a cost of 18 cents per pound, and the liquid alloy doubtless for little more, these forgotten devices should be revived and improved upon by supplementary inventions. Some of these methods of H. Wurtz were as follows:

First.—A method of rapidly making these metals into solid amalgams, in which forms they can be handled, and their great energies and affinities utilized, without danger or difficulty. Combination with mercury involves great and usually highly explosive evolution of heat, which Wurtz obviated by a very simple device. Instead of starting with pure mercury, he employed a pasty amalgam, containing about two per cent of the alkali metal; this being about half saturated; for solid, hard, fully saturated amalgam of sodium contains but four to five per cent. A series of iron pans is set in a row, with a small Bunsen burner which can be moved from one to the other. A lump of sodium, averaging a third to a half ounce, is placed on the amalgam in one of these pans, with a little paraffine wax as a flux. The burner is then applied beneath, until the sodium, without any explosion, suddenly melts down into a thin cake of hard amalgam floating on the poorer amalgam below, which is itself liquefied by the heat of the reaction. This cake is removed with tongs to a ledge on one side of the pan to cool, and the next pan operated upon. Unless the number of pans is too large, the burner need be used but once with each of them, as the heat retained is sufficient to produce immediate combination. One operator could in this way make a thousand pounds daily of saturated amalgam without an explosion. The cakes are all melted together under paraffine in iron kettles, and cast into ingots or other shapes desired. To use the liquid alloy in this way some modifications will be required in the manipulation, which experiment and invention will readily evolve.

Second.—A very little of such amalgam added to mercury was found by H. Wurtz to intensify so greatly the adhesion of the mercury to gold and silver that when these occur in ores in such forms as to be untouched by ordinary mercury, this prepared mercury instantly amalgamates and absorbs them.

Third.—When mercury becomes "floured" or "sick," as it is called, a little sodium amalgam wholly cures it, and coalesces the detached globules instantly. The water in the apparatus slowly dissolves out the sodium, but it will be a very simple matter of invention, now that sodium is applicable with great profit to such ores, to devise plans of feeding the amalgam automatically to the battery and pans in minute graduated quantities.

Fourth.—In alloying metals much trouble is often experienced through obstacles in the nature of such metals. Many such difficulties altogether disappear when a little sodium is present.

Fifth.—Wurtz invented also the now familiar addition of sodium to various kinds of *solders*, and to baths for coating iron and copper with zinc ("galvanizing," so called), lead, tin, and divers alloys.

Sixth.—He devised a plan for removing the sodium and mercury (if present), when desirable, from such metallic coatings, by washing them out, so to speak, in a secondary bath of the same metal. When this secondary bath becomes charged with sodium, it is used as a primary bath. The primary baths need not contain any mercury, as, with proper precautions, the sodium itself may be incorporated directly with other metals.

The best "pickles" and fluxes for these widely varying operations of coating, etc., will become subjects of invention. We should warn experimenters that nothing can be done with *aluminum* in this field. Mercury destroys it rapidly.

In another article methods of direct production of the liquid and other alloys, with applications of electrolysis to their manufacture and manipulation, will be indicated.

THE NEW STEAMERS OF THE INTERNATIONAL NAVIGATION COMPANY.

It will be remembered that two years ago Congress passed an act authorizing the placing of the American flag on the two splendid ocean steamers Paris and New York, which vessels, although chiefly owned by American citizens, were built in England. The conditions for the American registry were, among other things, that the company should build, as soon as possible, in this country, not less than two new vessels of at least equal size and speed to the vessels above named, and that they should be constructed of American materials throughout. In this way some encouragement to American ship building would be secured. Another provision was that the new ships should be adapted to use as cruisers in case of war.

In accordance with the above law the company entered into contracts with the Cramp Ship Building Company, Philadelphia, for the construction of two new vessels of American design and manufacture, and they are to be launched next spring.

At the recent annual meeting in this city of the American Society of Naval Architects, Mr. Charles H. Cramp read an interesting paper, in which he reviewed the rise and progress of fast Atlantic steamers, giving a brief account of the dimensions, power, and performances of each. He concluded with the following particulars of the two new steamers above alluded to:

"We are, as is well known, building a couple of 536 feet ships for the International Navigation Company. They are both framed up about two-thirds of their length amidships, and plating is in progress. They will be launched next spring, and will go in commission about a year from n w.

"Their principal dimensions and qualities are as follows:

Length on load water line	536 feet.
Length over all	554 "
Extreme breadth	63 "
Moulded depth	42 "
Gross register	About 11,000 tons.
First cabin capacity	320 passengers.
Second cabin capacity	200 "
Third cabin capacity	900 "

"Their propulsion will be by twin screws, actuated by two quadruple expansion engines on four cranks, which, with steam at 200 pounds, will probably develop about 20,000 collective indicated horse power. To support the outboard shaft bearings, the hull is built out in a horizontal web to a steel frame having both bosses cast in one piece and weighing about 68,000 pounds. The after deadwood is cut away, and the keel slopes up so that the shoe meets the boss frame at the after end. It will be observed that these ships are considerably larger than the New York and Paris, or about half way between them and the Campania class. I will not venture a prediction as to their probable performance, but I will guarantee them to be perfectly safe, comfortable, and economical ships.

"These ships are American from truck to keelson, no foreign material enters into their construction. They are of American model and design, of American material, and they are being built by American skill and muscle."

A Yellow Colored Alloy from the Union of Two White Metals.

BY J. D. DARLING.

Professor Richards, in his book on aluminum, page 299, first edition, quoting from Tissier's "Recherches sur l'Aluminum," says: "Aluminum unites with platinum with great ease, forming with it alloys more or less fusible, according to the proportions of aluminum. Five per cent of platinum makes an alloy not malleable enough to be worked; it is possible that by diminishing the amount of platinum a suitable alloy might be produced. In color it approaches that of gold containing 5 per cent of silver."

Three or four years ago, being engaged on experimental work with a process of electroplating with aluminum, the writer attempted to make an alloy containing 5 per cent of platinum, by fusing the proper proportions of aluminum and platinum in a crucible, with the idea of using the resulting alloy as an anode to plate from, but failed to obtain a colored alloy; most likely because the heat used was not high enough, although on pouring out the contents of the crucible, the platinum had disappeared and seemed to have combined with the aluminum.

But I succeeded in obtaining a yellow colored deposit of a rich appearance, by electrolyzing a hot solution of certain salts of aluminum and platinum; and as the result is rather curious and interesting, I will describe the solutions used and how to make them.

First prepare a solution of mono-sodic aluminate, $Na\,Al\,O_2$, in the following manner:

Take the precipitate obtained by adding a solution of sodium carbonate to a solution of aluminum sulphate, and, after washing it once with clean water, boil it with aqua ammonia until the white precipitate becomes gelatinous and assumes a slightly blue tint, then wash it with clean water until the wash water is free from sulphates. Dissolve a weighed quantity of pure caustic soda in water and bring to a boil in an iron pot and add the washed precipitated aluminic hydrate, a little at a time, until no more will dissolve. The solution of mono-sodic aluminate thus formed is, after cooling, filtered and diluted until each gallon of solution contains 130 grammes of metallic aluminum. This can be easily figured out when the amount and purity of the caustic soda used is known.

There are other ways of making mono-sodic aluminate solution, but when made in the above way it is not so liable to decompose on standing.

Next dissolve 6 grammes of platinum in nitro-muriatic acid and convert it into the double cyanide of potassium and platinum by adding a solution of pure potassium cyanide to the solution of platinum chloride until the precipitate first formed redissolves.

To prepare a plating solution that will yield a yellow deposit, take one liter of the mono-sodic aluminate solution and put it in an earthenware jar along with 60 grammes of pure potassium cyanide, and heat the whole to 130° F. Then add the platinum solution. On passing a current from three Bunsen cells through the bath, using a carbon or platinum anode, and a strip of zinc as a cathode, the zinc is plated in from fifteen to twenty minutes, with a film of golden colored alloy.

As it is a difficult matter to prepare a plating bath so that the conditions will always be the same, it is advisable to add the platinum solution slowly, while the current is passing through the bath, until the deposit is of the right color. It may take a little less or a little more than the above mentioned quantity of platinum, but that was about the average quantity used in the preparation of several one liter baths, in which a variety of objects, such as the blades of steel dinner knives, razors, etc., were plated.

An examination of the deposit showed the presence of aluminum and platinum, but the exact proportions were not determined.

The Rugg Reaper of 1844.

A curious and interesting contribution to the history of inventions has appeared in a recent number of the Chicago *Inter-Ocean*. It tells of the work of an inventor, Geo. H. Rugg, done in the forties. In the spring of 1845 Mr Rugg, then 22 years old, built a reaper. To make his castings a special heat was taken in a Chicago foundry, the place being then little more than a village. He cut 120 acres of hay on his own farm with it the first season. He had no thought of building more, but the next spring a couple of machines were ordered from him. As he says, he "like Putnam, left the plow standing in the field," and built the two machines. He tried to improve his first machine. He substituted for straight cutting blades and single diagonal edged fingers, diagonal or saw tooth cutters and straight edged double fingers. The latter being made double, the blades worked through slots, on the system used universally at the present time. He cut up a saw to get material for his blades. The young farmer-inventor applied for a patent, but his claims were rejected on reference to the Jonathan Read patent of March 12, 1842, and to the John F. Nicholson application, filed October, 1844. A perusal of the case impresses one with the idea that the merits of the invention should have insured it more hospitable treatment.

From Mr. Rugg, now 70 years old, we have received the following characteristic letter:

I inclose an article from the *Inter-Ocean*, of Chicago, the history of the Rugg reaper. I take it you are interested in a correct history of reapers, and the article I inclose is mainly the record of the Patent Office, and I judge, from your knowledge of patents, you will see I was wronged out of a valuable invention, which is now too late to correct, except as a matter of history; and as an old patron of your paper, also in having employed your agency in obtaining patents, I trust you will give this a careful perusal.

Ottawa, Ill., Nov. 16, 1893. G. H. RUGG.

Wonderfully Strong Armor.

The recent testings at Indian Head of the side armor of the Maine have been of great interest, as this is the first armor of the Harvey type ever made for use on a war vessel, either in this country or in Europe.

Before this trial took place the advantages of the Harvey process had been made plain by firings at comparatively small plates of uniform thickness. Yet it remained a question whether difficulties would not arise when the process should be applied to the various shapes required in actual armor. It was a matter of doubt whether the process of hardening would not so warp the plate that it could not be applied to the ship; or whether variations in thickness and form might not make it difficult to secure armor of uniform character.

The plate tested was 13 feet 7 inches long, 7 feet wide, and 12 inches thick for one-half its width, the other half tapering to 6 inches. It represented a lot of 475 tons of side armor. Commodore Sampson attacked this plate with two 8-inch armor-piercing projectiles, of which the first had one-half more energy than was necessary to take it through the same thickness of wrought iron, while the second had twice the energy required for perforating such a thickness of wrought iron. The result of the firing was that both projectiles were smashed to fragments against the plate, their points having penetrated only four or five inches, and having been there firmly welded. In other respects the plate was wholly without injury. The velocity of the second projectile had been 2,004 feet a second, and the energy 6,968 foot tons. That was the acceptance test, prescribed by the contract, and most satisfactory it had proved. Of course it passed the whole lot of 475 tons, which will duly be put upon the Maine.

But how much more could that plate have endured? This was a most interesting inquiry, and subsequently it led to a far severer set of tests. To begin with, the plate was fired at by an armor-piercing 8-inch shell having a rounded point, with a velocity of over 2,000 feet a second, so as to determine whether the blunter form of projectile could not gain some advantage over the hard surface of the plate. Yet, like the other two, it was smashed into exceedingly small pieces without inflicting visible injury to the plate beyond the point struck. Then, still another 8-inch shell, making four in all, was fired, striking at an angle of 35 degrees with the normal, and near one end, so as to see whether such a blow would not crack the plate; and once more the high velocity of 2,004 feet a second was imparted. The result was no crack at all, and, in fact, less injury to the plate than had been received at any of the previous fires.

The 8-inch gun having thus been completely defeated, a big 10-inch gun was brought up and trained against the same plate, already four times struck. Of course, it is highly improbable that any one plate on a ship would ever be hit so many times in battle. The first 10-inch shot was fired at a part of the plate which had been struck twice before, at an angle of 35 degrees, with an energy of 13,564 foot tons, or nearly double that of any one of the 8-inch projectiles. The plate, naturally, was cracked, yet the projectile was broken into fragments, like the others. Finally another 10-inch projectile, with an energy of 9,806 foot tons, was fired at a point 2¼ feet from any of the previous shots, and while the only cracks developed were three very fine ones, the shell, like all the other five, was smashed to pieces. The plate would still have given complete protection to the ship, and might have been struck several times more without failing in its office.

By how much, then, does our Harvey plate surpass in efficiency any other? The experts, from a mathematical comparison, find it to be about 25 per cent better; but the practical advantage would be still greater, because it can keep shot out where even nickel armor, if un-Harveyed, would not, so that the ship would be lost. Well did Secretary Herbert announce in his current report that the value of this surface-hardening process is so conclusively shown that it will be applied not only to all armor under new contracts, but, as far as practicable, to armor already under manufacture. The Maine and the Texas, the battle ships of the Indiana type, and the Puritan and the Monadnock, are among the vessels approaching completion which will profit by this decision.—*N. Y. Sun.*

The New Atlantic Steamer Kensington.

There was launched on October 26, from the shipbuilding yard of Messrs. James & George Thomson, Limited, Clydebank, the Kensington, a twin-screw steamer of about 9,000 tons, built for the International Navigation Company, to ply between Philadelphia and Liverpool. Her dimensions are: Length between perpendiculars, 480 feet; breadth, moulded, 57 feet; and depth, moulded, 40 feet. The vessel, which is throughout of Siemens-Martin steel, has a straight stem and an elliptic stern. She is in all respects at least up to Lloyd's requirements, and is, in addition, subdivided by nine watertight bulkheads.

The vessel is to carry 8,000 tons, at a draught of 28 feet, and is fitted with very complete arrangements for handling cargo expeditiously. There are ten powerful steam winches. There is an extensive installation of refrigerating machinery in separate sections—one for perishable cargo and the other for the ship's requirements.

Although intended as a first class cargo-carrying steamer, the Kensington has accommodation in large staterooms amidships on the upper deck for about 120 passengers, as well as for the officers of the ship; and on the bridge deck above is the dining saloon, a well-lighted, commodious apartment in polished oak, which is seated for 126 persons. There is, in addition, accommodation on the main deck for over 1,000 emigrants, and great care has been bestowed on the ventilating, heating, and sanitary arrangements of these particular spaces.

The ship has four steel pole masts, rigged fore and aft, and one large oval funnel. The engines are of the direct-acting, surface condensing, quadruple-expansion type, with four cylinders working on four cranks. The cylinders are 25½ inches, 37½ inches, 52½ inches, and 74 inches, and the stroke 4 feet 6 inches. The boilers are designed for a working pressure of 200 pounds per square inch.

THERE is no paper that comes more promptly every week than the SCIENTIFIC AMERICAN, and there is none that is more just to its exchanges. It "clips" extensively, but ablest judgment is employed to select only such matters that are of authority and merit in every branch of science, mechanics, art and manufactures, thereby concentrating the best brain of the whole world. Its editorial subjects are always reliable and the result of careful researches. The paper is now in its 69th volume and was established 48 years ago. Messrs. Munn & Co., publishers, are not only entitled to the praiseworthy financial success that they made for themselves, but deserve much acknowledgment for the good that they have rendered to the progress of every industry of all nations. The benefit that has been derived from this very instructive journal cannot be estimated, as the good that grows out of the elevation of skill and knowledge is beyond computation.—*Chicago Clay Journal.*