Electro-Plating with Aluminum.

As this metal is a most efficient protection against oxyd or rust, any improvement by which it can be economically applied to coat iron, or any of the oxydizable metals is invaluable. A patent has recently been secured in England for this purpose by F. S. Thomas and W. E. Tilley, and their specification has been published in *Newton's London Journal*.—As it is a very plain, important, and interesting document, we publish the following literal abstract of it :—

This invention consists in depositing aluminum, by electric currents, from a solution of alumina, prepared as hereinafter explained, with or without other metals, and in plating or coating metals with aluminum and alloys composed of aluminum and other metals :—

No. 1. *Solution of Alumina.*—In order to prepare about four gallons of a proper solution of alumina for the purpose of our invention, we place about 4 lbs. of the alum of commerce in an iron pot or crucible, and heat or roast the alum therein until it ceases to boil, and has been reduced to a dry powder by being deprived of its water of crystalization.—We then boil about two gallons of distilled water, into which we put the calcined alum, and boil the mixture well; we then add about 2 lbs. of cyanide of potassium, and boil again for about half an hour; then add two gallons of distilled water, with 2 lbs. more of cyanide of potassium, and boil again for a short time, and then filter the solution, which will then be ready to form a bath.

No. 2. *Solution of Alumina.*—Or, in place of the above, we dissolve about 4 lbs. of alum in water, and add thereto salts of tartar, until it ceases to precipitate. We then put the oxyd so produced into a filter and filter it, then wash the oxyd with water; then take the washed oxyd from the filter and place it in an iron vessel, and add thereto about two gallons of distilled water, and about 2 lbs. of cyanide of potassium. The solution is then to be boiled for about half an hour; two gallons more water is then to be added, and 2 lbs. more cyanide of potassium; the solution is then to be boiled again and filtered, when it will be ready to form the bath.

No. 3. *Solution of Alumina.*—Or, in place of the foregoing, we dissolve about 4 lbs. of alum in water, and add thereto ammonia until it ceases to precipitate; after which we follow the same mode and quantities as stated in No. 2, the only difference being that ammonia is used to precipitate the alumina in place of salts of tartar.

No. 4. *Solution of Alumina.*—Or, in place of the foregoing, we dissolve alum in water, and precipitate with carbonate of potassium, then filter the alumina, then take the alumina and roast it upon an iron plate until completely dry; we then place in an iron pot or crucible about 4 lbs. of cyanide of potassium, which we completely melt; we then add about 1 lb. of the dried alumina, and melt this with the cyanide; we then add (by degrees, to prevent a violent ebullition) about 1 lb. of carbonate of soda, and we fuse these three ingredients together about one minute at a red heat. We then place the mixed ingredients in about four gallons of water, then boil and filter, and the solution is ready. In a bath of the alumina, the articles to be plated are to be suspended by means of copper or brass, or other suitable rods, attached to the zinc or negative pole of a galvanic battery, and to the positive pole is to be attached a piece of platinum or a pole of aluminum. In the case of a platinum pole the metallic property of the bath is to be sustained by suspending therein a bag of the oxyd of alumina, and replacing such from time to time with fresh alumina, or by adding the solution of alumina from time to time. In working aluminum baths of various dimensions, we have used the battery of Bunsen of six cells, and also the battery of Smee of ten cells.

No. 5. *To plate with an alloy composed of Aluminum and Silver, or with Aluminum, Silver, and Copper.*—We use for this purpose a bath composed of alumina made according to the processes described in Nos. 1, 2, or 3, but we prefer No. 3, and having set the bath to work with a platinum pole, to ascertain that the aluminum will deposit, we insert, in lieu of the platinum pole, a pole of silver, usually lessening the battery power, and the deposit should become whiter and thicker. When we wish to incorporate copper we use a pole composed of silver and copper melted and rolled together in such proportions as we think proper.—We have found equal proportions of silver and copper deposit a very white metal, similar in appearance to standard silver; beyond that proportion of copper we have found the deposit of a reddish tint In the bath of alumina, No. 3, the oxyds of silver, or of silver and copper may be introduced, but we consider it preferable to work the silver, or the silver and copper, from the poles, as described, in the bath of alumina. The battery power in this bath should be moderate.

No. 6. *To plate with an alloy composed of Aluminum and Tin.*—We make a bath of alumina according to any of the foregoing methods—preferably No. 4—and instead of using a platinum pole we use a pole of tin. The baths of the alloy of tin will work with various battery powers, the deposit will be thicker for the presence of tin, and the presence of aluminum will be known by the deposit taking a good burnish, which tin alone will not sustain. We sustain the bath by adding alumina in solution from time to time, the tin being supplied from the pole. Or, in lieu of this mode, we prepare the alumina according to the mode specified in No. 4, until all the ingredients for the alumina are fused together. We then take 4 oz. of metallic tin, dissolve it with nitro-muriatic acid, precipitate with salts of tartar, dry the oxyd, then add it to, and fuse it with the fused alumina for about half a minute—pour the fused mass upon a slab, then put the whole into about four gallons of distilled water, boil and filter it, and the solution is ready. This bath may be worked with a platinum pole, in which case both alumina and the oxyd of tin are to be supplied from time to time, or it may be worked with a tin pole, in which case the alumina alone is to be supplied in solution. Or, in place of the above, we take alum, which, when dissolved, we precipitate with potass, soda, salts of tartar, or any suitable alkali. We then dry the alumina on an iron plate. We then take the dried alumina and fuse it with cyanide of potassium and carbonate of soda, and also fuse with oxyd of tin. This is then turned out upon a slab, dissolved in water, then boiled and filtered, and the solution is ready. This solution may be worked and sustained in the same modes as the former.

[Concluded next week.]

Cameos Enclosed in Glass.

When bas relief figures and medals enclosed within a coating of pure white glass were first brought before the public, they excited great surprise. This invention was first introduced by the Bohemain glass makers about a century ago, but from the inquiries sometimes made of us about it, it appears that a majority of persons are not yet aware how such works of art are manufactured.

The figure (or figures) intended for incrustation is made of materials requiring a higher degree of heat for their fusion than the glass within which it is to be incrusted. A mixture of China clay and silicate of potash is found to possess this quality. The bas relief is made of this material in a plaster mold, and after being slightly baked is gradually cooled. A mass of transparent white glass is blown hollow, with one end open, and the clay cameo, heated to redness, is placed within it. The mass is pressed or welded to make the two substances adhere, and the remote end being closed, the glass-blower *draws out* the air from within (instead of forcing in air, as in the ordinary manufacture), thus causing the glass to collapse, and to form one continuous substance with the cameo. When the glass is cut and polished to any desired form, the effect produced is striking and beautiful, for the clay cameo or bust has the appearance of unburnished silver, isolated in the midst of the solid transparent glass. Small articles are incrusted in a more expeditious manner, especially upon glass goblets or similar hollow vessels. The hot cameo is placed upon the hot manufactured vessel, a small piece of semi-liquid glass is dropped upon it, and this both fixes the cameo in its place and forms a glassy layer to enclose it.

The Volcanic Eruption at Hawai.

In the number for July 24th, of the *Commercial Advertiser*, published at Honolulu, we find a graphic account of the great volcanic eruption of Mauna Loa mountain, which broke out on the 11th August, 1855.

The seat of this eruption is an old traditional crater, 12,000 feet above the level of the sea, in a region rarely visited by man. Connected with this eruption there is one fact which ignores the theory of Prof. Winslow, namely, that the lava is an eruption of the matter of the interior of the earth, which is supposed to be a mass of molten fire. The fact is this: On the opposite side of the mountain there is an old open crater—Killawea—about 7,500 feet lower than the seat of the new eruption. Well, this old crater has remained without overflowing during the whole eruption. On this head the above-named paper remarks :—

"Does not this show that the mountain, instead of being one huge boiling cauldron of molten matter, is divided into vast chambers or ducts, into some of which the water from the sea finds access, causes steam, whose powerful agency forces out the molten lava, while to other chambers the water finds no access."

The lava has been issuing from this great crater since it first broke out. With its windings it is about 65 miles long, and varies from three to ten miles in width, and varies from 20 to 300 feet deep. It has already overflowed 200,000 acres, and is now within six miles of Hilo, on the sea-coast. What a terrible sight, to see a river of burning lava three miles wide and 20 feet deep slowly and resistlessly moving forward, eating up every green thing. Huge forests are soon devoured by the fiery monster, valleys filled up, and nothing left but a smoking scene of desolation. At present the flow of lava is not so great as it was in November last year, but it is still immense, and there is no signs of its ceasing.

Japan Varnish.

According to Thunberg, the very best Japan varnish is prepared from *Rhus Vernifera*, which grows in great abundance in many parts of that country, and is likewise cultivated in many places on account of the great advantages derived from it. This varnish, which oozes out of the tree on being wounded, is procured from stems that are three years old, and is received in some proper vessel. At first it is of a lightish color, and of the consistence of cream, but grows thicker and black on being exposed to the air. It is so transparent, when laid pure and unmixed upon boxes or furniture, that every vein of the wood may be seen. For the most part a dark ground is spread underneath it, which causes it to reflect like a mirror, and for this purpose recourse is frequently had to the fine sludge, which is got in the trough under the grindstone, or to ground charcoal; occasionally a red substance is mixed with the varnish, and sometimes gold leaf, ground very fine. This varnish hardens very much, but will not endure any blows, cracking and flying almost like glass, though it can stand boiling water without any damage. With these the Japanese varnish the post of their doors, and most articles of furniture which are made of wood. It far exceeds the Chinese and Siamese varnish, and the best is collected about the town of Jesino. It is cleared from impurities by wringing it through very fine paper; then about a hundredth part of an oil called *toi*, which is expressed from the fruit of *Bignonia tomentosa*, is added to it, and being put into wooden vessels, either alone or mixed with native cinnabar, it is sold all over Japan. The expressed oil of the seeds serves for candles. The tree is said to be equally poisonous with the *rhus vernix*, or American poison tree, commonly called swamp sumach.

American Book Craft.

"Forty years ago, three men, by hand-work, could scarcely manufacture 4,000 small sheets of paper a day, while now they can produce 60,000 in the same time. It has been calculated that if the paper produced yearly by six machines could be put together, the sheet would encircle the world.

Nowhere is paper so much used as in the United States. In France, with 35,000,000 of inhabitants, only 20,000 tuns are produced yearly, of which one-seventh is for exportation. In England, with 28,000,000 of inhabitants, 66,000 tuns are produced; while in this country the amount is nearly as great as in France and England together.

A large proportion of this consumption of paper is directed to the 2,000 newspapers which are incessantly springing up in all sections of this country—some to flourish, but more born but to die, and make room for the succession."

"The first book ever printed in the New World was in the city of Mexico. It was printed in the Spanish language, in the year 1544, and was entitled *Doctrina Christiana per eo los Indos*. The first publications made in English, in America, were the *Freeman's Oath*, an Almanac for 1639, nearly a hundred years after the work published in Mexico. In 1640 was published the first book, entitled the *Bay Psalm Book*. It was reprinted in England, where it passed through no less than eighteen editions; the last being issued in 1754. It was no less popular in Scotland, twenty-two editions of it having been published there. Altogether, it is estimated it reached to seventy editions abroad."

"The first printing press set up in America was 'worked' at Cambridge, Massachusetts, in 1839. The Rev. Jesse Glover procured this press by 'contributions of friends of learning and religion,' in Amsterdam and in England, but died on his passage to the New World."

"It is believed that the amount invested in the book business in Boston alone, at the present day, cannot be less than three millions of dollars. Now there are nearly one hundred booksellers, and over fifty distinct publishers in the American 'Athens.'

In New York there are four hundred and forty-four booksellers and one hundred and thirty-three publishers, and in Pennsylvania, four hundred and two of the first and seventy-two of the last. Most of the publishing, and the largest number of the booksellers, center in the three great cities of Boston, New York, and Philadelphia, which are the leading publishing cities of the country. New York has the most capital invested in the business."

[The above are extracts from that ably written and interesting book, "Salad for the Social," published by Dewitt & Davenport, this city.

Inventors of Cut Nail Machines.

A correspondent of the *Boston Traveler* writing from Hanover, N. H., gives a short biography of a remarkable individual who died in that place on the 16th ult. This was Increase Kimball, who departed this life at the age of 80 years, and labored under an aberration of mind for the past fifty. This correspondent says, "In 1804 he invented the first machine for making cut nails, and took out a patent for it. For this he was offered a large sum, but he refused to sell. Improvements were made by others on this machine and patented, which threw him out of the whole benefit, and the disappointment, is thought to have been the proximate cause of his derangement."

This letter has been copied by one of the daily papers in this city, and the statement thereby has been circulated far and wide. We regret this, because it contains great errors. It conveys the idea that Increase Kimball invented a machine, and that some other persons, by making slight improvements on it deprived him of the benefits of his invention. This cannot be done: no inventor of a subsequent improvement can use parts of a machine, covered by a previous patent, without the patentee's consent, therefore Mr. Kimball was not deprived of the benefits of his invention upon any such grounds.

The fact is he was not the first inventor of a cut-nail machine. His machine was patented in 1805, and no less than twenty-seven patents for such machines had been issued before his. Josiah O. Pearson, of New York, secured the first patent for a cut-nail machine in 1794, and the well-known Jacob Perkins, then residing in Boston, obtained one in the succeeding year. Whatever was the cause of unhinging the mental faculties of Increase Kimball, the correspondent of the *Boston Traveler* is not correct in his premises.