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(Illustrated articles are marked with an asterisk.)

Table listing various articles such as 'Universal Wood-Working Machine', 'Improved Sawing Machine', 'The Farmer Fountain', etc., with corresponding page numbers.

To Advertisers,

The circulation of the SCIENTIFIC AMERICAN is from 25,000 to 30,000 copies per week larger than any other journal of the same class in the world.

THE MANUFACTURE OF ILLUMINATING GAS.

There have been very few changes in the manufacture of illuminating gas since the time that Westminster bridge and Pall Mall were lighted by it about sixty years ago.

This state of things is now fast changing, and, recently, important progress has been made in the manufacture of illuminating gas, so that it is probable that the crude and unscientific method of distilling coal handed down to us by those who first undertook the manufacture, will be entirely dispensed with.

Nearly one half of ordinary illuminating gas is composed of hydrogen, which, as is well known, burns without any illuminating power whatever. It is also known, that perfectly pure hydrogen can be prepared by passing illuminating gas over lime heated to cherry redness.

What the gas company wants is, not hydrogen, but a suitable compound of that gas with carbon; but, in spite of all the precautions of the engineers, half of the product of the manufacture is hydrogen.

The method for the manufacture of pure hydrogen that appears to be the most practical, at the present time, is the one proposed by M. Tessie du Motay, and consists in heating a mixture of damp coals and hydrates of the alkalis.

in theory, at least, we here have a simple and cheap method for the manufacture of illuminating gas, without the necessity of vast retort houses, exhausters, purifiers, condensers, and incidental products of the ancient distillation process.

Since the introduction of petroleum into commerce, attention has been naturally turned to it, and to its products, as a probable cheap source for illuminating gas.

When petroleum is distilled, one of the first products that goes over is a highly explosive and volatile compound called naphtha. It would be entirely a waste product, were it not for the fatal and highly reprehensible habit, on the part of some dealers to adulterate and increase the volume of kerosene by its use.

The progress of science, during the last ten years, also points to the probability of our making illuminating gas synthetically. But such a realization is too distant for us to do more than allude to it as within the range of possibility.

It would not appear to be a difficult matter to accomplish this result, and, as we have pointed out in our article, there are a number of methods that have such elements of success in them, that they ought to be thoroughly tested before being abandoned as worthless.

COATING VESSELS WITH ZINC.

The protection of iron ships by the application of zinc, or, in other words, the galvanizing of their surfaces, has attracted considerable attention. The process of "galvanizing," as it is called, that is, the coating of iron with zinc, is ordinarily performed by dipping the piece to be galvanized into melted zinc.

Taking this brief description of the process as a starting point, it seems a bold proposition to galvanize a large iron vessel. Yet this is just what is proposed by Mr. Charles Lamport, who, in an address before the Institution of Naval Architects, at London, at a recent session, gave the details of his plan.

Before we notice these details, however, it will be necessary to notice the difficulties which render them needful.

The first of these is the removal of the peculiar skin, or scale, which is met with on all iron plates, as they come from the rolls, and which prevents the adhesion of the zinc.

It seems, that of late, on the European continent, a method of pouring the zinc over the plates, instead of immersing them, has been rendered possible and successful, by the use of a flux, the nature of which is not given in the address of Mr. Lamport—a very important omission indeed, as he seems to rely upon its use in the application of his method, which is as follows:

Over the sides of the ship he will suspend a bath with so much of a furnace attached as will maintain the zinc in a fluid state. This bath being in contact with the side of the ship, the plate against which it is placed will become of a temperature, he thinks, sufficient to allow of adhesion, if the scale be taken off.

To remove the scale, as well as to perform the other parts of the operation, he proposes to use what he styles molds, one of which will be made of a steel plate one fourth of an inch in thickness, rolled cold, and having a very fine skin put upon it, so as to prevent the adhesion of the zinc to it.

introduced and allowed to remain long enough to remove the scale. The flux is to be applied in a similar manner, after which the melting furnace and steel mold, above described, are to be applied, provision being made for its exact accordance with the space previously acted upon by the acid and flux.

Provision for buckling is to be made by allowing portions of the zinc to remain unattached to the iron, a matter regulated, of course by the non-removal of the scale, except of such parts as are desired to unite with the zinc.

Of course it would be unwise to hazard any positive prediction as to the ultimate success or failure of this method, in anticipation of its practical trial. We cannot fail to see, however, numerous practical difficulties, which will heavily tax the genius of Mr. Lamport to overcome.

THE NEW PATENT LAWS--IMPORTANT CHANGES AFFECTING AMERICAN AND FOREIGN MANUFACTURERS--FREE TRADE IN PATENTS NOW FULLY ESTABLISHED.

The advocates of the free trade system, if they did not succeed at the late session of Congress in realizing all their aims, certainly made a clean sweep so far as patents are concerned.

This country is now thrown freely open to all foreigners in respect to patents, and the peoples of all countries may come or send here and compete with American genius and industry on the most favorable terms.

The law which required foreigners to put and continue their inventions on sale in this country, within eighteen months after obtaining their patents, has been repealed, and foreigners, like our citizens, may choose their own time for working their patents.

Another provision of the new law permits a foreigner to patent his invention here at any time, even after it has been introduced and patented abroad for years, provided it has not been used here for more than two years prior to application for an American patent.

The old law prohibited the grant of a patent for any foreign invention that had been brought into use here, even for a day, prior to application for a patent.

In the same way the new law also throws open to foreigners the right to take out patents for designs, and as this virtually includes all the new figures and pattern for every description of fibrous and textile goods, such as carpets, silks, laces, calicoes, trimmings, etc., the law becomes important to our home manufacturers.

The following is the provision of the new statute in relation to design patterns:

"Any person who, by his own industry, genius, efforts, and expense, has invented or produced any new and original design for a manufacture, bust, statue, alto-relievo, or bas-relief; any new and original design for the printing of woolen, silk, cotton, or other fabrics; any new and original impression, ornament, pattern, print, or picture, to be printed, painted, cast, or otherwise placed on or worked into any article of manufacture; or any new, useful, and original shape or configuration of any article of manufacture, the same not having been known or used by others before his invention or production thereof, and patented or described in any printed publication, may, upon payment of the duty required by law, and other due proceedings had the same as in cases of inventions or discoveries, obtain a patent therefor."

The Government fee for a design patent is \$10 for 3 1/2 years, \$15 for 7 years, and \$30 for 14 years, with privileges for extension.

Another novel provision of the new law consists in the registration of trade-marks. When a patent has been granted for the article or the pattern, a further security may be obtained in the shape of a patent upon the trade-mark that is placed upon the article or goods.

"Any person or firm domiciled in the United States, and any corporation created by the authority of the United States, or of any state or territory thereof, and any person, firm, or corporation resident of or located in any foreign country which by treaty or convention affords similar privileges to citizens of the United States, and who are entitled to the exclusive use of any lawful trade-mark, or who intend to adopt and use any trade-mark for exclusive use within the United States, may obtain protection for such lawful trade-mark, by complying with the following requirements, to wit:—"

The Government fee for registration of a trade-mark is \$25. Duration 30 years, with privilege of renewal.

One effect of the above new laws will be to put an end to that extensive class of American industries which has grown up and flourished by the manufacture of articles and goods copied from foreign sources. All who undertake such reproductions without consent of the foreign originator, will be liable to be interfered with at any time, by the grant of a patent, and the stoppage of their works.

Another effect of these laws will be to compel our citizens to invent their own designs, and thereby artistic invention on our own soil will perhaps be encouraged.

We have in preparation, to be issued in a few days, a new