TECTORIUM, SUBSTITUTE FOR WINDOW GLASS.

We have already described the manufacture of a sheet glass in which wire gauze is incorporated. For some years, a product of the same nature has been manufactured, in which the glass is replaced by a special insoluble bichromated gelatine as translucent as opal glass and incorporated in the wire gauze. Fig. 1 shows the aspect of it. This product designated as *tectorium*, has, for some little time, been widely used. We believe it of interest to make this curious substitute for window glass known to our readers and to point out its useful qualities.

It has been employed for many years in Austria, Italy, Germany, Switzerland and Russia as a covering for hothouses, marquises, verandas, roofs of stores, windows of factories, etc. It refracts the rays of the sun, and, while possessing the translucency of opal glass, is tough and flexible, bends without breaking, is not injured by frost, and does not dissolve in water. It is a bad conductor of heat, and, when exposed to the air, becomes stronger and stronger.

Upon passing a slight coat of paint of oil color over the tectorium, one obtains an imitation of stained glass difficult to distinguish from the genuine article. It is easily cut with shears and may be given any form that is desired.

To properly utilize tectorium, it is necessary to nail it to the wood of the window like ordinary glass. When it is a question of employing it upon iron, it is necessary to first cover the latter with small laths and fix the tectorium to them with nails (large-headed ones by preference) somewhat distant from the edge of the material.

Tectorium is easily repaired, provided that the damage is not too great. For small holes the wire of the gauze is first put in place, and a special lac prepared for the purpose is then inserted. If, on the contrary, the rent is too large, it is better to cut out the broken part, and, by means of thick lac, fix a piece of tectorium over the hole.

Some manufacturers who employ the material with success assert that it is not only a very curious substitute for glass, but that it may be considered as much cheaper, owing to the long time that it lasts, its resistance to breakage, etc. It is manufactured in pieces 23 feet in length by 4 in width.

Employed for roofing buildings, hothouses, factories, etc., the tectorium, having to withstand rain, snow, etc., must be firmly and carefully fixed to the T irons that generally compose the framework of such coverings. One of the best means of obtaining a good result consists in cutting the squares or strips three-quarters of an inch wider than the frame on every side, and folding the edges upon themselves so as to double them. After piercing the T iron, one puts in place the tectorium, in which apertures are formed opposite those of the frame. Afterward a small strip of wood being applied to the doubled edge, it is fixed by screws or rivets in such a way that the sheet shall be firmly compressed between the wood and the iron (Fig. 2). —*La Nature.*

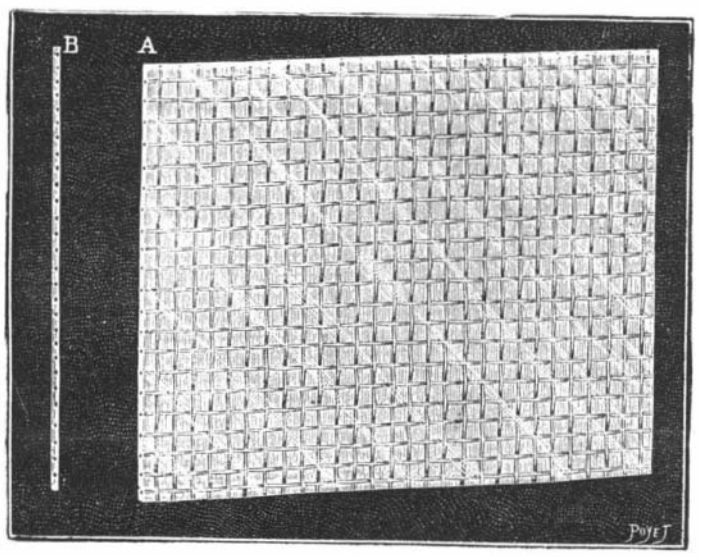


Fig. 1.—SHEET OF TECTORIUM.
A.—Face View. B.—Section.

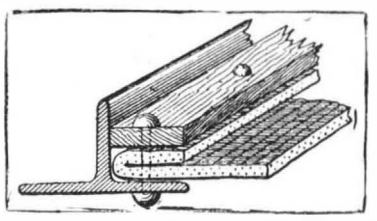


Fig. 2.—MOUNTING OF TECTORIUM.

Artificial Diamonds

To obtain the pressure which he judged requisite to the formation of the diamond, M. Moissan conceived the idea of utilizing the property that certain bodies possess of increasing their volume when cooling from a liquid to a solid state. He placed silver and charcoal of sugar in an electric furnace and fused the metal to a state of ebullition; a certain quantity of carbon was thus absorbed by the metal. The mass was then thrown into water, and at once formed a shell of solid silver. When this was withdrawn from the water and allowed to cool slowly, the pressure of the kernel of molten silver contained in the exterior shell, which expanded in the process of cooling, precipitated the carbon in the form of microscopic black diamonds.

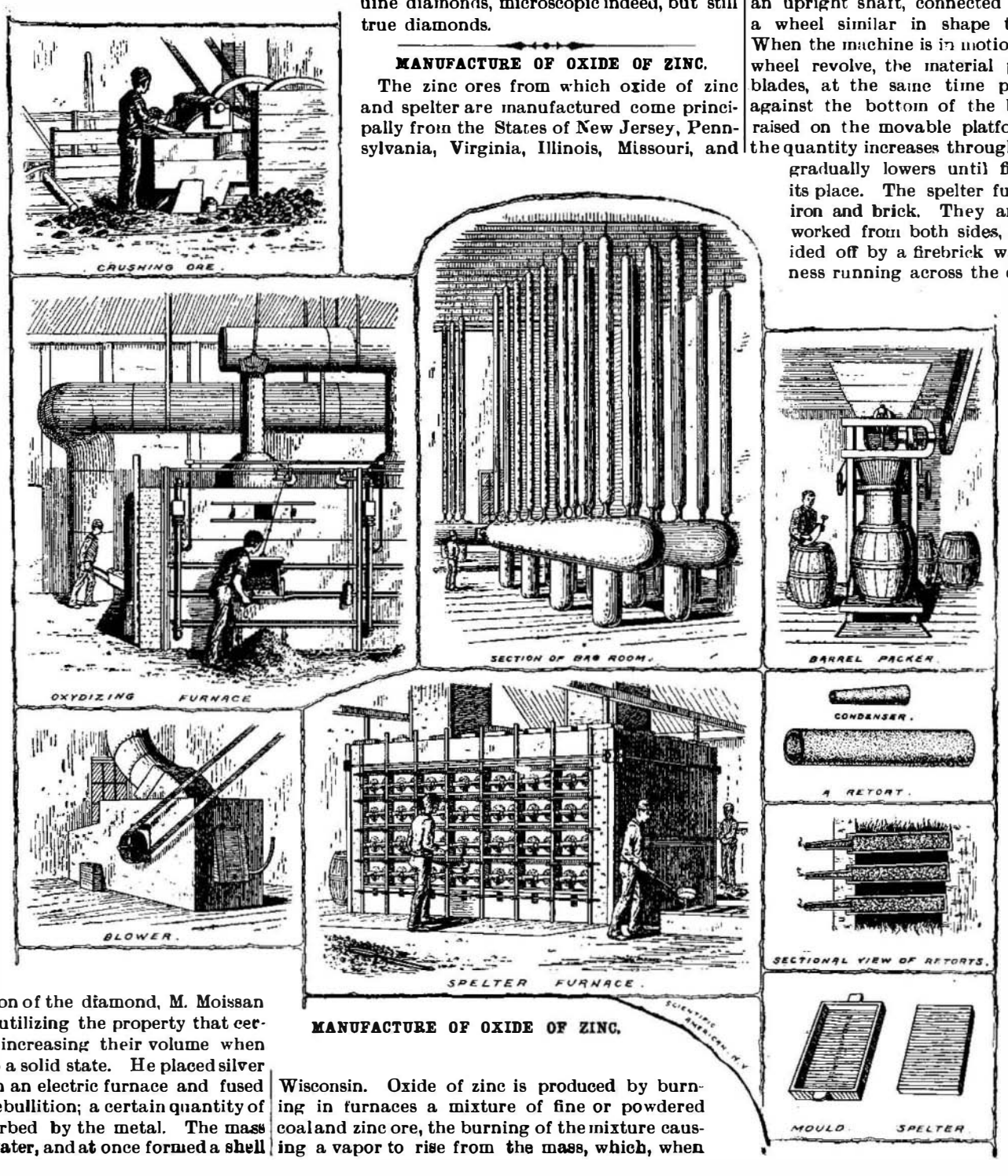
Following this experiment, M. Moissan inclosed in a cylinder of soft iron a certain quantity of charcoal of sugar, and plunged it into a bath of liquid iron, placed in an electric furnace. Withdrawing the crucible from the furnace, he plunged it in water and allowed the mass, as soon as the exterior shell was formed, to cool gradually. The result was the production of genuine diamonds, microscopic indeed, but still true diamonds.

MANUFACTURE OF OXIDE OF ZINC.

The zinc ores from which oxide of zinc and spelter are manufactured come principally from the States of New Jersey, Pennsylvania, Virginia, Illinois, Missouri, and Wisconsin. Oxide of zinc is produced by burning in furnaces a mixture of fine or powdered coal and zinc ore, the burning of the mixture causing a vapor to rise from the mass, which, when coming in contact with the air, forms itself into a white powder.

Spelter is produced by burning the mixture in air-tight retorts, the material in which vaporizes and forms itself into liquid zinc. The oxidizing furnaces are made of iron and brick, the inside of which is lined with fire brick. The burning spaces are about 6 feet in length, 4 feet in height, and about 4 feet in width. A charge—of which there are six daily—consists of about 400 lb. of fine coal and about 550 lb. of zinc ore crushed, which is moistened with water. When the furnace is ready to receive the charge, the mixture is put into the oven. After burning about one-half hour, an upper door of the furnace is thrown open to let the gas escape and prevent explosion. As the heat from the burning mass increases, a vapor from the heated ore arises, which is carried off through an 18 inch pipe or chimney, by means of a blast underneath the bottom of the furnace. This blast admits the oxygen, which, coming in contact with the vapor, causes it to form itself into a white powder. Running horizontally and attached to the pipe at the top of the furnace is a 4 foot pipe, which connects itself by an underground passage to a blower, which carries or forces the powder up into what is called the bag room. The pipes from the blowers run across the center of the room, connected to which every few feet apart, on each side, are a number of muslin bags ranging in diameter from 1 to 4 feet. The small bags are suspended to the rafters 50 feet above and are connected at the bottom to the large 4 foot bags, which run horizontally each way across the room, underneath the bottom of which are a number of 2 foot teats. The oxide of zinc is blown from the pipes into these bags. After a quantity is collected, the blower is stopped and the bags collapse and are shaken by the attendant, causing the material to settle down into the teats, where they are emptied in common bags and then screened and bolted. After being bolted the material passes to the barrel packer. The material passes down through a hopper and into a metal cylinder about the length and the diameter of the top of the barrel. Running down through the center of this cylinder is an upright shaft, connected to the end of which is a wheel similar in shape to that of a propeller. When the machine is in motion the upright shaft and wheel revolve, the material passes out through the blades, at the same time pressing and packing it against the bottom of the barrel, which has been raised on the movable platform of the machine. As the quantity increases through the blades, the barrel gradually lowers until filled and another takes its place. The spelter furnaces are also made of iron and brick. They are square in shape and worked from both sides, the furnaces being divided off by a firebrick wall about 1 foot in thickness running across the center. The distillation is carried on in cylindrical fire clay retorts. These retorts are about 5 feet in length and about 1 foot in diameter and 1⅛ inches in thickness. There are 56 of these retorts on each side, placed in rows, so that they can be encircled by the fire and heat, the inner ends resting on projecting shelves in the center wall and placed so that the inner ends are a little higher than the other.

When the retorts are all in position they are filled with a mixture of fine coal and ore, the attendants putting the material in by means of semi-cylindrical shovels, the operation taking about 3 hours, each retort holding about 125 pounds. After the retorts have been filled conical-shaped tubes or pipes of fire clay are plastered in the mouths of the retorts and the fires started. These conical tubes or condensers are about 18



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