Scientific Items.

DECORATING TIN SURFACES.

The peculiar effects produced by the surface crystallisation of tin have been often employed in the decoration of metallic articles, especially when made of what is known as tin-plate, tinned sheet iron, and tinned brass. It appears that when the effects are produced by means of acids, although very beautiful, they soon get dull, and the work is, moreover, irregular. Mr. L. Q. Brin, of the Borough, Southwark, has patented an improved process, the essential feature of which consists in the cooling of the metal in fusion on the surfaces of plates by the action thereon of air, water or steam ; these agents being employed under pressure varying according to circumstances. The air and water may be cooled in their passage before touching the plates, and the steam may be superheated. These agents—water, air or steam—act as cooling agents, and, at same time, as regulators of the designs formed in the crystallisation. Employed under varying pressures they are easily directed, and for the same reason they are caused to act by jets as large or small as may be required, and in this way names, letters, and devices of varying descriptions are capable of being produced, the effects of which are very good. Plates treated according to the invention may be subsequently coated with varnishes, and be coloured or not, as desired. The machinery employed by the patentee consists of an air-pump, which is in communication with an air-receiver or vessel or vessels for containing compressed air, and adjacent to the air-vessel there is a water-vessel ; these two vessels are in communication with a chamber or frame in which the plates to be treated are placed ; the design or pattern required is formed on the frame cover. Communication between the air and water-vessels and the frame is made or cut off by taps. The plate frame is supported in a trough, which is provided with inlet and outlet pipes. Conveniently situate with respect to the plate frame there is a gas or other suitable furnace or apparatus for heating the plates to be treated. The following is the modus operandi when treating sheets or plates of pure tin :—The sheets of pure tin are laid on a plate of cast iron, which is heated slowly until the tin begins to melt. The plate of iron supporting the tin plate is heated and treated as the coated plate, and cooled in a similar manner. After this operation they are placed in a bath described, similar to those used for coated plates. To fix them to paper they are allowed to dry, and are fixed by means of gum and pressure so as to render them very adherent to the paper. The metal-coated sheet is placed on a gas furnace until the tin is in a complete state of fusion. As soon as the surface is liquid, which is easily seen, the sheet is, by means of pincers arranged for this purpose, immediately placed at the top of a chamber which is provided with supports to receive it. As soon as it is in place the valve is opened, and water entering under pressure is forced to escape by the orifices formed in the upper plate of the chamber. If air is employed, it is used in the same way as water. If air has been compressed by means of a blower or rotary fan the effects are different, but the mode or method of employment is the same. The plates are then cleaned in an acid bath consisting of, say, the following ingredients in or about the proportions named:—10 parts each of nitric, sulphuric, hydrochloric and oxalic acids, and 60 parts of water; or a bath composed of nitric acid, 2 parts ; hydrochloric acid, 4 parts ; and distilled water, 12 parts ; or a bath of sea-salt, 10 parts ; distilled water, 90 parts; oxalic acid, 10 parts. The bath is intended to uncover the angles of crystallisation. The plates are then thrown into fresh water, and subsequently are varnished, if desired. The effects produced and the designs are then brought out with effect. When steam is used it is applied in a similar manner to that of the air, but produces different results in the designs. If it is desired, immediately after the tinning of the plate, as soon as it comes out of the tin bath, it is immediately cooled and treated as before described, as if it had come from the gas or other heating apparatus. The effects will be only more brilliant and more regular with a working economy of at least 50 per cent.

VEGETABLE ivory is the hardened kernal of the nut of a species of palm of which there are several kinds. The Brazilian palm (*phytelephas macrocarpus*) grows freely in Central America and Peru, and yields what is known as the corsos nut of commerce. When shipped, the kernals are quite milky and soft, like white wax, and during the voyage they ripen and become hard. The nut is chiefly used for making buttons and other small articles.

LEATHEROID.—The *American Manufacturer* says that a new chemical product has just been brought out at Wheeling, West Virginia, under the name of leatheroid. This name was selected by its inventors on account of its resemblance to leather. It is made of two varieties, one being soft and flexible like leather, the other hard like gutta-percha or vulcanized rubber, resembling those materials in its density, strength and hardness, and like them is susceptible of a very high polish. The leatheroid is manufactured from vegetable fiber by a chemical process which is patented. It is made in sheets of 12 feet in length by 4 feet in width, and can be made of any desired thickness, from one-hundredth of an inch to one inch. The leatheroid has been thoroughly tested as a substitute for leather in the manufacture of trunks and washers, for gutta-percha in combs, napkin rings, etc., for tin and iron in roving cans and bobbin boxes for cotton mills, for whalebone in whips, for copper in shoe tips, for wood in chair seats, and also used in the manufacture of friction pulleys for machinery cams, and in fact there seems to be no end to the uses to which it can be applied. Leatheroid can be made of any color, though it is usually made brick red to imitate leather or vulcanized rubber ; black, which is used in the manufacture of combs and canes ; and walnut, which is used in chair seats.

SMOKE-BURNING FURNACE.—From Cleveland comes the report of a successful smoke-burning furnace, the invention of Dr. S. G. Clark. At the rear of the grate-bars is a small auxiliary furnace with grate and ash-pit. Over this rear furnace is thrown an arch of fire-brick, the base of the arch resting against the bottom of the boiler. The coal is fed in the usual way at the front of the furnace ; as the smoke is burned off, the incandescent coal is gradually moved back toward the rear of the grate-bars, where it falls with the cinders into the rear furnace. There sufficient air is admitted to cause a most intense heat immediately under the arch, where all the smoke and gases are instantly decomposed. One of these furnaces is now in successful operation in Newburg, at the Cleveland Steel Casting Works, near the crossing of the A. and G. W. and C. and P. railroads, who claim the saving of coal over the old setting to be 40 per cent.—*Cleveland (Ohio) Trade Review.*

EFFECT OF CONSTANT VIBRATION UPON IRON.—Shafts of side-wheel steamers and propellers sometimes break suddenly, and it is supposed that the constant vibration of certain qualities of apparently sound iron causes a crystallisation and loss of cohesion. Lately the steamer "City of Chester" was proceeding at an ordinary rate of speed in clear, calm weather, when, without a word of warning, two blades of her wheel dropped off simultaneously, crippling her at once. An examination of the remainder of the propeller will probably show again that the constant vibration had crystallised the metal, so that the wheel went to pieces all at once, like the deacon's "one-horse shay." The *Brooklyn* (N.Y.) *Eagle* suggests that this gradual crystallisation of iron is one of the dangers which threaten the elevated roads. How long the trestle-work will retain its strength of fiber under the ceaseless vibration it is called upon to endure, is a question which only costly experience will determine.

PUTTY FOR REPAIRING BROKEN WALLS.—The best putty for walls is composed of equal parts of whiting and plaster-of-Paris, as it quickly hardens. The walls may be immediately coloured upon it. Some painters use whiting mixed with size ; but this is not good, as it rises above the surface of the walls, and shows in patches when the work is finished. Lime must not be used as a putty to repair walls, as it will destroy almost every colour it comes in contact with.

Another. Use plaster-of-Paris and white sand in nearly equal quantities, mixed with water.

INDELIBLE INK FOR MARKING LINEN.—Add caustic alkali to a saturated aqueous solution of cuprous chloride until no further precipitate forms ; allow the precipitate to settle, draw off the supernatent liquid with a siphon, and dissolve the hydrated copper oxide in the smallest possible quantity of ammonia. It may be mixed with about six per cent. of dextrine for use. Before washing pass a hot iron over the writing.

HOW TO DESTROY CARPET BEETLES. — When these beetles have once taken possession of a carpet, it is very difficult to dislodge them. Cotton moistened with benzine, or preferably kerosene, and forced into the cracks of the floor, under the surbase, etc., has thus far proved the most effectual means of destroying them and preventing new innovations. The ordinary applications of camphors, pepper, tobacco, turpentine, etc., are powerless against it.