for the high lustre, refractive power or brilliancy, specific gravity and softness, which it gives to the silicate. These qualities appear to be proportioned to the atomic weight of the bases employed, that of lead being among the greatest. Flint glass and crystal for optical purposes, are of like composition Common window glass and English with strass. crown, are silicates of potassa or soda, lime and alumina. Plate glass differs from this only in the purity of the materials. Oxides of gold, silver, copper and other metals, are employed to impart The native glass a variety of brilliant colors. which gives occasion to this article, as we have observed, is silicate of iron, with some added mixture of alkalies, alumina, or other "fluxes" (bases) of which we are not precisely informed, but which are among the usual elements of green bottle glass. —Scientific American.

#### Inlays.

White and colored inlays and enamels of almost indestructible hardness and beautiful polish may be made on wood or metals with oxychloride of zinc. The oxide of zinc, very pure and dense, is made into a stiff paste with water (if pigments are used, they are introduced into the dry oxide in powder), and introduced into the hollows to be inlaid, where it is allowed to dry. It is then carefully painted over with a strong solution of chloride of zinc, and the two compounds unite chemically, forming a very hard and dense substance. Before it sets, it may be polished with a piece of smooth, hard wood. If the object is such that the application can be performed very quickly, the oxide and chloride may be first mixed and introduced at once. It is an advantage to have all the materials warm.

SILVER INLAYING.—A cheap and simple process recently published consists in first engraving with nitric acid or otherwise the metallic surface to be inlaid, with the desired pattern, and then rubbing into the depressiops a little moistened nitrite of silver. When perfectly dry, the metal is heated until the nitrous acid is driven off, and the metallic silver fills the hollows in a spongy mass. This must be rubbed down and compressed well into the engraving with a burnisher. The silver thus inlaid adheres inseparably, and is of the utmost purity.

#### Electro Casting.

Statues and other fine models in metal are made with microscopical exactitude in the fine-art foundery of Messrs. Elbington, at Birmingham, by electro-casting, i. e., precipitating the metal from a state of solution upon the surface of the mold by electrical decomposition of its sults. In order to do this, the mold itself is first produced by the same process. The object to be copied is made impervious to moisture, and then coated with fine Placed in a copper solution, it is black lead. electrically coated with the metal to a sufficient thickness to retain its form when removed, and is then divided and taken off, or the model is removed from within. Its interior is, of course, a surface negatively identical with that of the model, and on being filled with a solution of bronze, and submitted to the battery, receives a deposit of bronze, the form of which is not to be distinguished from

the original by the finest scrutiny. These castings are usually made one-fourth of an inch thick, but the thickness can be varied at will, requiring weeks or months, according to the thickness. Unlike other modes of casting, in this there is no imperfection from the distortion either of the mold or of the casting, nor from imperfect filling of the finest lines of the mold.

## Darning Machine for Stockings, &c.

This is an English invention recently patented by Mr. E. A. Cowper, of London, and consists substantially in the use of a small rectangular frame, large enough to enclose any hole to be darned, and notched all around its outside like a saw, upon which darning cotton is wound in two directions crossing each other, one thread in each notch, and thus at uniform intervals. The network thus formed is applied to the hole, the article is stretched upon the frame and held by its teeth, and then the apparatus is placed beneath the needle of a sewing machine adapted to make stiches enveloping and clasping the threads at their intersections and filling the space with a firm and neat texture. When done, the frame is cut away, and the ends of yarn trimmed close with the scissors.

# Useful Receipts.

### **Cements and Uniting Bodies.**

In the preparation of cements and all substances intended to produce close adhesion, whether in a semi-fluid or pasty state, freedom from dirt and grease, without slovenliness, is a most essential and necessary condition.

A TEMPORARY CEMENT, to fix optical glasses, stones, jewellery, etc., on sticks or handles for the purpose of painting, repairing, or ornamenting, is made by melting together at a good heat, two ounces of resin, one drachm of wax, and two ounces of whitening; with this applied to the article when heated, secure fixation may be obtained, unfixed at pleasure by the same means, viz., heat.

RICE CEMENT, which is made by mixing rice flour intimately with cold water, and then gently boiling it, forms a beautifully white preparation, and dries nearly transparent; it is capable of bearing a very high polish, and is very durable; it is in every respect far before the common paste made with wheat flour or starch; it may be formed, also, into a plastic clay.

FOR UNITING STONE, DERBYSHIRE SPAR, ETC., ETC., melt together four ounces of resin and half an ounce of wax. and about an ounce of finelysifted plaster of Paris. The articles to be joined should be well cleaned, and then made hot enough to melt the cement, and the pieces then pressed together very closely, so as to leave as little as possible of the composition between the joints.

This is a general rule with all cements, as the thinner the stratum of cement interposed the firmer it will hold.

CEMENT FOR CHEMICAL GLASSES.-Mix equal parts of wheat flour, finely-powdered Venice glass,