UNITED STATES PATENT OFFICE.

J. A. F. LAIR, OF PARIS, FRANCE.

PROCESS FOR REDUCING COPIES OF ENGRAVINGS, &c.

Specification forming part of Letters Patent No. **33,485,** dated October 15, 1861.

To all whom it may concern:

Be it known that I, JOSEPH ALFRED FERDINAND LAIR, of Paris, in the Empire of France, have invented a Process of Producing Diminished Copies of Engravings and other Objects; and I do hereby declare the following to be a full, clear, and exact description of the said invention, which consists in first making a mold in gelatine or other equivalent substance of the engraved block or plate, or of any other object of which a contracted copy is desired, then contracting the said mold by chemical baths or otherwise, and finally submitting the mold to the electrotyping process, as fully described hereinafter.

In order to enable others to practice my invention, I will now proceed to describe the manner in which it may be carried into effect.

I take from an engraved block of wood or metal plate previously oiled or soaped an impression or mold in gelatine by pouring the latter, dissolved in water, onto the engraved surface, which is surrounded with an edging of gum-elastic or other suitable material, so that the mold may be of uniform thickness, the superfluous gelatine, if there be any, being removed by pressing on the surface a plate of glass previously oiled, so as to admit of ready detachment. When the gelatine has become sufficiently hard I remove the border, and then detach the mold, first from the engraved block or plate and then from the glass. After this I carefully wash the mold in ether and then steep it in one or more contracting-baths, which may be composed of different ingredients. Among others, I have found the following examples of contracting baths and the treatment of the molds in connection with the bath most successful in practice.

First example: Immerse the mold in a bath of alcohol containing sixty per cent. of the spirit, then into another containing ninety-five per cent. of the spirit; or several baths may be used, the percentage of spirit in each successive bath being increased and the contracting power of each bath being exhausted. After being taken from the baths the mold should be submitted to a partial desiccation, which takes away the greater portion of the spirit, and finally the mold should be submitted to a bath of double sulphate of iron and copper or of sulphate of peroxide of iron.

Second example: Immerse the mold in a bath or a series of baths of double sulphate of protoxide of iron and deutoxide of copper of different densities, commencing with the bath which is the least dense. The last and most dense bath may serve to impart a surface of copper to the mold with the aid of the usual galvanic battery. A bath of sulphate of peroxide of iron alone will suffice when the gelatine mold is of very large dimensions. Other substances—such as the salts of ammonia and manganese in certain conditions—will contract the gelatine. When the mold has been reduced to a sufficient degree of hardness, which often requires several days, I remove it from the baths, and when dried apply a coating of plumbago by means of a brush. I prefer, however, instead of using plumbago, to deposit on the mold a coating of silver or gold by the usual means.

Preparatory to submitting the mold to the electrotyping or coppering process, it will be advisable to secure it temporarily to a plate of glass, in order that it may be perfectly level.

Impressions printed from the electrotype thus obtained will be less in extent than those taken from the original engraved blocks or plates; but, as the gelatine mold contracts equally throughout every part, the diminished engraving will be found as perfect in every line as the orginal.

Reduced copies of engraved blocks or metal plates may be produced by processes other than that described above. For instance, a mold of gutta-percha may be first made from the engraved surface, and from this mold may be taken a gelatine cast, to be contracted either by allowing it to dry on an oiled plate or dipping it into the alcohol baths, and then taking from the contracted cast a mold of stearine or other suitable substance and submitting it to the electrotyping process.

The mold may be taken from the contracted cast by the pressure of plastic gutta-percha on the same, or of dental metallic cement, or alloys of mercury, silver, &c., the metallic cements having this advantage, that they do not require conductible preparations before submitting them to the electrotyping process.

My invention is especially applicable to the reproduction of engravings, the most perfect copies of diminished size being obtained without the necessity of any after touching. The invention, however, is not confined to the re-

production of engravings, as it may be successfully used in the production of diminished copies of basso-rilievos, carvings, statues, bronzes, and ornamental articles generally.

The gelatine molds may be rendered perfectly hard and insoluble by various processes, such as incorporating oxide of iron, lead, sulphate of baryta, &c., with the gelatine or immersing the mold in suitable solutions.

Although I have hitherto alluded to gelatine alone as a medium for reproducing diminished copies of engravings and other objects, that is not the only substance which can be employed for the purpose.

The same results as those obtained by the use of gelatine may be arrived at by a gluten, isinglass, gum-tragacanth, fibrine, swollen and dissolved in suitable liquors. Albumen, also applied to the object to be reproduced and afterward coagulated by heat, has enabled me to obtain reductions in the electrotyping-bath.

I claim as my invention and desire to secure by Letters Patent—

Producing reduced copies of engravings or other objects by first making molds of the object in gelatine or other equivalent substances, then contracting the said molds by immersion in chemical baths or otherwise, and finally electrotyping the contracted molds, substantially as herein set forth.

In testimony whereof I have signed my name to this specification before two subscribing witnesses.

F. LAIR.

Witnesses:
E. RUNARD,
GEO. HUTTON.