(No Model.)

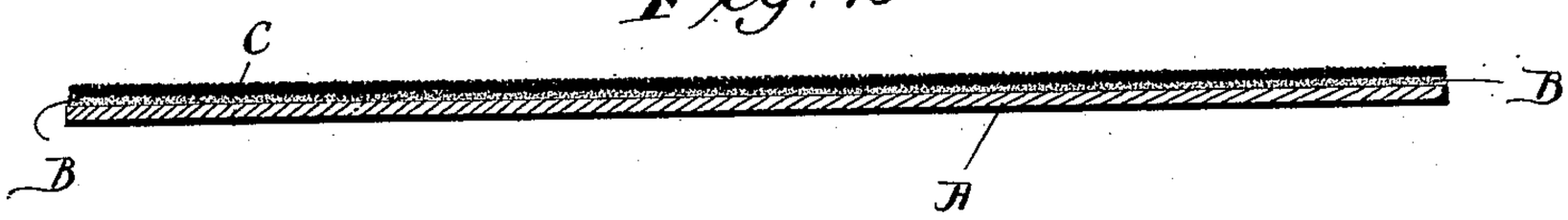
H. W. TAYLOR & C. W. WELMAN.

RELIEF TYPE.

No. 424,147. Patented Mar. 25, 1890.

Fig. 1.

Fig. 2



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UNITED STATES PATENT OFFICE.

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RELIEF-TYPE.

SPECIFICATION forming part of Letters Patent No. 424,147, dated March 25, 1890.

Application filed March 18, 1889. Serial No. 303,720. (No model.)

To all whom it may concern:

Be it known that we, HENRY W. TAYLOR and CHARLES W. WELMAN, citizens of the United States, residing at Sullivan, in the county of Sullivan and State of Indiana, have invented a new and useful Improvement in Relief-Types, of which the following is a specification.

Relief-types of the class to which the present improvement relates are cast, molded, electrotyped, or prepared in a matrix formed out of a composite engraving-plate consisting of a base-plate having a smooth hard surface, to which is applied a coating that is softer than the base-plate and of pulverizable or friable material which can be readily scored and engraved by means of a graver, and the matrix is formed by engraving the design of the desired type in the coating, the lines engraved being extended through the coating to the base-plate beneath. This process of preparing matrices is old, having been practiced by Hoffman in France, and by Palmer, Joyce, and others in Europe and this country; but the various coatings which have been devised and used are objectionable for many reasons, and especially because the particles of the coating adhere more to each other than to the base-plate, and consequently scale or chip off when cut with the graver, thereby rendering it impracticable to form cuts closely together or to cross them, or to do any but coarse work with the plates.

To obviate this difficulty, as well as to provide an engraving-plate having other superior qualities, is the aim of this invention.

A further object of the invention is to provide a coating which, besides possessing the qualities to prevent chipping, possesses a surface on which the engraver can trace with a lead-pencil the design, figure, or picture which is to be engraved.

The base-plate of the improved engraving-plate is preferably of polished blue steel—such as is used for finely-tempered saw-blades—as it withstands the heat incident to stereotyping, and its tint, when a light-colored coating is used, presents a marked contrast to the coating and enables the engraver to readily judge the effect of his work.

For the coating of the plate finely-powdered plaster-of-paris is used. This material is mixed with water to form a thin fluid paste, which is flowed over the plate evenly and smoothly and allowed to harden or "set" and form an "etching-film," after which a mixture of plaster-of-paris and cement (such as Portland cement) is mixed with water to form a paste, which is spread over the etching-film to form a "backing." The backing is allowed to dry and harden sufficiently to form a "drawing-surface," on which the design is subsequently sketched.

The leading features of the improvements are that the affinity of the particles of plaster-of-paris forming the etching-film for the base-plate causes them to adhere thereto and separate from the water, thereby rendering the coating very friable, so that it crumbles under the graver without breaking away or chipping between the lines; independently drying the etching-film and the backing, so that the latter may be separated from the former by introducing a sharp instrument between them without injuring the former; forming the etching-film and backing, respectively, of plaster-of-paris and of a mixture of plaster-of-paris and cement, whereby the latter forms a hard drawing-surface, while the former is sufficiently friable to be readily worked with the graver; forming the etching-film very thin, so that in representing heavily-shaded surfaces the lines may be made close together without chipping, and forming the backing somewhat thicker, so that in representing a single distinct line the backing and film may be cut through, thereby forming a clean even line.

The annexed drawings, forming a part of this specification, represent an engraving-plate of the kind under consideration.

Figure 1 is a plan view. Fig. 2 is a longitudinal sectional view.

In the drawings, A represents the base-plate. B represents the etching-film, and C represents the backing.

In preparing the matrix or engraving-plate, proceed as follows: Take finely-powdered plaster-of-paris (the more carefully and evenly it is comminuted the better, and it should be sifted to remove all lumps and large grains) and wet the same, slowly and without stir-

ring, with clear water, after which water is added to make a thin paste. This is placed on the clean, smooth, and polished surface of the base-plate A and flowed thereover by tipping the plate from side to side in the same manner that a photographer washes a plate in developing a negative. The etching-film thus formed must be very evenly spread and should be about one-sixteenth of an inch in thickness, and after it has set sufficiently to prevent it from rubbing off when touched lightly with the finger dry plaster-of-paris is sprinkled over the surface and a smooth block of wood (or other hard material) is rubbed lightly thereover, thereby reducing the surface to a plane and drying the same.

The backing consists of a mixture of plaster-of-paris and cement, as above described, the proportions varying with the season. In winter (when cements of all kinds dry more slowly than in summer) equal parts of plaster-of-paris and cement are preferred; but in summer the proportion of plaster-of-paris may be reduced to one-fourth; but these proportions are not arbitrary and may be varied slightly one way or the other without destroying the efficiency or defeating the object of the mixture. A thin paste is made by means of water of this mixture, (the same being slightly thicker than the paste which is used to form the etching-film,) and it is spread evenly over the surface of the etching-film from one to three sixteenths of an inch thick, this latter being left to the discretion of the engraver, as it is governed by the size of the plate and the character of the engraving, a complicated engraving requiring a thinner backing. The backing is now allowed to dry and harden slowly by exposing it to the atmosphere for ten to twenty hours, or if it is desired to use it immediately it may be dried by exposure to a fire; but in the latter case care must be taken not to have the heat too great, as that will render the surface soft and not suitable to receive the sketch.

In tracing the design on the engraving-plate as above prepared the single distinct lines, as shown at *a* in the drawings, are formed by cutting through the backing and the etching-film; but in a heavily-shaded surface, where the lines are close together and cross each other, the backing is removed by inserting a thin knife or other sharp tool between the backing and the film, after which the lines are traced in the film.

The above-described process of preparing the film—namely, by rubbing dry plaster-of-paris thereinto, so as to destroy the cohesive power of the particles—renders it perfectly easy to trace fine lines closely together without chipping, but at the same time renders it impossible to sketch the design thereon, whereas the harder surface of the backing is suitable for sketching, but it is too brittle to receive the fine close lines without chipping.

We have above described our improved method of preparing engraving-plates, stating at the same time the preferred materials of which the films or coats are composed; but it will be understood that we do not desire to confine ourselves to these materials exclusively, as other clays and earths may be employed.

The principle and substance of the invention is that we form an etching-film of a very friable substance which is protected when not in use, while using a backing of harder material which forms a sketching-surface, the said backing being so applied to the etching-surface as to be readily separated therefrom to expose the latter to receive the fine close lines representing shaded surfaces.

We prefer to use the materials above mentioned for the reasons that they are cheap, easily procured, readily worked, and effective.

Having thus described the invention, we claim—

1. As a new article of manufacture, an engraving-plate having a base-plate, a soft friable coating of minute particles of powdered matter, and an outer layer covering the first layer and provided with a hard surface suitable for sketching, substantially as specified.

2. As a new article of manufacture, an engraving-plate having a base-plate, a thin etching-film of soft friable material, as plaster-of-paris, the particles of which cling closely to the base-plate, but do not cohere to each other, and a backing of plaster-of-paris and cement covering the etching-film and having a hard upper surface, substantially as specified.

3. The herein-described process of making an engraving-plate having a base-plate, consisting in applying to the latter a thin coating of liquid plaster-of-paris, rubbing the surface of the latter when set with dry plaster-of-paris, and subsequently applying an outer coating in a liquid state and hardening the latter by exposure to heat, substantially as specified.

In testimony that we claim the foregoing as our own we have hereto affixed our signatures in presence of two witnesses.

HENRY W. TAYLOR.
CHARLES W. WELMAN.

Witnesses:
WILLIAM C. HULTZ,
J. R. RIGGS.