Sept. 9, 1930. O. A. BERIAU 1,775,384

METHOD OR PROCESS OF PRINTING

Filed Dec. 28, 1927 2 Sheets-Sheet 1

Fig. 1

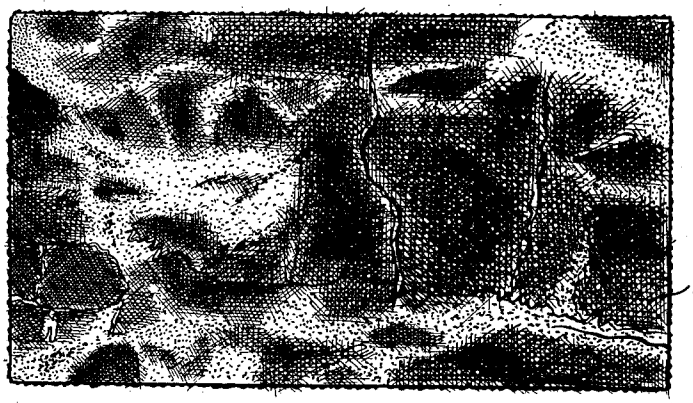

Fig. 2

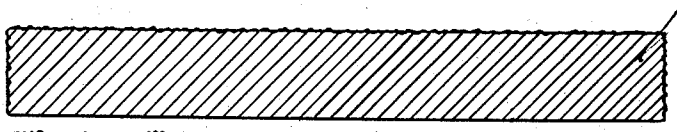

Fig. 10

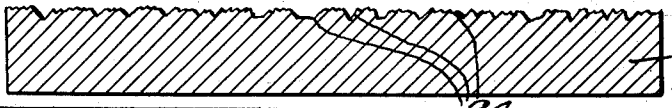

Fig. 3.

Fig. 11

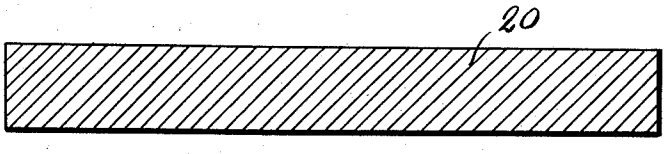

Fig. 4

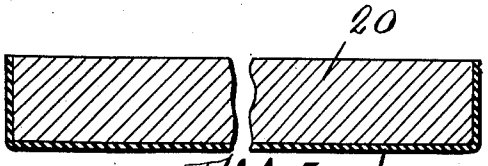

Fig. 5

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METHOD OR PROCESS OF PRINTING

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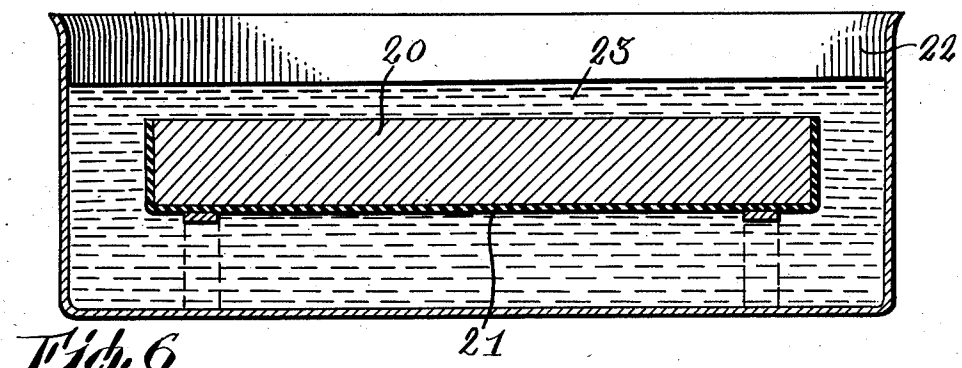

Fig. 6

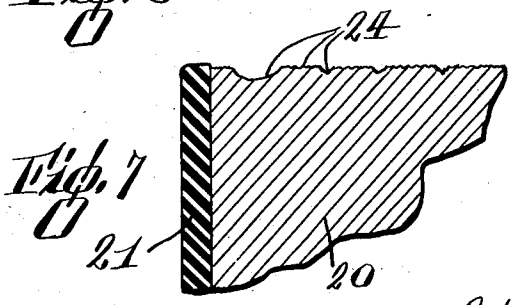

Fig. 7

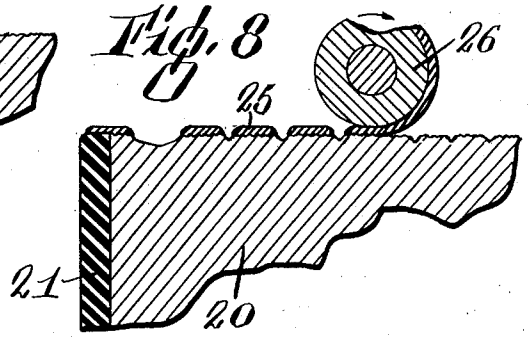

Fig. 8

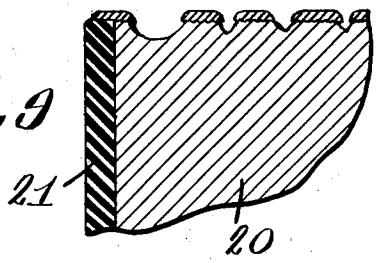

Fig. 9

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Patented Sept. 9, 1930 1,775,384

UNITED STATES PATENT OFFICE

OSCAR A. BERIAU, OF QUEBEC, QUEBEC, CANADA

METHOD OR PROCESS OF PRINTING

Application filed December 28, 1927. Serial No. 243,213.

This invention relates to new and useful improvements in the process of printing and reproducing imitation marble, tile, stone, and wood on soft or rigid materials.

The main object of the invention is to provide a printing process which will produce a replica of the material or object to be printed, with the minimum amount of labour and with the least possible expense.

Another object is to provide a print of wood, marble, or the like, without photographing, drawing, or using designs, negatives, screens, metal plates, or lithograhphic stones, such as are commonly used in printing processes.

According to my invention I treat the object or material to be reproduced with an acid which eats into and etches the softer parts of the material to the desired depth, leaving raised sections and depressions. The material thus treated is then used as the printing surface to thereby produce an exact replica of such a surface. For reproducing a marble surface, for example, my process may be described as follows:—I take a slab of natural marble and after polishing the surface until it is smooth, I attack the marble with a suitable acid, such a hydrochloric or nitric acid, the strength of which may be varied in accordance with the hardness of the marble. After a preliminary treatment I roll the slab with a composition of etching ink or a fat or gummy solution. I then continue etching and rolling and alternatively washing and proving after each etch until I have produced the necessary depth between the raised surfaces and the etched portions to produce a print of desired clarity, the slab being used as the printing surface. It will be readily seen that this slab may be also used to reproduce prints by the typographic or gravure (intaglio) methods, either direct or offset.

In the typographic method the raised portions only of the slab receive the ink; in the gravure (intaglio) method the whole slab (raised and depressed portions) is inked with a suitable ink and the surplus ink (i. e. the ink on the raised portions) is scraped away by means of a doctor and the design comes out from the depressions of the slab.

When the impression is direct it is made from the slab to the material to be printed upon. In offset impression the impression is first made on a rubber or gelatine surface, then transmitted to the material to be printed upon.

When a flat slab is used to print, a flatbed press is used and the slab is placed on the bed of the press. The printing surface may be also made by using a stone of cylindrical form treated in the same manner as the slab and the roller or cylinder is used as the printing medium. When using a stone of cylindrical form, then a rotary press is used either for the typographic method or the gravure (intaglio) method, either direct or offset. Any other stones may be treated in the same manner and used as the printing medium.

In reproducing wood surfaces, the slabs or cylindrical pieces of wood are polished. I then attack the softer grains of the wood with an acid, such as nitric acid or even better cupric ammonia, but when cupric ammonia is used the wood is not previously moistened. The wood is then moistened to swell and expand the harder surfaces. The surface is then polished and a glossing solution is used on the raised parts only. The glossing can be accomplished by various processes, one of which is the application of beeswax with a hot plate to bind and gloss the printing surface. The surfaces of the wood thus treated are used as the printing plates. The printing of the wood is done in the same manner as that described with relation to the printing of marble. In reproducing green antique marble a slab of green antique marble is used; for reproducing gold and black marble, a slab of gold and black marble is used; for

reproducing mahogany, a piece of mahogany is used; for reproducing oak, a piece of oak is used, and so on.

The advantage of using, as the printing medium, the article to be reproduced, is that no design is made; that no photographic, positive or negative films are necessary and half tones are obtained without the use of screens or graining equipment, as the article itself, or material to be reproduced is used as the printing medium. Any size of printed matter can be reproduced without joins or other markings. This process of printing by using the material to be reproduced as the printing medium ensures an exact replica of said material with the minimum amount of labour and expense.

Figure 1 is a plan view of a rough slab of natural marble,

Figure 2 is a longitudinal sectional view therethrough,

Figure 3 is a plan view of the slab of marble in polished condition,

Figure 4 is a longitudinal section taken through Figure 3,

Figure 5 is a longitudinal sectional view through the marble slab showing the bottom and edges covered with an acid resisting material,

Figure 6 is a longitudinal sectional view showing the covered slab positioned in and submerged in an acid bath,

Figure 7 is an enlarged fragmentary sectional view showing the sectional design of the top surface after the initial or preliminary acid treatment,

Figure 8 is a similar view showing the initial application of etching ink or other acid resisting material,

Figure 9 is a similar view illustrating the design after a second acid treatment,

Figure 10 is a longitudinal section illustrating the completely etched printing surface of the slab, and

Figure 11 is a fragmentary plan view of the slab shown in Figure 10.

With particular reference to the drawings, the numeral 20 designates an elongated slab of marble, shown in Figures 1 and 2 in its rough cut form.

The slab 20 is subsequently highly polished so as to form a smooth surface. One face, which will be hereinafter called the bottom face, as well as the side and end edges, are covered with a coating of acid resisting material, preferably a gummy solution indicated at 21. The slab is now in condition for its initial or preliminary etching treatment.

This initial application of etching material or acid forms an important step in carrying out the process and requires careful predetermination of the chemical employed.

For this purpose, the slab, as shown in Figure 5, is immersed in an acid bath which may comprise a vat 22 containing an acid solution 23 comprising a relatively weak solution of hydrochloric, nitrate or other suitable etching solution. This initial acid application forms the relatively shallow depressions 24 shown in greatly enlarged scale in Figure 7, affecting the intermediate as well as the vein forming material in order to bring out the finest details in the surface.

After the completion of the initial or preliminary chemical treatment, the printing surface of the slab is rolled with etching ink or other suitable acid resisting material 25, the initial rolling operation being preferably performed by a comparatively hard roller 26 to form a protective covering upon the harder elevated surfaces and the finer tone etchings.

This is followed by a proving operation performed to determine the design of the printing surface developed at this period of the process. The printing surface of the slab is then washed and subsequently rolled to form a second coating of etching ink. The surface is then subjected to a second application of etching chemicals, which in most cases, will comprise a somewhat stronger solution of acid to further develop the intermediate and coarse tone depressions, that is, to increase the depth thereof. The surface is again rolled with etching ink and again etched.

By thus successively etching, washing, rolling and proving the printing surface of the slab, a printing design accurately corresponding with the design of the material is produced, faithfully developing the extremely delicate as well as the relatively coarse tones of the material. In consequence thereof, the reproduction obtained from the printing surface embodies an exact replica of the marble or other material treated in accordance with the present process.

Having thus described my invention, what I claim is:—

1. A process for reproducing the natural design of a material which consists in forming a printing surface by subjecting the surface of the material to a preliminary etching, rolling and subsequently etching to form a replica of the material.

2. A process for reproducing the natural design of a material which consists in forming a printing surface by chemically treating the surface of the material to form a preliminary etching, rolling and successively repeating the etching and rolling operations to form depressions corresponding to the hardness of the material to form a printing surface in the natural material which will reproduce a replica thereof.

3. A process for reproducing the natural design of a material which consists in chemically treating the surface of the material to form a preliminary etching, rolling the etched surface with an acid resisting material, repeating the chemical etching treatment, and

successively washing, rolling and proving the surface of the material to form a printing surface which will print a replica of the natural material.

4. A process for reproducing the natural design of a material which consists in subjecting the material to a preliminary treatment with an acid to develop the fine details, then rolling and etching and proving by the ordinary methods of etching, then printing from such material.

In witness whereof, I have hereunto set my hand.

OSCAR A. BERIAU.