

(No Model.)

J. BAYNES.

METHOD OF DECORATING METALLIC SURFACES.

No. 378,422.

Patented Feb. 28, 1888.

Fig. 1.

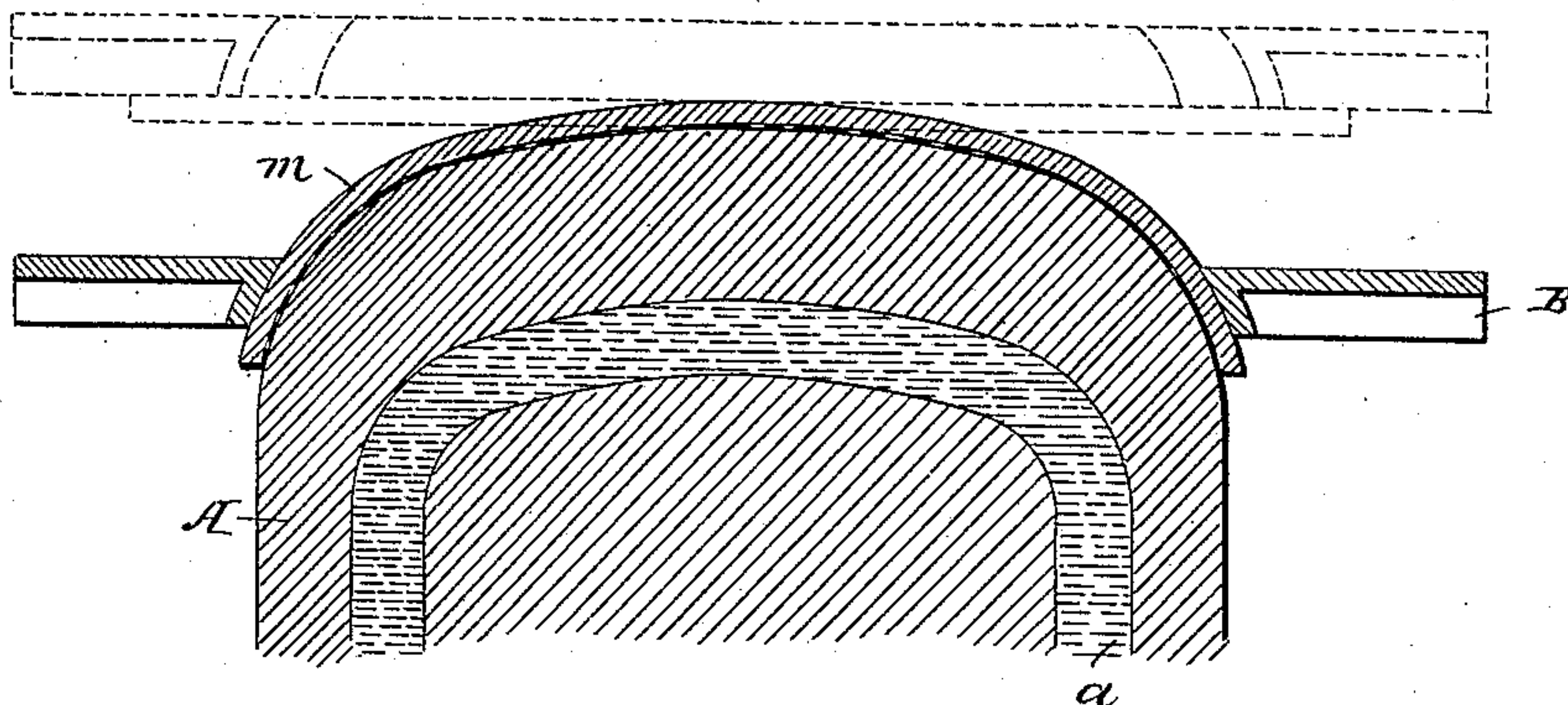


Fig. 2.



Fig. 3.

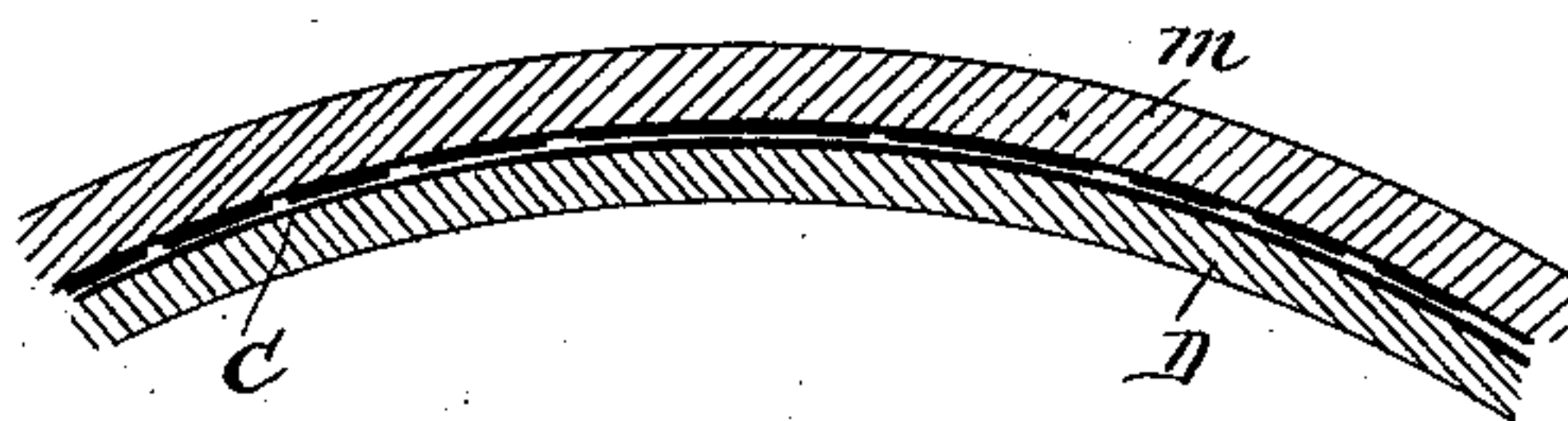
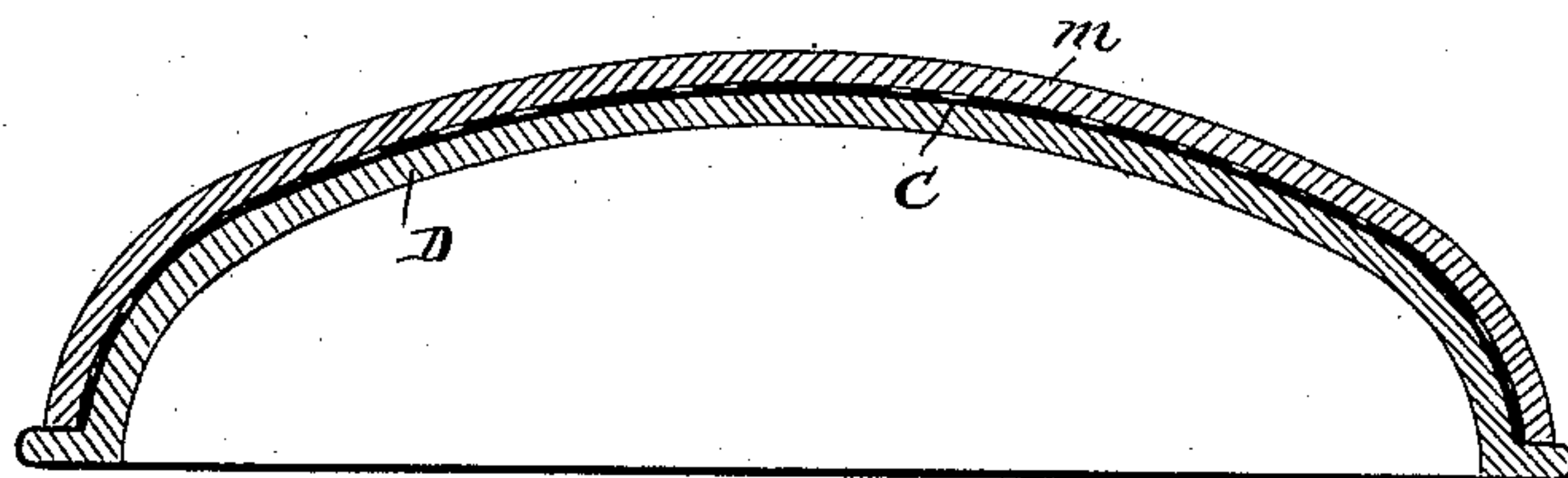


Fig. 4.



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UNITED STATES PATENT OFFICE.

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METHOD OF DECORATING METALLIC SURFACES.

SPECIFICATION forming part of Letters Patent No. 378,422, dated February 28, 1888.

Application filed May 21, 1887. Serial No. 238,993. (No model.)

To all whom it may concern:

Be it known that I, JOHN BAYNES, a subject of the Queen of Great Britain, and a resident of Westchester county, in the State of New York, United States of America, have invented certain new and useful Improvements in Decorating Metallic Surfaces, of which the following is a specification.

My invention relates to the ornamentation or decoration of metallic or other articles, and especially articles of this character which have an irregular or curved contour or form; and it consists in the method and apparatus substantially as hereinafter set forth.

In order that my invention may be clearly understood, I will describe it in connection with the ornamentation of the backs of watch-cases, as I have used it extensively for this purpose, as well as in ornamenting other articles.

The watch-cases are made and shaped by stamping, spinning, or otherwise, so as to be uniform with each other.

I take a suitable plate—as of glass—and after cleaning it carefully coat it with clear gelatine, and when it is dry and hard I detach the gelatine from the glass and coat the plane face, which was previously applied to the glass, with a suitable sensitive ground for a dry-process negative, and then produce the negative pattern of the desired ornamentation by any well-known process of photography. If the outlines of the pattern thus produced are not sharply-defined figures of dense black alternating with clear transparent gelatine, they should be carefully corrected, in the usual manner, so as to produce as nearly an absolute perfect negative as is possible, as the firmness of the work of ornamentation depends to a great extent upon the character of the negative.

The plane negative being thus produced, the next operation is to reduce it to the required form to closely fit the convex or irregular surface of the article to be ornamented. To do this, it is carefully warmed and dampened by exposing it to a column of vapor-laden air rising from the surface of a kettle containing water at a temperature considerably below the boiling-point; or it may be done on a more extensive scale by immersing the gelatine negative in a bath of steam below the pressure of the atmosphere. When it is sufficiently

warmed and dampened, it is applied upon one of the watch-backs, or upon a carefully-burnished shaper of steel or other material corresponding in outline to the watch-back; and in doing this I have found it convenient to make use of a ring having a beveled interior surface corresponding to the watch back or former, and which draws the gelatine smoothly over the whole surface and holds it until cold and dry. Proper care having been taken to center the work and evenly shape the gelatine, a negative is produced with the desired pattern or ornamentation on its concave surface, which has an exact outline of the cases to be ornamented, and which may be used for an indefinite period in treating watch-cases successively. The watch-cases to be ornamented are then warmed and uniformly coated with a suitable sensitive acid-resist, and put away to cool and dry and kept in a dark place until wanted. The known sensitive acid-resists require a long exposure to a strong light, and I have produced a resist that will be affected within a much shorter time than usual, and one composition I have found advantageous to use consists of ninety parts of Syrian asphalt, eighty parts of oil of turpentine, and ten parts of gum-copal.

When the coated cases are to be operated upon, they are taken out one by one and the previously-prepared negative fitted closely thereon and exposed to light the required time—say for two hours, more or less. The negatives are then removed and the cases washed or otherwise treated to remove the parts of the resist unaffected by light-rays, and which were shielded by the negative, leaving the parts that were exposed unaffected. When this is done, the cases are treated to an etching process—as an acid of suitable character—to bite the gold, silver, or other metal of the case, and the parts exposed are eaten away, leaving the parts protected by the acid-resist unaffected. The cases are then washed and treated with naphtha or other solvent, to remove the resist, and the operation is complete.

To aid in illustrating what I consider the best method of carrying out my invention, reference is made to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a central vertical section showing the negative strained upon a shaper or

former specially adapted to give the required concave condition to the negative. Figs. 2 and 3 are sections on a greatly-enlarged scale, and show portions of the negative in the two conditions. Fig. 2 shows it plane. Fig. 3 represents the negative in its dished condition applied upon the sensitive coating on a watch-back. Fig. 4 represents one of the watch-backs with the dished negative mounted thereon.

A is a former, of copper or other suitable material, having a passage in its interior, marked *a*, provided with connections (not shown) through which currents of water at widely-different temperatures may be passed at will. The upper and outer surface of this former A is an exact counterpart of the several watch-backs before they are decorated, and is smoothly finished by burnishing or otherwise.

B is a ring having its beveled interior of a size adapted to match properly upon the former A, with only the thickness of the gelatine negative between.

The negative is marked *m*. It is made in a plane condition, of clear gelatine, with a sharply-defined image on its under face. The parts of the negative which are to be bitten with acid in the several watch-backs are dark and perfectly opaque, and the parts which are to remain unaffected in the watch-backs are left transparent. The dark portions of the negative may be made photographically by what is known as the "dry" process; or they may be made with printing-ink or by dark pigment applied in any suitable manner to produce clear and perfect decorative figures. Figs. 2 and 3 show a magnified portion of this negative, Fig. 2 showing it in the plane condition and Fig. 3 showing it after it has been dished on the former A.

C is a coating of material having a quality adapted to serve as a complete resist in the etching process, and also of a quality which is soluble in oil when it is unaffected by light, but is rendered insoluble or more slowly soluble after it has been affected by light.

After the watch-back D has been exposed a sufficient length of time to the action of light to properly affect the coating, it is washed in oil, which removes the soluble portions, and

thus exposes parts of the metal. The watch-back in its partly-uncovered condition is then placed in a bath of the proper acid, which is agitated by a brush, or otherwise, to remove the bubbles and insure a uniform biting action on the exposed surface.

The passage *a* in the shaper or former A gives, by the aid of supplies of hot and cold water, facilities for controlling the temperature at will. By flowing hot water through for a brief period the temperature of the former is raised, and aids in inducing the required condition in the negative when it is in the act of being changed in form. Flowing cold water through it aids in rapidly cooling and hardening the gelatine after the proper form is attained.

Modifications may be made in the details without departing from the principle or sacrificing the advantages of the invention. I can by a sufficiently long exposure produce the desired effect either in the manufacture of the negative or in the subsequent treatment of the sensitive coating on the watch-backs by different light—as a north light—without exposure to the direct rays of the sun.

The flexible negative may be of various materials other than gelatine. I can use any substance having sufficient strength and transparency or translucency which has the qualities of allowing the form to be dished or otherwise changed materially, as required after the negative is made and has received the desired image or design.

I claim as my invention—

The process described of producing dishing or irregular negatives adapted for use on corresponding irregular surfaces, which consists in making the negative in a plane condition, afterward dampening and dishing or molding it to the required form, and subsequently hardening and retaining it in the irregular condition for future use, all substantially as herein described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN BAYNES.

Witnesses:

P. KEMBLE, Jr.,
BERNARD J. KELLY.